United Nations Commission on Science

and technology for development (CSTD)

Exploring the impact of

Virtual reality on Mental

Health and Well-being

Director: Ximena Pérez Gómez

Moderator: Ana Emilia Molina Carrión

I.   INTRODUCTION

CSTD, also known as Commission on Science and Technology for Development, is a subsidiary body of ECOSOC. It was created on April 30th, 1992, with the purpose of discussing matters in relation to science and technology. It provides a space within the United Nations for exploring solutions to old issues with the help of the continuous evolution of technology. Its origins go back to the UN Conference on Science and Technology for Development held in Vienna in 1979. The CSTD also maps new ways that developing countries contribute to science, technology and innovation (UN trade and development.n.d). CSTD guides the future of the UN, helps develop common policies between delegations, agrees on appropriate actions related to technology and innovation (UN trade and development.n.d). It holds an annual intergovernmental forum for discussion and has strong links with other UN organs such as The Commission on Status of Women, Regional Commissions, ITU (International Telecommunication Union), UNESCO (United Nations Educational Scientific and Cultural Organizations) (UN trade and development, n.d).

CSTD makes draft resolutions for ECOSOC (Economic and Social Council), these draft resolutions are in relation to issues ranging from access to the Internet and information and communication technologies (ICTs) to the use of ICTs in mitigating climate change (Diplo, n.d). The CSTD also addresses themes such as science, technology, and innovation for sustainable cities and communities (Diplo, n.d). The CSTD is constantly involved in the rise of new technologies, this includes artificial intelligence. At its 22nd session, the CSTD pointed out that AI and other frontier technologies offer significant opportunities to accelerate progress in achieving the sustainable development goals (SDGs), while also posing new challenges (Diplo,n.d). The challenges mentioned previously include how new technologies could disrupt labour markets, exacerbate or create new inequalities, and raise ethical questions. CSTD also works to identify strategies that search to ensure inclusiveness and equality (Globalcitieshub, n.d).. It also works to supervise the progress of IGF (Internet Governance Forum) which is in itself a forum for discussing public policy issues related to essential areas of Internet governance.

One of the most pressing issues CSTD is currently dealing with is the Impact of Virtual Reality on Mental Health and Well-being. Virtual reality, also known as VR, is a simulated three-dimensional (3D) environment that lets users explore and interact with a virtual surrounding in a way that approximates reality, as it's perceived through the users' senses (Techtarget,n.d).

Virtual reality can have a severe influence on the physical and mental health of people. Several users of VR have reported symptoms such as headaches, tiredness, eye strain and debilitating neck and shoulder pain all which can be linked with any use of a computer. However the really concerning, new found symptoms include disorientation, dizziness, nausea and increased muscle fatigue (digitalcxo, n.d). Scientists have referred to this kind of symptom as "Cyber sickness." Another concern virtual reality has caused is that VR can create false memories on children less than 12 years old (webmd, n.d).

Nevertheless, VR has also been found by several experts to have a positive effect on its users. For example, VR has been used by a variety of hospitals to ease the pain of patients who have recently undergone surgery, given birth or been through invasive and intensive treatments such as those for cancer (digitalcxo,n.d). VR is seen by medical professionals to have an analgesic effect without the need of drugs or invasive medical substances. VR has also been found to be a way to alleviate anxiety and social isolation. Users with social anxiety can interact with others without leaving the comfort of home, however this once again raises concerns on how VR could minimise to a great extent, physical human interactions. The National Institutes of Health (NIH) recently reported on the application of virtual reality for spatial memory. According to this experiment, VR improves spatial memory and cognitive skills by immersing users in realistic virtual environments (digitalcxo,n.d). While in the VR, the user develops their abilities to learn, navigate and interact. In the same studies, VR technology was found to have a positive effect on motor intervention for children with developmental disabilities (digitalcxo,n.d). Children's motivation to learn was stimulated while in the VR causing their attention to improve significantly (digitalcxo,n.d).

VR is a technology that is yet to be explored. Up to this point, a comprehensive analysis has been conducted to assess both the beneficial and adverse impacts VR technology might have on the physical and mental health of users. Whether the use of VR technology should be limited or incremented is a decision the international committee must take.

II.   HISTORY OF THE PROBLEM

Virtual Reality, or at least some attempt to create it, has existed for a long time, even before the word was coined. Panoramic paintings from many artistic and historical periods attempt to immerse the viewer into the painting to fully experience what it is depicting. There are also various examples of immersive movies created in the early twenties, with a famous example depicting a train heading straight for the camera. The Viewmaster was critical in the creation of the modern VR commercial system; its creation in 1939 was mainly used for "virtual

tourism". The thirties and fifties also introduced the world to various other early forms of VR, such as the first flight simulator and Morton Heiling's Sensorama, which was an arcade-style theater cabinet that fully immersed the user into short films named "sensoramas" using all five senses. The sixties were an important year for the development of VR, with the development of the first VR head-mounted headset by Morton Heiling and the creation of the first motion tracking head-mounted headset (Virtual Reality Society, N.D).

Virtual Reality (VR) has come a long way since its introduction in the 1960s. Today, VR is a multi-billion dollar industry that is rapidly growing and changing the way we interact with technology (Spree, n.d). Ivan Sutherland was the first person to invent a VR system properly. The latter was named "The Sword of Damocles", which used a head-mounted display to project images onto a screen in front of the user. The setup consisted of a stereoscopic display system displaying an output from a computer program that updated itself according to the user's movements (D'source, n.d).

However, it wasn't until the early 1980s that the first commercial virtual reality systems were introduced (Spree, n.d). Early VR lenses were bulky and featured low-resolution screens. Early systems used magnetic, ultrasonic, or optical sensors to track the user's head movements. During this era, VR environments were created using specialized software that could depict 3D graphics and handle user input. The experience was quite basic with low-resolution graphics and simple geometric shapes. The visuals lacked textures and details due to the lack of technological advancement of the time.

VR in the 90s

In the 90s, video game companies released their very own virtual reality headset hardware. The first VR headset was sold by VPL (Virtual Programming Languages). The latter company sold both headsets and gloves. The gloves were called "Data Glove" sensed the user's finger movement and translated it into computer input (linkedinIN, n.d). Other companies that decided to join the VR business include SegaVR, Mega Visor Display, Forte Technology's VFX1 headset and XR Atrlas Nugget. One of the most popular systems was the Virtuality arcade system, which allowed users to play games in a fully immersive virtual world. However, these systems were expensive and required powerful computers to run

(Spree, n.d). By the late 90s affordable VR headsets were released including the I-Glasses by Virtual IO and VFX1 headgear by Forte.

The 90s were also the first time a therapist used virtual reality as a form of treatment. In 1995, psychologist Barbara Rothbaum and computer scientist Larry Hodges combined their talents to conduct the first study to examine the effectiveness of virtual reality therapy in mental health treatment (Career in psychology, n.d). The results portrayed that virtual reality could be used to help patients get over "acrophobia", an extreme fear of heights. In 1996, psychologists Albert Carlin and Hunter Hoffman published a follow-up study conducted at the Human Interface Technology Laboratory at the University of Washington (Career in psychology, n.d). The study showed that virtual reality could also help patients get over a fear of spiders.

A few years later, Hunter Hoffman continued his research by trying out a virtual reality headset on burn patients in an attempt to take away their pain. Hoffman developed a virtual reality world similar to that of a frosty landscape. To test his hypothesis, Hoffman carried out MRIs (magnetic resonance imaging) with and without virtual reality goggles to compare the patients' brain activity (Healthy mind, n.d). The study proved Hoffman right when in addition to the change in brain activity, patients also reported a 25 to 50% reduction in the intensity and unpleasantness of pain (Healthy mind, n.d).

VR in the 2000s

Meanwhile, during the 2000s virtual reality continued to evolve rapidly. In 2007 Google introduced "Street view". "Immersive Media was identified as the contractor that captured the imagery for four of the five cities initially mapped by Street View, using its patented dodecahedral camera array on a moving car (VirtualSpeech, n.d)." In 2010 Google updated its street View by adding a 3D mode. That same year Palmer Luckey, an 18-year-old entrepreneur, created the first prototype of the Oculus Rift headset. It featured a 90-degree field of vision, which had never been seen before, and relied on a computer's processing power to deliver the images (Virtual Speech, n.d).

By 2014 Sony announced that they were working on Project Morpheus, a VR headset for the PlayStation 4 (PS4) (Virtual Speech, n.d). Additionally Samsung released Samsung Gear VR, a headset that uses a Samsung Galaxy smartphone as a viewer. VR became more accessible in regards to the materials and price. Furthermore, companies began adding innovative accessories to VR technology. Additionally in 2014, VR began to be used to treat addictions. The scenario where addiction behavior is very likely to occur is replicated using VR, so that the counselor can observe their behavior and reaction to it (National Library of Medicine, n.d). This information is used to plan appropriate therapy.

In 2015 VR technology started becoming more available to the public. The Wall Street Journal launched a VR roller coaster that followed the ups and downs of the Nasdaq Stock Market (Virtual speech, n.d). The BBC created a 360-degree video where users view a Syrian migrant camp (Virtual speech, n.d). The Washington Post released a VR experience of the Oval Office at the White House Correspondents' Association Dinner (Virtual speech, n.d).

In 2018, Oculus, a VR company presented a new headset prototype, the Half Dome. This is a varifocal headset with a 140 degrees field of vision (Virtual Speech, n.d). Virtual reality had evolved in such a way that it was now being used to not only provide enjoyable gaming experiences but also to treat psychological disorders, teach new skills and help terminally ill people. In 2019 there was a shift from tethered to standalone VR headsets that were much easier to use for the average consumer (Virtualspeech, n.d). By April of the same year, Nintendo had decided to enter the VR market with Labo: VR kit for Nintendo Switch. In 2021, Pico, another VR company, launched the Pico Neo 3 headset, a competitor to the Oculus Quest 2 headset.

Meanwhile, since its first experiments in the 90s, virtual reality for the treatment of mental health and general well-being had continued to be researched on. In 2021, Max Ortiz-Calan, along with a team of researchers began experimenting with VR to treat chronic pain related to a phantom limb. The device consists of recording the activity of the remaining muscles of the amputated limb and then processing them using artificial intelligence (Healthy mind, n.d). This data is then used to animate a virtual limb that can be seen and controlled by the patient (Healthy mind, n.d). After 12 weeks the patients reported an extreme decrease in the pain felt. Some of the patients even reduced the amount of painkillers they were taking a day by 80%.

This VR device also helps with the reduction of anxiety. CTSD hopes that the international community will support VR being used to help mental health and well-being.

III.   CURRENT SITUATION

The mechanism of virtual reality has changed drastically since its introduction in the 60s. One area that has changed profoundly is the display and optics. Nowadays VR technology has lenses that can magnify the and focus the image of screens. VR also uses HMDs (head mounted displays) with high-resolution screens, typically one for each eye, to create a stereoscopic 3D effect.

2024 has seen the release of the Apple Vision Pro, a device created by Apple company. This device was released in the United States of America on February 2nd. This device combines both virtual and augmented reality. The headset can play virtual-reality content and simulate augmented reality using video pass-through to see the real world. It is designed for entertainment, education, communications and productivity applications. The App Store now features more than 2,000 apps designed for Apple Vision Pro. The device also can access over 1.5 million compatible iPhone and iPad apps (Seitz, 2024). With new VR advancements and devices on the rise, experts have felt the need to further understand the impact VR can have on mental health and well-being.

Negative impact of virtual reality

In a 2021 research paper from the UK Department for Business, Energy & Industrial Strategy, the findings show that much existing research into the use of domestic VR systems focuses on cybersickness as an adverse effect of usage (Research community, n.d). "Cybersickness is a form of motion sickness that can generate physiological effects such as a loss of spatial awareness, nausea, dizziness, and disorientation" (Research community, n.d). The study showed that 20 minutes of exposure to virtual reality could begin to impact the ability of children to understand the distance of objects. With the release of the Apple Vision Pro, Apple attempted to minimize this impact by reducing lag and delay and utilizing high-quality displays. Although Apple's headset is the best in its class on preventing motion sickness, some users still report discomfort.

The data on the negative long-term impact of virtual reality is limited, however experts are concerned on the threats virtual reality can bring. Myopia can be one of the

long-term injuries VR can bring. The exposure to any kind of technological screen can cause a loss in vision, this could reach even higher proportions with the emergence of VR devices. Another thing that must be taken into consideration is that users can trip if they are not in a room appropriate to wear VR headsets.

Besides the physical negative impact VR can have, it is also important to highlight the psychological impact. Studies that have been performed on rats, showcase that more than half of the neurons in the brain shut down while in virtual reality (Research communities, n.d). These studies are however not conclusive since they were not performed on humans. Another possibility is that VR's excessive use can cause addiction to it. This addiction can be similar to that caused by video games and it can eventually lead to social isolation. VR users can eventually start preferring virtual interactions over real-world ones, leading to reduced face-to-face socializing.

Studies have also shown that VR can lead to an increase in emotions related to aggressiveness and hostility. Excessive use of VR can lead to users lacking the understanding of the difference between VR and reality. With the virtual reality market expected to nearly double to a value of $22 billion dollars by 2025 it is important for the international community to fully understand the negative impact VR could have (Research communities, n.d).

Positive impact of virtual reality

Although virtual reality can have a negative impact on mental health, it can also have a positive effect, something that has been previously mentioned in this paper. Researchers are seeing potential for it to help with everything from anxiety and depression to rehabilitation after strokes to surgeons strategizing where they will cut and stitch (New York Times Magazine, n.d). In November 2022, the Food and Drug Administration gave authorization for the first V.R. product to be marketed for the treatment of chronic pain. In the case of VR for chronic pain reduction, the environments patients are put in are serene nature settings, such as a grassy field with a brilliant blue sky and a rolling stream nearby (Harvard medical school, 2022). VR uses certain strategies to calm patients and reduce chronic pain. The latter approaches include mindfulness (focusing on the present moment), meditation, guided imagery, or cognitive behavioral therapy (Harvard medical school, n.d). . They're all used to control stress and mood.

Additionally, mental health experts use VR exposure therapy. This kind of therapy has existed since the 90s, nevertheless it has evolved and become more specific over time. Vr exposure therapy consists in gradually exposing a person to what they fear in small, manageable steps with their consent (Medical news today, n.d). This kind of exposure therapy can also help treat PTSD (Post-Traumatic Stress Disorder). Furthermore, VR can be used to reduce anxiety and depression by helping people understand mental health, helping people visualize CBT techniques, teach self-compassion, simulate other therapies (such as gardening or animal-assisted therapy) (Medical news today, n.d). Moreover a person can practice various social and emotional skills using VR therapy.

IV.   UN ACTIONS

The UN has been one of the first to take advantage and show interest in the tool that is the VR, this in order to help achieve the sustainable development goals. Since January 2015, the UN Sustainable Development Goals Action Campaign has coordinated the United Nations Virtual Reality Series to bring the world's most pressing challenges home to decision makers and global citizens around the world, pushing the bounds of empathy (UNVR, n.d). Through the use of high tech headsets, viewers are transported into another time and place as 3D images fill the full range of perspective and tracking technology moves in 360' in lightning speed (UNVR, n.d). The campaign looks to create sensitivity towards development challenges by showcasing human experiences through VR films.

In 2015, the first 4 films were created. The first was a partnership between the UNVR and the WFP (World Food Programme) separated into three different episodes, each one displaying the daily life of the WFP staff in areas of humanitarian conflict such as the Republic of Yemen, north eastern Nigeria, and Iraq. The other three films were Clouds Over Sidra (Jordan), Waves of Grace (Liberia) and Growing a World of Wonder (Senegal). In 2016, 6 VR films were created including My Mother's Wing (Gaza), Born into Exile (Jordan), La canción del Lobo Feroz (Mexico), You are there (Kenya), Life in the time of refugee (Finland, Home (Lebanon) each displaying the actions the UN undertakes in areas of conflict or those that have been affected by natural disasters.

In 2017, another 6 films were incorporated into the campaign those of which are called Beyond Tanganyika (Democratic Republic of Congo), Under the Net (Tanzania), Ground beneath her (Nepal), Sea prayer (Un Refugee Agency), Building brains, building futures (UNICEF), Ready to learn, Ready to live (Afghanistan). In 2017, the program decided to include films showcasing the everyday lives of members of UNICEF, UNHCR and UNDP.

In 2018, about 5 films were made. Their names are the following: Big Picture (Nigeria), Lebanon (UN woman), The Journey (Nigeria), Guardians of the Forest (Brazil), I am Fatmira (Europe and Asia). In 2019 only 1 film was created and it was given the name "My destiny as a kid at risk" and was filmed in Haiti. The latter film is about the neighborhood of Cité Soleil in Port-au-Prince (Haiti), in which the youth is particularly vulnerable to the threat of violence and the lack of opportunities (UNVR, n.d). The story is narrated by Ricardo, who was a kid at risk that participated in a Disarmament, Demobilization and Reintegration program in 2007 (UNVR, n.d).

The films have been screened at the most important diplomatic forums and film festivals around the world. The VR films have even been integrated into some of the UN's most important conferences. The first film was showcased in the Third International Humanitarian Pledging Conference for Syria, Clouds Over Sidra was shown to top donors and decision makers (UNVR, n.d). Commitments originally projected 2.2 billion USD pledged; the conference ended up raising 3.8 billion USD, 1.2 billion USD more than the year before (UNVR, n.d). Waves of Grace was shown in the Secretary-General's International Ebola Recovery Conference and it raised $5.2 billion in pledges (UNVR,n.d).

In conclusion, the UN has looked for ways to get the most out of virtual reality experiences. They are currently using VR to showcase the harsh reality of a belic conflict through VR lenses. They have also helped people truly understand the mission of the UN and its main bodies. Through them they are also showing case studies in order to facilitate how people understand them. The CTSD looks to find solutions in which the international community can also take advantage of the opportunities VR brings.

V.   POSSIBLE SOLUTIONS

In order to find a way to balance the use of virtual reality, it is essential to take into account different solutions and perspectives of the countries involved, as it will help us as an international committee understand how this issue affects society in different ways. The following are solutions that seek to find an equilibrium in the application of virtual reality.

1. **Provide funding for VR-training to ensure its safe implementation into areas of medicine, engineering, physiological treatments among others.**
   a) Prior to implementing the training, create a needs assessment to analyze the areas in which VR would have the deepest impact.

b) For its implementation in medicine, the training will be offered to doctors, nurses and others who are in contact with patients being treated with VR. The training programs will be in collaboration with expert engineers in VR.

c) Additionally, implement VR training into areas of education by providing virtual laboratories for experiments and research in schools with few economic resources.

2. Invest in the further research of VR technologies and the possible negative impact it could have on those who use it constantly.

a) Although many previous studies have shown that after using VR people could immediately get cyber sickness, there is a lack of studies on the possible long term negative impact of using VR.

b) It is important to note that the studies should focus on the impact it could have on small children. Some studies have already revealed that use of VR on small children can distort their perspective of distance and space.

c) Focus the research on possible ways for VR companies to reduce the negative long term effects of excessive use of VR. An example would be how Apple used high quality displays to reduce the lag and delay for their Apple Vision Pro therefore decreasing the negative impact it could have.

d) The research could be funded by an NGO or the international community.

3. Create awareness campaigns

a) The awareness campaigns could be done to enlighten the public on the risks of excessive use of VR and addiction while at the same time keeping in mind the positive impact VR can have.

b) The campaigns could be mostly done through social media. A partnership could be done with medical associations, healthcare organizations, educational institutions, and VR technology companies to amplify the campaign's reach and impact.

c) Success stories on the positive impact of VR should also be shared through this campaigns.

d) The target audience for these campaigns would mostly be healthcare professionals, policymakers, medical institutions and the general public.

e) Additionally a feedback mechanism should be established so the target audience can amplify their opinion. The impact should be assessed through surveys directed towards the target audience.

f) The campaigns could be funded with the help of NGO's or the international community.

4. Create accessibility programs so that VR can reach communities with few economic resources.

a) Taking into account the positive impact VR can have on medical, social and engineering areas it is important that this tool can reach all kinds of communities.

b) A collaboration could be done with VR companies in order to have discounted or donated equipment to educational and medical institutions in rural areas.

c) Integrate VR technologies into telemedical platforms after the training of the medical professionals involved.

d) Use the help of NGO's or the international community to secure VR technologies that are to be sent to communities with few economical resources.

e) Ensure that VR content that includes language is set in multiple languages so all communities can make use of them.

f) After a certain amount of time, collect data from surveys to analyze the impact.

g) Ensure the VR equipment is given proper maintenance to guarantee its conservation.

VI. *COUNTRIES INVOLVED*

1. People's Republic of China

China is quickly emerging as the world leader in VR technology. This is due to rapid adoption by property firms and by companies in other industries (virsabi,n.d). China is the current leader of the mobile internet giving them an advantage in technology. China is at the moment using VR in areas of education, healthcare and real estate. China uses VR in education to provide students with experiences in relation to history, science and engineering. In areas of healthcare, China uses VR for virtual therapy, surgical training and rehabilitation. Additionally, real estate agents are using VR as a tool for potential clients to take virtual tours of properties. Currently China contributes greatly to CSTD by giving extensive datasets to diverse UN programs through its national statistical offices, aiding global Sustainable Development Goal (SDG) modeling and forecasting efforts (UNCAD,n.d). Tracking data is a highly relevant job in the CSTD since it allows for the UN to track the progress of the sustainable development goals.

2. United States of America

VR technologies are currently revolutionizing life in the United States of America. One of the areas that is being highly impacted is healthcare. In the USA, medical procedures are being simulated with VR technologies so medical students can get a closer look into the real experience of a medical procedure. This reduces the risks of errors during an actual medical procedure. Additionally VR is taking a role into the military with training for military students in areas of aviation, military, and hazardous occupations. Pilots can practice complex flight maneuvers, soldiers can train in realistic combat scenarios, and workers in high-risk environments can familiarize themselves with potential hazards without exposing themselves to real danger (Learn transformation, 2023). The United States of America has a position in CSTD until 2026. So far, in its 4 year term in CSTD the United States of America has contributed with alliances towards NASA programs to recollect data and provide capacity building. In 2023, NASA and the U.S. Mission to International Organizations in Vienna (UNVIE), in collaboration with the UN Office for Outer Space Affairs (UNOOSA) organized the Pale Blue Dot: Visualization Challenge to create a visualization using Earth observation data that advances at least one of the following Sustainable Development Goals (UNCTAD, n.d). This is one of the United States' many contributions to CSTD.

3. French Republic

VR in France is extremely present. It is estimated that in France the Augmented Reality and Virtual Reality Market to Grow at a CAGR 23.6% from 2022 to 2027 (Markets and Markets, n.d). In France, the market is growing rapidly due to the use of VR and AR in various consumer, medical, and aerospace & defense applications (Markets and Markets, n.d). France is home to several industrial and commercial manufacturers that offer a variety of products related to VR. Even supermarkets in France are currently using virtual reality headsets to create a virtual shopping experience. For instance, the superstore Système U used gesture cameras, software, and a large video wall at one of its stores to deliver an engaging way of communicating the launch of a few of its key products (Markets and Markets, n.d). France is currently a member of the CSTD and is set to continue in this position until 2026.

4. Dominion of Canada

Many highly relevant VR companies currently reside in Canada including Ubisoft and Electronic Arts. The Canadian government has also contributed to its quick rise in the area of virtual reality with projects such as The Virtual and Augmented Reality Fund, which aims to support entrepreneurship in these fields. Canada has made some of the most notorious contributions to virtual reality in areas of gaming. Studios located in Canada such as Cloudhead Games are developing immersive gaming experiences that captivate players and showcase the potential of VR as a solo gaming platform (Mentorworks, n.d). Additionally VR hardware is becoming more accessible to Canadians with VR headsets such as Oculus Rift, HTC Vive, and PlayStation VR (Mentorworks, n.d). However, Canada has also used virtual reality in areas of medicine. Like other countries, Canada uses this tool for pain management, surgical training, and mental health therapy. Institutions like St. Michael's Hospital in Toronto have adopted VR technology to distract and calm patients during medical procedures, significantly reducing anxiety and discomfort (Mentorworks, n.d). Education institutions across the country are similarly incorporating VR into their curricula to enhance learning experiences, with organizations like Veative Labs developing immersive learning experiences that enhance student engagement and understanding (Mentorworks, n.d). Canada has also made significant contributions to CSTD and is set to be a part of this committee until 2026.

5. Japan

Japan is recognized as a leader in the virtual reality industry. Statistics show that Japan that the virtual reality market in Japan is set to grow 30.6% from 2022 to 2027 (Markets and markets, n.d). Additional statistics show that VR could expand to ¥1.42 trillion (about $9 billion) in 2026 (The Japan Times, n.d). This rapid growth in the industry would be due to the entertainment industry. Japan has a strong base of technologically advanced manufacturing industries that offer multiple opportunities for the growth of companies manufacturing AR and VR devices (Market and markets, n.d). Companies currently offer VR and AR opportunities in the consumer electronics, gaming, and entertainment industries. VR headsets in Japan have gone as far as to block off existing social environments and reroute perception into more malleable virtual platforms (Comparative media studies, n.d). Japan has also made truly significant contributions to CSTD and is set to remain in this committee until 2026.

6. People's democratic Republic of Algeria

7. Belize

8. Republic of Botswana

9. Republic of Cuba

10. Republic of Colombia

11. Republic of Djibouti

12. Republic of Ecuador

13. Arab Republic of Egypt

14. Hungary

15. Republic of India

16. Republic of Latvia

17. Sultanate of Oman

18. Romania

19. Republic of Rwanda

20. Republic of Tajikistan

21. Turkiye

22. United Kingdom of Great Britain and Northern Ireland

23. United Republic of Tanzania

24. Republic of Uzbekistan

VII. BIBLIOGRAPHY

Apple. (2024). Apple Vision Pro. https://www.apple.com/apple-vision-pro/#:~:text=Apple%20Vision%20Pro%20is%20Apple's ,before%20with%20immersive%20Spatial%20Audio.

Barnard, D. (2023). History of VR – Timeline of Events and Tech Development. Virtual Speech. https://virtualspeech.com/blog/history-of-vr

Barreca, A. (2023). Exploring Virtual Reality (VR) Trends in Canada. Mentorworks. https://www.mentorworks.ca/blog/business-strategy/exploring-virtual-reality-vr-trends-in-can ada/

Berman, R. (2024). Depression: Virtual reality may help improve mental health. MedicalNewsToday.

https://www.medicalnewstoday.com/articles/depression-virtual-reality-may-help-improve-me ntal-health#Virtual-reality-may-help-reduce-barriers-to-depression-care

Byrne. (n.d). A fresh look at Virtual Reality: Physical and Mental health benefits. Digital cxo. https://digitalcxo.com/article/a-fresh-look-at-virtual-reality-physical-and-mental-health-benefits/#:~:text=However%2C%20recent%20findings%20have%20shown,leaving%20the%20comfort%20of%20home.

Career in Psychology. (n.d). WHY VIRTUAL REALITY IS SET TO TRANSFORM MENTAL HEALTH TREATMENT. https://careersinpsychology.org/why-virtual-reality-transform-mental-health-treatment/#:~:tex

Digitalcxo. (May 8, 2024). A Fresh Look at Virtual Reality: Physical and Mental Health Benefits. https://digitalcxo.com/article/a-fresh-look-at-virtual-reality-physical-and-mental-health-benefits/

Digwatch. (2024). Internet Governance Forum in 2024: process, issues, and actors. https://dig.watch/processes/igf-process

Diplo. (n.d). Commission on Science and Technology for Development. https://www.diplomacy.edu/actor/commission-science-and-technology-development/

Duman, P. (2022). Driving sustainable development and climate action through virtual reality and interactive 360-degree videos. United Nations System Staff College. https://www.unssc.org/news-and-insights/blog/driving-sustainable-development-and-climate-action-through-virtual-reality

Edwards, B. (2018). The Wacky World of VR in the 80s and 90s. PC. https://www.pcmag.com/news/the-wacky-world-of-vr-in-the-80s-and-90s

Fatai, B. (n.d). What VR looked like in the 90s - The Stone Age of VR. LinkedIn. https://www.linkedin.com/pulse/what-vr-looked-like-90s-stone-age-babatunde-fatai

FEATURE: UN uses virtual reality to inspire humanitarian empathy. (19 May 2016). United Nations. https://news.un.org/en/story/2016/05/529752-feature-un-uses-virtual-reality-inspire-humanitarian-empathy

Globalcitieshub. (n.d). UN Commission on Science & Technology for Development (CSTD). https://globalcitieshub.org/en/un-commission-on-science-technology-for-development-cstd/#:~:text=The%20UN%20Commission%20on%20Science,a%20sustainable%20future%20for%20all.

Godman, H. (2022). Virtual reality for chronic pain relief. Harvard Health Publishing. https://www.health.harvard.edu/pain/virtual-reality-for-chronic-pain-relief

Healthy mind. (2022). History of therapeutic virtual reality in 3 key points. https://healthymind.fr/en/history-of-therapeutic-virtual-reality/

Ismail, A. (n.d). Virtual reality: Introduction. D'source. https://www.dsource.in/course/virtual-reality-introduction/evolution-vr/sword-damocles-head-mounted-display

Learn Transformation. (2023). How is Virtual Reality Impacting the USA Significantly? https://learntransformation.com/virtual-reality-impacting-the-usa/

Low, S. (2024). Action drives VR, but Japan prizes anonymity and plot. The Japan Times. https://www.japantimes.co.jp/life/2024/06/21/digital/virtual-reality-japan-hardware/

Market and Markets. (2023). France Augmented Reality and Virtual Reality Industry to Grow at a CAGR 23.6% from [2022-2027]. https://www.globenewswire.com/en/news-release/2023/05/30/2678060/0/en/France-Augment

Market and Markets. (2023). Japan Augmented Reality and Virtual Reality Industry to Grow at a CAGR 30.6% from [2022-2027]. https://www.globenewswire.com/en/news-release/2023/05/26/2676822/0/en/Japan-Augmented-Reality-and-Virtual-Reality-Industry-to-Grow-at-a-CAGR-30-6-from-2022-2027.html

National Library of Medicine. (n.d). Virtual reality applications in mental health: Challenges and perspectives. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4361984/

Oaks, C. (2022). 10 Countries With Big Metaverse Initiatives. LinkedIn. https://www.linkedin.com/pulse/10-countries-big-metaverse-initiatives-catherine-oaks

Ouyang, H. (2023). Can Virtual Reality Help Ease Chronic Pain? The New York Times Magazine. https://www.nytimes.com/2022/04/26/magazine/virtual-reality-chronic-pain.html

Roquet, P. (2022). The Immersive Enclosure: Virtual Reality in Japan. Comparative Media Studies. https://cmsw.mit.edu/the-immersive-enclosure-virtual-reality-in-japan/

Seitz, P. (2024). Apple Expands Rollout Of Vision Pro Headset. Investor Business Daily. https://www.investors.com/news/technology/apple-stock-vision-pro-headset-launches-in-more-countries/#:~:text=Since%20its%20launch%20on%20Feb,product%20availability%20beginning%20June%2028.

Spilka, D. (2023). Is Virtual Reality Bad for Our Health? Studies Point to Physical and Mental Impacts of VR Usage. Research Communities. https://communities.springernature.com/posts/is-virtual-reality-bad-for-our-health-studies-point-to-physical-and-mental-impacts-of-vr-usage

Spree. (n.d.). The History of Virtual Reality and its Impact on Gen Alpha. https://jointhespree.com/the-history-of-virtual-reality/#:~:text=The%20Origins%20of%20Virtual%20Reality,in%20front%20of%20the%20user.

Statista. (n.d). AR & VR - United States. https://www.statista.com/outlook/amo/ar-vr/united-states

United Nations Sustainable Development Goals. (n.d). The Potential of Virtual Reality for the SDGs: Infrastructure Development through Content and Cultural Policies. https://sdgs.un.org/sites/default/files/2023-05/A9%20-%20Kunitake%20-%20The%20Potential%20of%20Virtual%20Reality%20for%20the%20SDGs%20Infrastructure%20Development.pdf

United Nations Virtual Reality. (n.d). VR Films.https://unvr.sdgactioncampaign.org/vr-films/#.Zng1aj1Bzrc

United Nations Virtual Reality. (n.d). VR + Advocacy & Impact. https://unvr.sdgactioncampaign.org/vr-advocacy-impact/

UN Trade and Development. (n.d). About the CSTD. https://unctad.org/topic/commission-on-science-and-technology-for-development/about#:~:text=The%20CSTD%20was%20created%20to,Agree%20on%20appropriate%20actions

UN Trade and Development. (n.d). Membership of the CSTD. https://unctad.org/topic/commission-on-science-and-technology-for-development/membership

Virtual Reality Society. (n.d). History of virtual reality. https://www.vrs.org.uk/virtual-reality/history.html

XpertVR. (n.d). Top Latest Countries Implementing VR In Their Education System. https://xpertvr.ca/top-latest-countries-implementing-vr-in-their-education

Yasar, K. (n.d). Virtual Reality. TechTarget. https://www.techtarget.com/whatis/definition/virtual-reality