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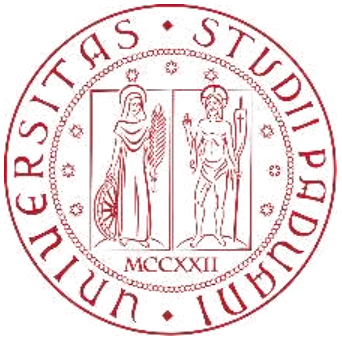

Breaking Barriers: Virtual Reality as a Catalyst for Human Rights Education

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List of Acronyms

AI – Artificial Intelligence

AR – Augmented Reality

HDM – Head Mounted Displays

ICT – Information and Communication Technology

OECD – Organisation for Economic Co-Operation and Development

UNCTAD – United Nations Conference on Trade and Development

UNSSC – United Nations System Staff College

UNWTO – United Nations World Tourism Organization

VLE – Virtual Learning Environment

VR – Virtual Reality

VRNF – Virtual Reality Non-Fiction (Experience)

VT – Virtual Tourism

WHO – World Health Organization

WTCC – World Travel and Tourism Council

Abstract

In an era characterized by rapid technological advancements and a growing emphasis on sustainable development, human rights, and inclusive education, this master's thesis wants to examine the transformative potential of virtual reality (VR) as a multifaceted tool. Through literature review the study wants to underpin theoretically the main features of Virtual Reality as an emerging technology, its role in the tourism industry and in educational environments. Can Virtual Tourism exist? Can Virtual Reality improve current educational curriculums? The research seeks to elucidate how VR can effectively bridge the gaps between touristic applications of VR and educational ones, fostering a synergistic relationship that advances progress, equality and human rights.

Introduction

In an age characterised by constant technological innovation and an ongoing effort toward the construction of an equal global society, the encounter between virtual reality technology and human rights education has emerged as a potentially powerful catalyst for change. Virtual reality (VR) can be defined as a type of technology able to recreate fully immersive contexts and experiences (Bevan et al. 2019), giving the user the illusion of being transported into a completely different environment (Sora-Domenjó, 2022). In the last decade, the field of virtual reality and its related technologies has seen an increase in production investment aimed at the development of ever more efficient devices that simulate 360° settings and environments (Nagta et al., 2022). The availability of relatively cheap VR devices on the market has popularised the consumption of 360° video and image content (Jones, 2017), allowing brand new genres – such as immersive journalism – to emerge.

Originally developed to feed the gaming industry, nowadays immersive technologies are increasingly being used also in other fields, such as the tourism industry, educative and educational fields, marketing and promotion. Moreover, many psychology and sociology studies are focusing on the ability of VR to increase empathy in humankind (Bujic et al, 2020) due to the fact that it allows users to put themselves in other peoples' shoes and live life from another point of view (Sora-Domenjó, 2022). In particular, using VR as an "empathy machine" (Milk, 2015) has been proven effective in enhancing understanding, compassion, and positive change (Sora-Domenjó, 2022).

In this context, the aim of this thesis is to analyse the potential of VR technologies in strengthening and improving human rights education and advocacy. By taking into examination literature from a variety of sciences, such as psychology, education, sociology, law and others, this thesis strives to explore the different facets and application of this emerging technology, focusing on the integration between virtual reality, tourism, education and the promotion and protection of human rights and fundamental freedoms. By investigating the integration of virtual reality and human rights education, the possibilities of virtual tourism in promoting awareness and the ethical challenges and concerns associated with the use of newborn technologies, this thesis aims at examining

the potential of VR in breaking barriers and fostering a global community of informed individuals committed to upholding human rights.

In the first chapter, there is a thorough analysis of the use of virtual reality in the tourism industry. The analysis starts from the definition of tourism and its inherent characteristics with the objective of understanding whether virtual reality can create experiences that simulate real-life trips. The main questions asked are: can Virtual Tourism be considered Tourism? Does an immersive touristic experience create the basis for an accurate representation of the destination to the user? Taking into account the complexity of stimuli necessary to create a sense of 'authenticity' as well as the variety of ways in which humans experience the world, virtual tourism is analysed as a potential substitute of physical tourism in its advantages and disadvantages.

In the second chapter, virtual reality is analysed in educative settings as a potential tool to promote solidarity, sustainability, and cultural heritage preservation. Not only, exploring the use of VR devices and contents in different educational settings it was possible to understand its benefits in terms of inclusion and accessibility, especially for diversly-abled individuals, as well as the efficacy of a diversified approach in teaching and learning.

Finally, in the third chapter, virtual reality is examined as a tool to promote human rights and fundamental freedoms. In particular, considering the different types of non-fiction VR content being produced, such as immersive journalism, serious games and virtual dark tourism, this chapter wants to focus on the ability of VR experiences to evoke feelings of empathy and compassion in the user. These sentiments can and are being used not only by NGOs and international organizations worldwide to educate on human rights, but also as powerful tools to promote global citizenship education and the achievement of the 2030 Sustainable Development Goals. Clearly, all that glitters is not gold and, although in many instances VR has proven to be the right instrument to obtain a specific goal, it comes with its downsides. The main disadvantages, in this sense, are related to user's data and privacy protection, legal implications connected to the accountability of crimes perpetrated in virtual worlds and general limitations tied to the costs, availability and production of both VR devices and contents.

Ultimately, virtual reality can be considered an interesting tool for the obtainment of global equality purposes and an innovative way of integrating human rights advocacy strategies with emerging technologies and communication practices. Its effectiveness specifically in human rights promotion and protection is still to be thoroughly studied as many papers examined in this thesis only focus on punctual aspects related to the use of VR technologies. Nevertheless, by adopting a multidisciplinary approach and involving different sciences and research methods, it is possible to capture the potential of virtual reality to revolutionise the way in which human rights advocacy and communication is made.

CHAPTER 1 – Virtual Reality and Virtual Tourism

> *Wang Miao found the V-suit next to a computer. He struggled into the haptic feedback suit, put on the panoramic viewing helmet, and turned on the computer. After entering the game, Wang found himself in the middle of a desolate plain at dawn. The plain was dun-colored, blurry, its details hard to make out. […] When the dust finally cleared from the sky, Wang saw two giant words erected between the sky and the earth: THREE BODY. Next came a registration screen. Wang created the ID "Hairen," and logged in.*
>
> [CIXIN LIU, THE THREE BODY PROBLEM, 2014, TOR BOOKS]

In The Three Body Problem by Cixin Liu the main character Wan Miao is a scientist who discovers a way to connect to another solar system through a computer-generated Virtual Reality game. Putting on a haptic feedback suit – V-suit[1] – and a panoramic view helmet, he is able to access another planet and get to know its native inhabitants.

Whether it is used to enter a game, access other dimensions or momentarily travel to a faraway destination, Virtual Reality (VR) and Virtual travels have been a recurring theme in science fiction production for many years. It seems like in science fiction novels, films and tv series, the idea of virtual travels has always been present, as well as the speculation that sometime in the future they would be available for all people. In this sense, VR is an effective narrative tool able to explore a wide range of themes, from the implications of advanced technology on society, to the nature of reality itself.

[1] "*The V-suit was a very popular piece of equipment among gamers, made up of a panoramic viewing helmet and a haptic feedback suit. The suit allowed the player to experience the sensations of the game: being struck by a fist, being stabbed by a knife, being burned by flames, and so on. It was also capable of generating feelings of extreme heat and cold, even simulating the sensation of being exposed in a snowstorm*." (Cixin Liu, The Three Body Problem", 2014, Tor Books, p. 67)

The concept of virtual reality is indeed fascinating as it allows reflections on complex philosophical, ethical and societal questions, offering a means to probe the boundaries of human experience and psyche, as well as the frontier between real and virtual.

Although the term 'Virtual Reality' has originally been created by Myrion Kruger in the mid-1970s as way to describe a theoretical approach to the understanding of human-computer interface, throughout the years the theory has begun to shift towards the practice (Williams e Hobson, 1995). Technology, in specific, has played a significant role in improving and multiplying people's possibilities to travel virtually.
To present date the field of virtual reality is still in development, but its popularity has grown a lot since the first VR devices – the Oculus Rift Consumer Version 1 – have been launched on the market in 2016 (Nagta et al., 2022). This is only one of the many devices that, throughout the years, have contributed to blurring the lines between real and virtual and revolutionized the conception of traditional travelling experiences.
Indeed, although a V-suit has still not been developed, thanks to devices such as the Oculus Rift, we are now capable of travelling virtually just like in our favourite science-fiction novels.

As virtual reality continues to evolve, we have a reason to believe that it will impact reasonably not only society as a whole, but also a variety of different sectors and industries, including the tourism industry. But can it actually be considered tourism if it is virtual?

1. What is Tourism?

It can be said that travelling is an activity as old as humankind. Although both the ways of transportation – from horse and carriage to trains and airplanes – and the reasons of travelling changed, one thing remained the same throughout the years: the willingness of humans to move around. Initially travelling was an activity that was stimulated by the need for survival (searching for food, a better refuge, fleeing from droughts or hostile invaders), but, as technology developed, so did transportation systems and soon it became

one of the fastest-growing industries. Indeed, according to the World Travel and Tourism Council[2] (WTCC) in 2022, the Travel & Tourism sector contributed 7.6% to global GDP.

Tourism, as defined by the United Nations World Tourism Organization (UNWTO), is "*a social, cultural and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes. These people are called visitors (which may be either tourists or excursionists; residents or non-residents) and tourism has to do with their activities, some of which involve tourism expenditure*"[3] (UNWTO, 2008). Throughout the years many international organisations, such as the United Nation itself, stimulated the growth of tourism worldwide for its ability to contribute to world peace and understanding (Leiper, 1979). This is an undeniably important industry that involves many sectorial goods and services, such as transportation, accommodation, recreation, food, entertainment activities.

For the purpose of this dissertation, it will be important to define the main characteristics of tourism and tourism related activities, in order to give a definition that is as close as possible to representing the reality of this very segmented industry. Starting from the UNWTO definition, Tourism, as a phenomenon, comprehends a set of components:

(1) A *movement component* ("A trip refers to the travel by a person from the time of departure from his usual residence until he/she returns it thus refers to a round trip. A trip is made up of visits to different places" IRTS 2008, p. 10);
(2) *A purpose component* ("The main purpose of a trip is defined as the purpose in the absence of which the trip would not have taken place" UNWTO);
(3) *An individual component* ("A traveller is someone who moves between different geographic locations, for any purpose and any duration" IRTS 2008, 2.4)

[2] World Travel and Tourism Council (WTTC), Economic Impact Research. Available at: https://wttc.org/research/economic-impact
[3] United Nations World Tourism Organization (UNWTO), Glossary of Tourism Terms. Available at: https://www.unwto.org/glossary-tourism-terms

(4) An *activity component* ("In tourism statistics, the term activities represent the actions and behaviours of people in preparation for and during a trip in their capacity as consumers" IRTS 2008, 1.2[4]);

(5) An *economic component* ("Tourism generates directly and indirectly an increase in economic activity in the places visited (and beyond), mainly due to demand for goods and services that need to be produced and provided" UNWTO)

(6) A social and cultural component ("This includes the willingness to learn, discover, experience and consume the tangible and intangible cultural attractions/products in a tourism destination" UNWTO[5]).

Each of these components defines a different set of characteristics that define tourism as an activity inherently different from everyday activities or experiences. The tourism industry is one that is deeply segmented since the characteristics of the trip rely heavily on the traveller's need, interests, motivations and constraints. Since the destination is central to the decision to take the trip (IRTS, 2008), one individual's touristic experience might be completely different from another's. For this reason, there are many different types of tourism: Adventure tourism, Business or professional tourism, Coastal, maritime and inland water tourism, Cultural tourism, Ecotourism, Education tourism, Gastronomy tourism, Health tourism, Mountain tourism, Rural tourism, Sports tourism, Urban/city tourism, Wellness tourism (UNWTO).

Moreover, tourism, as a very complex economic activity, includes a variety of different economic sectors, which are dedicated to providing some type of good or service especially tailored to meet the tourists' needs. For instance, in an international destination a traveller must use services provided by different economic sectors, such as transportation (planes, trains, buses and coaches, cars), accommodation (hotels, hostels, BnBs, etc.), entertainment (theatres, night clubs, etc.) and many others.

Finally, according to UNWTO, trips associated with different forms of tourism may have different characteristics. These are influenced by (1) the purpose of the trip, (2) the types

[4] UNWTO, International Recommendations for Tourism Statistics 2008. Available at: https://unstats.un.org/unsd/publication/Seriesm/SeriesM_83rev1e.pdf#page=12

[5] UNWTO, Tourism and culture. Available at: https://www.unwto.org/tourism-and-culture

of "tourism product"[6], (3) the duration of a trip or visit, (4) the origin and destination of the traveller, (5) the modes of transportation, and (6) the type of accommodation (IRTS, 2008, p. 24).

2. Virtual Reality: definition and related technologies

A few discrepancies exist in the various definitions of Virtual Reality (VR) that can be found in existing literature, mostly because of disagreements regarding the features needed in order to have a virtual experience.

As defined by Stevenson and Lindberg (2010)[7], virtual reality is a computer-generated simulation of a three-dimensional image or environment – called a '*virtual environment*' (VE) – that can be interacted with in an apparently real or physical sense by a person wearing appropriate electronic equipment such as a helmet with a screen inside and gloves equipped with sensors. Gutierrez et al. (2008) adds two features to this definition: the ability to *navigate*, referring to the ability to explore and move throughout the VE, and the ability to *interact*, which refers to being able to either select and move a virtual object or communicate with virtual elements.

On another note, Cartwright (1994) defines virtual reality as 'a computer-mediated, multisensory experience' that allows us to access dimensions different from our own. A similar definition was also given by Kardong-Edgren et al. (2019) who described VR as a computer-generated 3D environment which can be explored by the user through all five senses.

It is clear that there are several components and features to Virtual Reality. First of all, it must be (1) an environment completely computer-generated, which can be (2) experienced through sensory gear, such as VR glasses, headsets or helmet-mounted displays. The devices, then, allow (3) each user to be immersed into a vivid virtual environment capable of both stimulating interactivity, imagery and vividness, but also of

[6] As defined by UNWTO, a Tourism Product is "a combination of tangible and intangible elements, such as natural, cultural and man-made resources, attractions, facilities, services and activities around a specific center of interest which represents the core of the destination marketing mix and creates an overall visitor experience including emotional aspects for the potential customers. A tourism product is priced and sold through distribution channels and it has a life-cycle". UNWTO, Product Development. Available at: https://www.unwto.org/tourism-development-products

[7] Stevenson, A., and Lindberg C. A. (2010 a,b,c). New Oxford American Dictionary (3 ed.), Oxford University Press.

creating a complete sense of psychological immersion, where the tourist lose sense of real and virtual (Verma et al., 2022). Some of the most important features comprehend the capacity of VR to provide to the user both the feeling of psychological immersion[8] and of psychological presence (Guttentag, 2010).

According to Cruz-Neira et al. (1992), there are three essential and specific components of a Virtual Reality experience that set it apart from other virtual experiences. They are:

1. *Visualization* features including stereoscopic vision (3-D), visual acuity (resolution), linearity of vision, the capacity to glance around, and the capability to observe other VR users taking part in the experience.
2. Being fully immersed in the experience. A viewer-cantered perspective (where images respond to head and body motions), a field of vision, a panorama encircling the user, and a body or physical representation of objects all contribute to *immersion*, which is the degree of suspension of disbelief by the VR participant. From a psychological perspective, this sentiment is used to describe the state of mind where people think that what they are experiencing is believable (Perry Hobson, 1995).
3. *Interactivity* of the experience. Specifically, how much control a participant has over their experience, for instance kinetic effects like sensors, joysticks, and graphic manipulators make it easier for VR users to interact and feel present.

The degree of *'realism'* in the experience is determined by the interaction of these three components and, the more elements there are and the higher their quality, the more realistic the experience will be. This is because these elements are intended to 'fool' the human senses into creating and maintaining an illusion where VR users become so engrossed in the experience, they really feel it is real (William and Hobson, 1995).

For the purpose of this dissertation, other terms correlated to VR research, such as Virtual Worlds or Virtual Environments, will also be used.

[8] "'*Immersion'* refers to the extent to which a user is isolated from the real world. In a '*fully immersive system*' the user is completely encompassed by the VE and has no interaction with the real world, while in a '*semi-immersive*' or '*non-immersive system*' (the latter includes contemporary 3D video games) the user retains some contact with the real world" (Gutierrez et al. 2008).

a. Augmented Reality and the Virtuality Continuum

The idea of being able to experience an environment virtually entails a few different ways in which the virtual environment can be experienced. It could either be through Virtual Reality, reproducing a complete three-dimensional virtual environment, or through Augmented Reality (AR), which incorporates virtual elements – designed and synthetized through computer graphic – to an otherwise real environment. In this sense, Augmented Reality can be defined as an experience based on the projection of artificial computer-generated images into real life scenarios or views (Guttentag, 2010).

In this sense, Milgram and Kishino (1994) proposed a *virtuality continuum* – or mixed reality spectrum – which strives to demonstrate that the virtual and real world coexist in the same space using virtual environment (VE) technologies.
Both virtual and augmented reality provide new tools to inspire interaction between the two worlds: the virtual and the real worlds (Ishii & Ulmer, 1997).

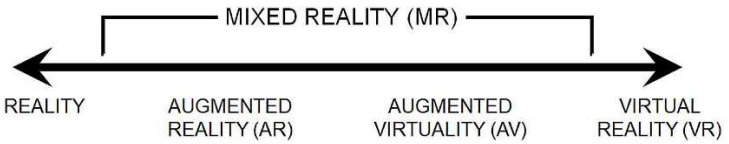

Figure 1 - Reality-Virtuality Continuum (adapted from Milgram and Kishino, 1994).

On the right end of the spectrum, Virtual Reality (VR) is able to create virtual three-dimensional environments through its technology, which allows an individual to interact in such virtual world in a seemingly real or physical way (Jung et al., 2016). On the left end, Augmented Reality (AR), a technology that allows the real world to be superimposed onto a digital setting, has many different types of application in the virtual tourism: text, video, photos, and 3D objects (Azuma et al., 2001). Especially 3D objects can easily be inserted into a virtual reality context, coexisting easily in both virtual and real spaces.
The concept of a virtuality continuum relates to the mixture of both technologies and classes of hybrid display environments. These technological advancements produce many opportunities of development in the tourism and education environments.

b. Modern virtual reality technologies

Every VR system requires several input devices for its correct functioning. Inputs such as mouse, joystick, remote control, and displays are the norm when using interactive 2D technologies, but more elaborate devices might be necessary when the purpose is to create a virtual environment that should be able to give the user a feeling of immersion and presence.

Perhaps the most fundamental device for VR is the head-mounted display (HDM), which is used as a binocular and is mounted on headwear such as headset, glasses, goggles or a helmet (Guttentag, 2010).

In general, VR systems are able to capture the motion of hand-held devices or a user's head or limbs, and the data collected is used to define the user's view, navigation, interaction with objects, and possible movement of a virtual body, known as the *'avatar*.' The devices used to track motion can be interactive gloves, wands – similar to those used with Nintendo Wii's console – as well as body suits with angle measurement devices. The tracking can also involve noncontact devices, such as optical sensors, ultrasonic sound, infrared emitters or electromagnetic fields (Guttentag, 2010).

Although the projection of a head-mounted display could be quite effective in creating a feeling of illusion in the user, still the stimulation of all the five senses is necessary to recreate a complete sense of presence and authenticity. Audio elements are inserted through headphones, which can also be built on the HMD itself, and spatially located speakers. These are particularly important because they allow the user to create a 'spatial mapping' of the surroundings, detecting sounds and locating them depending on where they are emitted from (Guttentag, 2010).

On another note, both tactile sensations and olfactory and taste stimulation have been very hard to reproduce. On one hand, the sense of touch encompasses many tactile sensations (temperature, vibrations, pressure etc.) and involves complex mechanics of the nervous system. So far, researchers have developed only few devices, such as 'haptic devices'[9] – usually gloves – which provide the user with force feedback (Gutierrez et al., 2008). On the other hand, both sense of smell and taste have been considered the least important for VR experiences (Guttentag, 2010). Odors are reproduced using 'olfactory displays' that spray smells or a combination of smells toward the user (Gutierrez et al.,

[9] Similar to the V-suit mentioned in the first paragraph of the chapter.

2008). Research on how to reproduce the sense of taste are even scarcer. It is worth mentioning a "Food Simulator", which reproduced a sensation of taste by spraying drops of liquid into the user's mouth (Guttentag, 2010).

Clearly, different devices and inputs are useful in different situations and depending on the stimulus received a specific purpose will (or not) be achieved.

c. Modern virtual reality market

The history of development of Virtual Reality (VR) dates back several decades, but it was only during the late 20th century that the more advanced technologies appeared. Especially during the past decades VR technology emerged in a more consumer-oriented way, developing more accessible and affordable VR devices and gaining popularity among consumers.

The gaming and entertainment industry has been a significant driver of VR technology and in the last years several giants of the tech industry – such as Microsoft, Google, Apple, Samsung, HTC and others – have been working on developing their own tech gear and VR headset. Since these devices entered the market, many gaming and software companied joined in the research of virtual reality and leaned in into the creation of more and more virtual reality games and experiences (Baciu et al, 2016).

The PC-connected Oculus Rift prototype debuted in 2010 as the first modern VR device made available to the public. Between 2014 and 2017, the market transitioned from PC-tethered headsets (for example, the HTC Vive) to console-tethered headsets (for example, Sony's PSVR) and mobile-tethered headsets (for example, Samsung GearVR and Google Cardboard). Untethered headsets (such as the Oculus Go, Lenovo Mirage Solo, and HTC Vive Focus) debuted in 2018, establishing VR as an autonomous platform[10].

In the last five years only, giants such as Meta (formerly known as Facebook Inc.) made huge investments into the virtual reality newly born industry. In 2021 Meta launched the Metaverse, an alternative virtual world where the physical and the digital come together. According to the Guardian[11], the investments from Meta in its Reality Labs division –

[10] Verdict – Global Data Technology, History of virtual reality: Timeline, 29/01/2020. Available at: https://www.verdict.co.uk/history-virtual-reality-timeline/

[11] Dan Milmo, Enter the metaverse: the digital future Mark Zuckerberg is steering us toward, The Guardian, 28/10/2021. Available at: https://www.theguardian.com/technology/2021/oct/28/facebook-mark-zuckerberg-meta-metaverse

where the company works on VR and AR – reduced operating profit by $10bn (£7.25bn) in 2021.

Subsequently, in the first months of 2023, Apple[12] announced the release of the Apple Vision Pro and developed the first special VR operating system, designed to drastically change the way in which humans interact with tech devices.

3. The encounter between Virtual Reality and Tourism: Virtual Tourism

The tourism industry has been developed essentially around providing people with experiences. The definition of tourism revolves around the idea of a journey with a destination and a point of departure, where tourists return to when the journey is over. Tourism is also a powerful economic activity, contributing highly to the global Gross Domestic Product and giving jobs to millions of people all over the world.

The relationship between technology and the tourism sector has evolved rapidly throughout the years, and the tourism sector has benefited immensely from the development of Information Technology (IT), as well as the Internet-of-Things. Technology has offered new opportunities to the hospitality sector in a variety of ways.

a. Distinguishing Virtual Tourism and Digital Tourism

The digitalization of tourism gave birth to several new concepts, such as digital tourism, e-tourism, smart tourism and virtual tourism. Although virtual and digital tourism might seem like synonyms to the same concept, it is important to give them a definition, in order to better understand the role of different types of technologies in the tourism industry.

As already mentioned, the tourism industry benefited a lot from digitalization and the influence of the Internet. It is defined as **Digital Tourism** or **e-Tourism** the sector of the tourism industry concerned with the delivering of services for tourism administrative departments (Wu, 2020). From airline and hotel reservations to holiday packages, from restaurants and shops forums to travel destination marketing, the Internet has revolutionized the industry of tourism. Neidhardt and Werthner et al. (2018) defined this

[12] Apple Vision Pro. Available at: https://www.apple.com/apple-vision-pro/

field as also encompassing the "analysis, design, implementation and application of IT/e-commerce solutions in the travel and tourism industry, as well as the analysis (of the impact) of the respective technical/economic processes and market structures".

On another note, stemming from the recent technological developments in the tourism industry, Virtual Reality technologies have emerged and opened inedited opportunities in the tourism sector (Verma et al., 2022). The concept of **Virtual Tourism** does not have a unified definition in literature, and it can be considered as a sort of hybrid concept combining the notions of Tourism and Virtual Reality (Ankomah e Larson, 2018). It can be defined as that fraction of the tourism industry concerned with the delivering of services and products through VR and AR technologies, which can include a variety of experiences and technologies. There are many ways and degrees of technological capability that can be involved in a virtual touristic experience, ranging from a 360° video or photo to an interactive virtual environment where the tourist can move freely and explore the surroundings. In essence, these experiences simulate the idea of taking a trip without having to actually travel anywhere. The use of AR/VR technologies guarantees interactivity, imagery and immersion into the virtual environment, which allows the tourist to feel physically involved and emotionally present (Verma et al., 2022).
While there are many common elements to a virtual touristic experience, such as immersive digital environments, an entertaining and engaging content, interactivity and others, the specific definition can vary based on the goals and techniques used by the providers and developers. Additionally, the field of VR and AR technologies is continuously evolving, and new forms and applications of virtual reality in tourism continue to emerge.

b. The impact of Covid-19 Pandemic on the development of Virtual Tourism

Since being reported to the World Health Organization (WHO) by the Chinese government in December 2019, and later declared a pandemic by the WHO in March 2020 (WHO, 2020)[13], in a matter of months the COVID-19 virus has caused an unprecedented global crisis with enormous impacts on our political, social, and economic

[13] World Health Organization (WHO) (2020) Coronavirus disease 2019 (COVID-19): situation report, 57. Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports

systems (Gretzel et al., 2020). Governments all over the world were compelled to introduce safety policies in order to protect the health of their citizens. Measures such as travel bans, community and country lockdowns, individual self or mandatory quarantines were introduced, resulting in many different restraints targeting a wide range of industries and businesses. Inevitably the travel and tourism industry was one of the most affected during the peak moments of the pandemic, seeing especially the airline industry and hospitality sector drastically reduced and, in some cases, halted. The impact of Covid-19 on touristic activities was deeply devastating, especially from an economic point of view. The UNCTAD (United Nations Conference on Trade and Development) report[14], jointly presented with the UN World Tourism Organization (WTO) in June 2021, estimated a loss of $2.4 trillion only in 2020 due to the steep decrease in international travel and tourism and its cascading effect on closely linked sectors, compared with 2019 levels. In April 2022, the World Travel and Tourism Council (WTTC) reported[15] a total of 62 million job losses worldwide in the travel and tourism sector due to the Covid-19 pandemic in 2020 and 2021.

During this period Information Technologies (IT) were vastly used to address some of the most pressing issues of daily life, including work, education, leisure, business, and governance (Gretzel et al., 2020). IT was a highly effective tool to give many economic businesses and industries the opportunity to 'survive' the pandemic crisis by adapting and finding creative non-traditional solutions. Therefore, the tourism industry also had to adapt to the everchanging pandemic situation, and it did so by advancing virtual activities and experiences. Museum, for instance, started creating virtual versions of their exhibitions that could be enjoyed by 'wannabe' tourists in lockdown or quarantine. Airbnb hosts started offering virtual experiences instead of in-person ones and even Google partnered up with many different cultural institutions to create digital exhibitions through its Google Arts and Culture platform[16] (Pascoal et al., 2021).

[14] United Nations Conference on Trade and Development (UNCTAD, Covid-19 and tourism: an update. Assessing the economic consequences, 2021. Available at: https://unctad.org/system/files/official-document/ditcinf2021d3_en_0.pdf

[15] Statista.com, Travel, Tourism & Hospitality, Employment loss in the travel and tourism sector due to the coronavirus (COVID-19) pandemic worldwide in 2020 and 2021, by region. Available at: https://www.statista.com/statistics/1104835/coronavirus-travel-tourism-employment-loss/

[16] Google Arts and Culture was launched in 2011, but saw an increase of users and audience in the Covid-19 confinement period (Pascoal et al., 2021)

During the confinement period virtual tours and trips played a crucial role in supporting the tourism industry and tourism-related activities (Lu et al., 2022) and in promoting an alternative to in person travelling. Also, the virtual alternatives to travel gradually developed to be effective instruments not only to spread awareness of crises, support humanitarian relief and promote solidarity, but also as powerful tools to help rebuild the touristic industry in the post-pandemic phase (Nautiyal et al., 2022).
Indeed, many virtual tours developed in the pandemic era as an alternative to in person travels to give regular people the opportunity to be able to enjoy a travelling experience – however different from the 'traditional' one – while being protected in the safety of their homes. One example of a virtual tourism experience that was born out of the pandemic years was the Conexão Baré, a virtual trip promoted by Braziliando.com[17].
Moreover, through these virtual opportunities, tourists contributed to help sustain and rebuild the tourism industry in the post-pandemic world (Nautiyal et al, 2022).

c. Asynchronous and synchronous experiences

As previously mentioned, one of the main characteristics of VR is the ability to interact within the virtual environment. Whether it is by moving in the space or by communicating with faraway colleagues, virtual tourism experiences might differ in the modes of interaction and communication within a VR environment. Generally, a Virtual Tourism experience can take place synchronously or asynchronously.

A synchronous virtual tourism experience entails real-time interaction between the individuals participating in the virtual trip. In this sense, the 'virtual tourists' share the same virtual environment, and they can see, hear and interact with each other. Virtual events that allow this type of interaction usually take place in the form of a videocall or online meeting, where several participants join to experience and online touristic adventure. For instance, the Conexão Baré, an online experience by Braziliando, promotes an online trip with the indigenous Baré people of the Amazon Forest in order to support and get to know the traditions of the community. This virtual tourism experience takes place in the form of an online videocall, and it was especially developed

[17] Conexão Baré, Braziliando.com. Available at: https://braziliando.com/pt/experiencias/viagem-online/

to give the tourists an opportunity to experience the trip as it would be in person. The video simulates a boat ride through the Amazon Forest and, when it eventually arrives to the indigenous village, the tourists are guided by a member of the community, who explains more about their culture and traditions. Through this setting the participants are able to ask questions and get responses in instant interaction, just as it would happen in a physical trip.

Another possible way of delivering synchronous tourism experiences is through live streaming. Live streaming has been a trending phenomenon especially during the confinement in China. Many platforms (i.e., TikTok, WeChat, etc.) were used in this period to launch live streaming of tourism destinations by travel agencies, cultural institutes and even individuals to keep the 'touristic curiosity' alive (Lu et al., 2022).

An asynchronous Virtual Tourism experience, contrarily, does not encompass a live or real-time interaction between participants. It mostly takes place in a timeless virtual environment, where all interactions and activities are taken by one participant. They are usually solo experiences, where the tourists engage either with pre-recorded content – such as 360° videos or pictures – or in virtual environments where they can explore at their own pace. An example of an asynchronous virtual tourism experience is the Torres Strait Virtual Reality (Loban, 2022), a VR game depicting the Torres Strait Islanders Aboriginal community (located in Far North Queensland, Australia) and their lifestyle. The game has adopted a cultural-centred and player-centred approach, where one individual engages and explores the virtual space with the aim of discovering the environments, the traditions, cultures and practices of this Aboriginal people.

Other ways of using asynchronous VR might involve storytelling techniques that accurately represent historically, culturally and sociologically significant places, artifacts, stories and infrastructures. Virtual tourists can, therefore, experience the whole virtual environment without exploring it, but rather deciding in which direction they want the storytelling to go – similarly to a *gamebook*[18].

[18] Also known as Interactive Fiction, a game book is "an adventure or mystery story, usually presented as a video game or book, in which the player or reader is given choices as to how the storyline is to develop or the mystery is to be solved" Collins Dictionary ©

4. The primary uses of Virtual Reality in the tourism sector

To present date, virtual reality technologies have found application in the tourism industry in a variety of forms. Tourism education, destination marketing, cultural heritage management and gamification are some sectors which have all started utilizing Virtual Reality technologies (Yung, 2017).

The use of technology in tourism has been proven particularly valid in promoting smart destination management and in creating an intelligent tourism ecosystem (Verma et al. 2022). Also, from a marketing and promotion perspective, Hanefors and Larsson (1993) emphasized the value that travel agents place on videos when advertising places to potential customers. In this sense, virtual tours are very effective in offering a realistic simulated and interactive experience of a specific environment, which has a high potential of intriguing the individual at the point of making them plan a physical trip. For instance, if potential travellers want to try out several locations before choosing a vacation, virtual reality (VR) could be the sales tool for the travel agency (Jeffery, 1993). In a study by Mura et al. (2016), one of the subjects expressed desire to visit the Vatican City only after being exposed to a virtual trip to this destination.

Although it has mostly emerged in tourism marketing, VR and AR are both used to enhance already existing experiences by creating immersive tourism experiences in destinations, as well as off-site and once the trip is over (Neuhofer et al., 2014). Indeed, museums and exhibitions all over the world have started to offer experiences, which mix physical exhibitions with a virtual presentations or activities. As an entertaining product itself, VR has been very effectively integrated into various theme parks worldwide, as a way to enhance the experience of the rides. For instance, a whole VR park has been built in Dubai and many rides at Disney – such as the Star Wars & Secrets of the Empire – have also adopted some type of virtual or augmented reality experiences (Lu et al, 2022). Having virtual roller coaster rides is considered a pro as they are re-programmable and potentially more cost-effective than the regular rides (William and Hobson, 1995, p.425).

Aside from the entertainment activities, VR also offers many opportunities as an educational tool. Dvareckienė et al. (2016) found that VR/AR-based systems applied to the education field performed better than traditional ones in terms of enhancing student motivation and satisfaction, particularly for situated, inquiry-based, and self-regulated learning. Generally, it was found that the use of Augmented Reality was especially

effective in improving interaction and motivation of learners, with many of them expressing excitement and describing the VR learning experience as more interactive and interesting (Yung, 2017). VR offers opportunities of learning not only in museums and heritage areas, but also in traditional learning contexts, such as schools and universities. The plus of adopting a mixed approach – VR or AR – is that learners feel more motivated, thanks to the feeling of presence and to the interactivity of the whole learning experience (Guttentag, 2010).

One of the contexts related to tourism in which VR has been mostly used, though, is the field of promotion and preservation of cultural heritage. In this field, VR and AR have been proven specifically useful in reproduction of both tangible and intangible material. In this sense many heritage sites, especially in the field of archaeology, have been involved in virtual reconstructions aimed at showing the visitors how the site use to be in its antique (and original) form. Examples are Rome Reborn – a VR game that allows users to walk in a virtual reconstruction of Ancient Rome, the ARCHEOGUIDE project – an AR project that superimposes a virtual reconstruction of buildings on the archaeological sites of ancient Olympia, or even see athletes competing.

Many experiences promoting the reconstruction of heritage sites revolve around the ability to transport tourists through time and space, creating a completely innovative way of visiting otherwise 'normal' spaces and creating unforgettable memories. The same could be said about VR experiences in the tourism sector as a whole, since both virtual and augmented reality have a potential to enhance tourist's experiences in a specific destination, both prior to the visit, during the visit and after, potentially revolutionizing the tourism industry.

5. Can Virtual Tourism provide a substitute of the tourism experience?

Umberto Eco questioned whether technology would be used to say, "We are giving you the reproduction so that you will want the original?" or "We are giving you the reproduction so that you will no longer feel any need for the original?". Although the use of VR in the tourism industry might represent a positive alternative to in-person

tourism in many ways, one important question regards whether the potential customers – or tourists – would be receptive in accepting such substitute.

a. The prospects of VR tourism substitutes

The developments made in VR technologies allow us to think that we might be near a drastic change in the way we are used to experiencing tourism and trips. However, the probabilities of virtual tourism being able to substitute traditional tourism is still not a reality, mostly because it is unclear how receptive tourists would be towards the VR substitutes.

Some scholars argue that, although VR is an excellent option when it comes to preservation and conservation of heritage material, when it comes to travelling some aspects could never be fully replicated (Guttentag, 2010). The lack of spontaneity, absence of opportunities to relax or to communicate with locals, as well as the lack complexity and improbability of events are some of the most logical limitations to virtual travelling. On the contrary, others would argue that an online trip would represent an easier way of travelling, which also guarantees some personal benefits. For starters, a virtual experience has an incomparably low cost when compared to traditional travelling, and there are also no transportation hassles, no stress for documents or visas, no safety problems (loss luggage, pickpocketing, etc.), no weather concerns nor language barriers (William e Hobson, 1995). It would be an overall guaranteed experience, which can even adhere to a "satisfied or refunded" type policy, in a way that all virtual tourists know exactly what to expect when purchasing an experience and are sure that there will be no inconveniences.

The acceptance of VR substitutes is also tied to the nature of the experience itself. Many touristic sites already incorporate some type of VR or AR activity within their tours, and the virtual reconstructions can be useful especially in cases of vulnerable heritage sites. However, the existence and popularity of such activities does not mean that tourist see them as acceptable substitutes. For instance, it is unlikely that a potential tourist accepts a virtual tour of Florence as an acceptable substitute of visiting the city itself, as the in-person trip entails a complexity of events difficult to reproduce virtually. If anything, VR has a huge potential in increasing the users' desire to visit a certain location after taking part in a VR experience.

In contrast, the digital replica of Lascaux Cave in France, which contains prehistoric paintings dating back 17 000 years, is an example of a digital copy accepted as a satisfactory substitute for the original. Indeed, the original cave has been closed to the public since 1963, when it was discovered that carbon dioxide from tourists' breath contributed to the deterioration of the paintings (Guttentag, 2010). Since there is an impossibility in visiting the original spot, the digital reproduction has been accepted as a tangible substitute by visitors who still want to see the prehistoric paintings.
The acceptance of VR experience as substitute also comes down to its content, as it is much easier to reconstruct or recreate a damaged object or site, such as the Colosseum, rather than recreating a whole activity, such as riding an elephant or swimming with dolphins.

According to Lu et al. (2022) the biggest constraint when it comes to using VR as an alternative to tourism is the lack of awareness around these new tech advancements and opportunities, and the lack of familiarity of the users with the tech gear needed. As VR technology evolves fast, younger generations will probably be more responsive and acceptive of new technologies than their parents (Guttentag, 2010). For this reason, developers should create enjoyable user-friendly products capable of mentally stimulating the users, who will, consequently, develop more affinity to the VR experiences and programs and use them more. The more a content is simple and delivered through a user-friendly platform, the more the potential virtual tourists will be psychologically satisfied (Kim et al. 2020) and will want to replicate the experience.

b. The importance of authenticity

One of the main questions regarding Virtual Tourism is whether the tourism experience results authentic to the individual. Generally, the discussion regarding the perception of authenticity between scholars has been very broad and it encompasses a variety of different key points.

First of all, it is important to make a distinction between the concept of *real* and the concept of *virtual*. This question might feel easy to answer, at first.

The basic understanding entails that a "virtual image" is necessarily synthetized by a computer in order to give the individual the feeling that what they are experiencing is not artificially made but is "real" (Milgram and Kishino, 1994). Whereas a "real image" can be observed directly and potentially experienced through the senses – for instance, in different environments individuals can smell, see, feel (temperature, weather elements) and touch, being able to interact with the "real image".

However, the dichotomy real/virtual can be problematic because labelling virtual experiences as unreal and non-virtual experiences as real can potentially be misleading. Considering that individual perception plays a significant role in defining what is 'real' or not, virtual experiences can be considered 'real' if perceived as such by an individual (P. Mura et al, 2016, p. 148).

It would also be misleading to regard virtual tourist experiences as 'mirrors' of corporeal experiences (P. Mura et al, 2016, p. 148). This is because it is possible that an event is considered very real by the individual experiencing it, although it was experienced through virtual reality. A virtual reality experience is capable of triggering emotions that could potentially have consequences in the user's everyday life. Considering this, a virtual experience can be as real as a 'real' experience.

The idea that a virtual tour is unreal also challenges the traditional dichotomy between home and tourism. Indeed, travelling represents an opportunity for a temporal and temporary escape from the mundane every-day routine life (P. Mura et al, 2016, p. 149). Change has always been part of humans' lives and it is apparent that humans need change, and travel enables people to experience something different. That's the reason why many travellers affirmed that the change of environment was one of the primary reasons why they travel (Perry Hobson, 1995, p.126). In the end, tourism means travel and fun and an escape from the routine.

The main purpose of Virtual Tourism is, too, to allow people to temporarily travel to a whole different scenario and, with that, having the opportunity to learn and experience new environments and context, as well as cultures.

Secondly, the concept of authenticity shall be analysed. Whether it refers to object reproduction, the accuracy of the scene setting, or the actual reproduction of historical or

cultural environments or events, the quest for authenticity is at the centre of the development of virtual touristic experiences.

In a study conducted in 2009, Mura and Lovelock (2009) identified several components that may trigger a perception of authenticity in tourists, such as architecture (visual aspect), food (sense of taste and smell) and music (hearing). Based on this, the study further showed that bodily experiences that involve all the senses are the ones that trigger beliefs of authenticity (P. Mura et al, 2016).

As previously mentioned, technology is developing some gadgets that try to reproduce a multi-sensorial experience by stimulating all five senses and triggering sensorial perceptions. However, these devices - such as the "Nasal Ranger" that uses olfactometers to reproduce olfactory stimuli, and the "Digital Taste Interface" which seeks to reproduce simulated taste sensations - remain limited and exceptionally costly (P. Mura et al, 2016) and, therefore, less accessible to the average tourist.

Besides, in a study conducted in 2016 by Mura et al., virtual tourism was found 'less authentic' than physical tourism due to the impossibility of feeling the experience through all five senses. Indeed, the presence of the body provides a complex sensory experience impossible to reproduce.

Although innovative technological developments in this field constantly emerge striving to create a sense of authenticity in the user, to present date no device, or combination of devices, has been able to completely 'fool' a human. This is also because electronic devices – as efficient as they can be – might always be subjects to errors in programming, bugs and other technical problems. One of the main issues when reproducing a virtual environment, for instance, is the potential 'latency', namely the delay between the user's movement and its reproduction in the virtual point of view. Clearly, the higher the perceived delay the more difficult it is to reproduce a feeling of presence; and it could also induce a feeling of sickness in the user (Guttentag, 2010). Another factor that contributes to reducing the feeling of authenticity is image quality: the lower the quality the more the users will feel like they are watching a video on a monitor.

Finally, it could be argued that, although virtual reality technologies might be able to recreate completely realistic experiences, in terms of perception of realness and

sensorial stimulation, they still may not reproduce a completely authentic environment. This refers both to the accuracy of representation of a specific historical or cultural setting that a user can explore, and to the factuality of information, stories and values they incorporate. This is particularly interesting in the current industry of tourism, which is being deeply influenced by mass travels and the progressive loss of curiosity in genuine environments. Boorstin (1975) noted that the development of mass tourism has led to a progressive loss of the ideas of the early traveller, who wanted to explore, seek out and be involved in authentic environments. This is because, according to him, the masses are more than happy in engaging with staged or unreal events (Boorstin e Will, 1975).
Indeed, generally one would think that a tourist who is willing to go through the distresses and troubles of travelling to a faraway destination would want to get the most of it and experience the destination in the most authentic way possible. However, this is not always the case, since many tourists – mainly modern Western tourists – agree (and are happy) to live constructed experiences, fabricated by the tourism industry to accommodate their desires and expectations (MacCannell, 1999). This is even more problematic when reflecting that the desires and expectations are often socially constructed representations of past events and cultures, many times informed by colonial and postcolonial discourses (Tucker, 2009). One example of this practice is the Padaung tribe living north of Chiang Mai in northern Thailand, where women and girls are famous for wearing several brass rings coiled around their necks, giving them their famous giraffe-like appearance. The Seattle Times reporter Amit Paley, in a trip to the village, reported that the Padaung women are forced to live in this artificial town. They cannot leave, they are generally not paid, and are forced to show off their traditional neck rings for the benefits of tourists who pay to see and photograph them. When asked why they wear rings around their neck, one woman answered, "We do it to put on a show for the foreigners and tourists!"[19].

It appears that the new profile of the traveller-consumer is more than content with their 'fast-food' touristic activities and simulated environments. Cohen (1988) suggests that tourists will participate playfully in a game of 'as if' pretending that a staged product is authentic, even if deep down they are not fully convinced of its authenticity.

[19] Amit R. Paley, Tradition vs. exploitation in Thailand, The Seattle Times, 25/10/2009. Available at: https://www.seattletimes.com/life/travel/tradition-vs-exploitation-in-thailand/

In this context, a virtual experience, with all its limitations, could represent a more authentic way of representing certain environments and heritages which are being threatened by this consumeristic and superficial way of experiencing tourism.

c. Travelers' motivations and constraints

As already mentioned, tourism is a complex industry involving the movement of individuals for various reasons. An individual choice of travel is always influenced by personal motivations and desires, which can encompass a variety of activities, destinations and experiences. Additionally, the characteristics of tourism vary depending on the destination and can change over time or by following trends.

In the same way, the characteristics of virtual tourism are also influenced by the motivations and constraints of the individuals.

The motivations for travelling include both push factors (wanting to escape the routing, wanting to visit a place, desire to meet new people, to do specific activities – concerts, hikes, etc.) and pull factors (characteristics of the location, availability of desired experiences, etc.). VR experiences are also subjected to personal pull and push factors, that influence the choice-making of the virtual tourist. In this sense though, a virtual experience is able to satisfy one's desires only to a certain degree. A virtual reality experience gives the virtual tourist the opportunity to interact with strangers from all over the world even if the interaction is limited by the available technologies. For instance, an individual buying an Airbnb Virtual experience to learn how to make fresh hand-made pasta from an Italian granny will be able to interact with the person offering the experience, but they won't be able to taste the dish at the end of the activity.

Depending on what the tourists are seeking from the experience they will be more or less willing to accept a virtual substitute. An individual travelling for business, for example, will probably be more likely to accept the VR option; while an individual who is seeking adventure and risk would probably reject the VR substitute as the artificially designed environment is too controlled and would not represent a good enough alternative (Guttentag, 2010). In the same way, a person wanting to relax by the pool will probably feel unsatisfied with a virtual option, because it is not able to reproduce the desired sensations.

Motivations, however, are not the only factors that influence the destination and type of trip taken; constraints represent the other half of the coin. There are many constraints for travelling, common examples are lack of funds or time, safety fears, language barriers, unavailability of a desired experience or attraction, seasonal changes or weather-related issues, and others (Guttentag, 2010). Just like they influence the choice of destination they also influence the acceptance of a virtual alternative. For instance, when delivering a VR stadium experience, one shall consider that the VR option might not represent a satisfactory experience for a fan who wishes to live the experience of the stadium. Conversely, it could be satisfactory for another fan who feels unsafe in the stadium environment and sees it as a constraint.

It seems clear that the motivations and constraints behind the individual choice can be mutually excluding for virtual and in-person tourism. What represents a motivation to travel to a specific destination can represent a constraint for the virtual alternative, and vice-versa. Additionally, the choices of accepting a virtual experience instead of an in-person experience is always subject to personal feelings: excitement and curiosity as much as doubts and fears.

6. Advantages of Virtual Tourism

Many individuals might still feel sceptical when it comes to buying a virtual experience, but this emerging sector of tourism also offers several advantages.

First of all, virtual trips represent an opportunity for *inclusion and accessibility*. Not only they represent cheaper alternatives to in-person tourism, allowing individuals who do not have the financial conditions to pay a full trip to still enjoy a museum exhibition or a virtual exploration of a faraway destination. Most of all, virtual tourism represents an opportunity for all people who may have physical limitations. Considering that people with disability face a variety of barriers to travels but might still be looking for alternatives to genuine travel experiences, VR represents a valid alternative to enjoying an environment they wouldn't be able to access otherwise.

Secondly, virtual reality supports *environmental sustainability* and conservation. This is true not only because virtual trips reduce the carbon footprint by reducing greenhouse gas emissions derived from plane rides and, therefore, promote sustainable tourism (Lu et al. 2022). Also, they contribute to environmental preservation, alleviating the negative

effects of mass tourism, protecting the flora and fauna of destinations, and contributing to preserving the local cultures and their habitat.

Thirdly, the range of *different experiences* one can develop through virtual reality is only limited by the developer's imagination: virtual reality could mean being able to enter into different dimensions and world, offering excursions that travel in time or in fantasy worlds (i.e. visiting Harry Potter's Hogwarts or Buckingham Palace during the reign of Henry the VIII) (Cheong, 1995). This means that there is a potential for access to remote, inaccessible or destroyed destinations.

Fourthly, VR represents a *convenient alternative* to in-person travelling. From the hassle and stress of unforeseen events to the extensive planning, packing and logistics, VR is the technology able to eliminate all that. By creating ready-made experiences, VR guarantees a 'perfect' holiday and experience.

Finally, it guarantees a safe option in times of *health crises*. As experienced during the Covid-19 where VR saw a steep increase in development, VR trips cam result useful in times of health emergencies to explore places while still adhering to social distancing and not risking being exposed to the disease.

While understanding that these are only some of the numerous advantages of VR applications in tourism, especially considering that an individual might have personal advantages or motivations in joining such experience, it is important to clarify that there are also many disadvantages.

7. Disadvantages of Virtual Tourism

Although the benefits of using virtual tourism are many and variegate, the case against virtual holidays might be as strong as the case in favour. Considering the continuous technological advancements, there is a need to produce also rules and legislations able to guarantee cybersecurity and keep the pace with the constant evolutions of this emerging field.

One of the main issues that might arise in the future related to Virtual Travels is the one concerning *privacy and the use of tourists' data*. Indeed, in order to create a sustainable tourist ecosystem, even in the world of virtual technologies, it is fundamental to take into consideration privacy, security and ethical use of data (Tussyadiah, 2020). The analysis of data is fundamental to understand tourism and its process, not only for past trends but

especially for the future. On one hand, data allows to assess the long- and short-term impacts of tourism, on climate, biodiversity and communities, but it is also capable of detecting opportunities for growth and development (Verma et al. 2022). This is why the need for transparency in managing users' data has been increasing in the last years, especially due to the rising consumer awareness and company regulations on governance and ethics.

Another problem related to the constant advancements of technology regards the possible fusion between Artificial Intelligence technologies, machine learning and VR which can lead to the misuse of a real individual's physical appearance. Through recent advancements in *deep fake technologies*, it is possible to reproduce highly convincing videos or media content where one person appears to do or say something that they never did (Khan et al. 2023). This represents a potential risk not only for the reproduction of individual's images after their passing, which would represent an unauthorized use of a dead person's image or identity theft (depending on the case). But it also raises many concerns for the potential *misinformation* risks of the content represented. Considering that many VR experiences are used in educational or cultural heritage preservation contexts and that humans are more likely to believe to something they see with their own eyes, the risk of inaccurate representation and disinformation of content could potentially have long-term effects on the users.

Connected to this come issues of *intellectual property*. Indeed, if a private company develops a VR experience with a full-scale reproduction of a historical site – such as the Eiffel Tower – and potentially profit from the experience, they are profiting off of something that is considered to be public and freely enjoyable (Guttentag, 2010). In many cases, cities, historical monuments or natural landscapes are not protected by intellectual property law, demonstrating the potential issues that may arise with the spreading of these technologies. Considering that intellectual property law are already quite complex in the real world, they might prove even more complicated in the virtual one, where the copied monuments might be made from unauthorized (private) developers and may cause piracy issues.

On another side, VR technology might have potential negative effects on the destination's tourism economy. The absence of physical bodies in any given destination would be *unsustainable from an economic perspective* (P. Mura et al, 2016, p. 149), as

virtual tourists would not be able to spend any money on local businesses (restaurants, bars, museums, giftshops, etc.). This ultimately would be detrimental to those communities that rely on tourists' money for their survival. Indeed, many countries rely heavily on revenue generated by income tourism and develop especially around the tourism business building facilities such as hotels, restaurants, and resorts and delivering services such as guided tours and visits, which contribute to generating job and creating wealth for the locals. Of course, it is in their best interest to encourage tourists to physically and not virtually visit their country. Therefore, on one hand it might be efficient to promote the VR tours of threatened touristic sites or sites that suffer from excessive touristic pressure, on the other hand the revenue of the VR experience would go directly to the developers leaving local communities to face the scarcity of clients (Guttentag, 2010).

There also might be some *health risks and social implications* associated with excessive use of VR technologies. From motion sickness to potential long term psychological implications, the use of VR technologies could also be responsible for health risks of the users in the long term.

8. Ultimately, can Virtual Tourism be considered Tourism?

The possible applications of VR in the tourism sector and the prospects of VR tourism substitutes questions whether these experiences can and will be considered as a new form of 'tourism' (Guttentag, 2010). However, the diversity of activities and experiences that one can have while travelling make it impossible to give a rigid definition of tourism and of its inherent characteristics. Some experiences might be specifically designed to target tourists, while other could be more spontaneous and reflect the culture and everyday life of the locals.

The main question is: should virtual tourism be considered part of the tourism industry or not? When you can experience traveling over the Himalayas from the comfort of your living room, is it entertainment or travel? (Perry Hobson, 1995)

Is it tourism or heritage preservation when you can visit Virtual Stonehenge[20] and explore the environment moving forward and backward in time? (Sussmann e Vanhegan, 2000).

[20] English Heritage, Stonehenge Virtual Tours: inside the stones. Available at: https://www.english-heritage.org.uk/visit/places/stonehenge/history-and-stories/stonehenge360/

Is it tourism or education when you can play an interactive game – Fantastic Voyage[21] – that allows you to shrink down to cellular scale and travel throughout the human vascular system to see how the immune system and body work together?
It is clear that adopting a multidisciplinary approach, involving research fields such as ICTs, engineering and psychology, could lead to valuable insights in future research. For now, VR and AR have enormous potential in different tourism's sub-sectors, such as education, marketing, cultural legacy, or environmental sustainability, although there is still a lot of hesitance from both consumers and business to accept virtual substitutes to corporal experiences (Yung, 2017).

The existing literature leans towards the refusal of Virtual Tourism as a form of Tourism, mostly because it lacks some key components. Mura et al. (2016), for instance, supports the idea that virtual tourism cannot replace corporal travel as the physical presence of the body is thought to be fundamental to experience authenticity. Indeed, movement of the physical body defines the activity of tourism itself. Depending on where bodies travel to and where they come back to, the form of tourism changes. "Travel within a country by residents is called domestic travel. Travel to a country by non-residents is called inbound travel, whereas travel outside a country by residents is called outbound travel" (IRTS 2009, p. 9).
Also, Musil and Pigel (1994, p. 6) affirm that virtual tourism is unable 'to replace the feeling of being in nature and seeing, hearing, feeling, and breathing an environment that is real', making it impossible to substitute in-person tourism.
Another important factor that was pointed out was that the physical experience allows the tourist to obtain tangible signs (photos, gifts, souvenirs, etc.) which are important in the post-tourism moment. In a study by Lu et al. (2022), Karen, 21, from Taiwan, stated that "*When I review my photos, I can remember the time and feel I am there a second time throughout my memory. I like the feeling; it brings me back to the travel situation*".
The tourism experience, in this sense, is not strictly confined in gazing upon the toured environments or objects, but includes activities that not only are consumed with all the senses but also trigger emotions, both before (i.e. excitement before departure, ritual of preparing the baggage) during and after (i.e. gifting souvenirs, showing photos) the trip.

[21] Available at: https://appadvice.com/app/fantastic-voyage-vr/1200771398

This makes virtual tourism still impossible to compare it to the non-virtual in terms of complexity of the experience. Indeed, even though the immersion effect may trick the mind, virtual reality may not accurately and totally duplicate real-world events and sensations (Cheong, 1995, p.421). On this topic, according to McClure (1994), the actual world has "a high level of complexity, randomness, and uncertainty," and virtual reality systems might not be able to handle or analyse the enormous quantity of data necessary to render a genuine virtual experience quickly enough.

Also, since travelling is not only about physical presence in a different environment, but it entails a social and cultural immersion, people who are eager to visit faraway destinations to interact with and learn about local culture and heritage could not be satisfied with the mere sensory stimuli provided by VR. Interaction in virtual tourism is not a spontaneous activity (Cheong, 1995, p.421). In many cases, especially if the experience is being consumed asynchronously, the virtual traveller will be unable to interact with others and will instead play the role of a passive spectator taking in sensory information (Cheong, 1995, p.421).

Finally, in a study by Lu et al. (2022) exploring the willingness of Chinese individuals to use Virtual Tourism as an alternative during the Covid-19 confinement period, the 1288 individuals participating expressed diversified attitudes with relation to virtual tourism. Both positive and negative attitudes are summarized in the following scheme (Table 1).

Positive Attitudes		Negative Attitudes	
(i)	Virtual tourism is an interesting and innovative experience and possesses a sense of technology;	(i)	Virtual tourism is lacking a sense of reality and immersion;
(ii)	Virtual tourism is an entertainment activity to make people relax and relieve stress;	(ii)	The related technology is not mature enough;
(iii)	Virtual tourism can be a good alternative to the actual trip, especially during the pandemic;	(iii)	Visitors cannot have a real on-site traveling experience when using virtual tourism, such as food, shopping, and entertainment;
(iv)	Virtual tourism can save time and money;	(iv)	Virtual tourism does not have the social function and interpersonal interactions as actual trip;
(v)	Virtual technology enables people to experience the destination without directly being in the destination in-person;	(v)	Certain people might be vertigo and dizzy when using virtual tourism;
(vi)	Virtual tourism is more comfortable than the on-site visit because some tourism destinations are very crowded		

	and have a long-line of service and waiting;	(vi)	The internet speed can limit the development of the virtual tourism and influence the user experience;
(vii)	Virtual tourism enables people to visit scenic sites that are closed or visit some places that they cannot go due to various constraints (inclusivity);	(vii)	The general public is not aware of virtual tourism
(viii)	Virtual tourism can help visitors to know more about the destinations and plan their trips;		
(ix)	Virtual tourism can be used as a promotion and advertisement means to attract more visitors for on-site visits;		
(x)	Virtual tourism can enhance **heritage preservation**;		
(xi)	Virtual tourism can enhance **environmental conservation**.		

Table 1 - Positive and negative aspects of Virtual Tourism (Lu et al., 2022)

Although most of them expressed positive feedback on virtual tourism experiences and reinforced a positive attitude towards the technological developments related to this field, none of them perceived it like an authentic touristic experience. Nevertheless, the participants expressed excitement over the opportunities that VR offers and found that it would find a better application in the fields of cultural and heritage valorisation and in educational activities (Lu et al. 2022).

Ultimately, a new approach involving both virtual and non-virtual experiences in tourism should be considered, as it would lead to more sustainable travel practices. The combination of both elements might also enhance the perceived authenticity of the overall experience by tourists. For instance, there might be a good window of growth for VR and AR technologies in sport tourism and event-based tourism (Verma et al. 2022).

To present day whether or not Virtual Tourism can be considered a form of tourism is still a matter of debate. Although the existing literature tends to lean towards the idea that it does not fit into the classic tourism definition, the mere fact that this phenomenon has been labelled as Virtual *Tourism* indicates that a natural identification is already happening. In conclusion, although it might not fit the traditional definition of tourism, virtual tourism can still offer valuable and real experiences. Its ability to create an immersive, engaging and highly entertaining environment has been proven to be especially effective in education and training activities, as well as in heritage preservation.

CHAPTER 2 – Virtual Reality as a tool for Education

"*The Copper Key awaits explorers*
In a tomb filled with horrors
But you have much to learn
If you hope to earn
A place among the high scorers"
[ERNEST CLINE, READY PLAYER ONE, 2011,
CROWN PUBLISHERS]

From gaming to tourism, from entertainment to marketing, VR technology has come a long way since its inception and is now finding applications in an ever-expanding array of fields. The immersive and interactive nature of VR has made it a versatile tool, transforming the way we engage with digital content and real-world experiences.
Although the development of virtual tourism as a substitute for actual tourist activities is unlikely, virtual trips and VR activities are increasingly being used in education and training and they are developing to be promising educational support tools. Thanks to its specific characteristics, a Virtual Reality simulation can replicate real-world scenarios for a wide range of training purposes. Medical professionals can practice surgical procedures, pilots can hone their flying skills, and various industries can train their personnel without exposing them to real-world risks. This technology has offered a newly found way of having hands-on experiences that enhance understanding and retention. Moreover, VR simulations and training scenarios have found their way into various industries, including aviation, military, and emergency response. In science and research – astronomy, biology and physics, for instance – VR is already being used to visualize complex data and simulate environments. In this way, researchers can explore virtual worlds, conduct experiments, and gain insights that may not be possible in the physical world. It seems clear that this technology is destined to emerge more and more, potentially influencing many activities, industries and environments.

As technologies – and VR with them – enter every area of contemporary life, one important question to be asked is whether all individuals will be able to benefit equally from the use of this technology and if it will ultimately promote the present and

future wellbeing of humans. In this sense, VR could be a powerful tool to raise awareness about human rights issues. VR technologies can be used to support inclusive practices and to embrace diversity (Mphahlele e Korkmaz, 2023), by creating inclusive learning environments and providing accessible learning. But it also has a potential for strengthening human rights education and advancing global awareness on human rights related issues and solidarity actions.

It is safe to assume, however, that this emerging technology might also be connected to substantial limitations and problems. This chapter aims at exploring the role of Virtual Reality technology as an educative tool and in the realisation of inclusive education, as well as considering the effectiveness of adopting a VR-based educative approach.

1. Virtual Tourism as an Educative Tool

The technological transformations brought by in the last decades contributed to revolutionizing many industries, sectors, business activities and life in general. Tourism, as mentioned in Chapter 1, has encountered tremendous innovation thanks to information and communication technologies. Every part of a trip, starting from buying a plane or train ticket to applying for visa, including finding accommodation, restaurants and general information about a destination, can be managed digitally. Technology has ultimately resulted in higher efficiency of the delivering of tourism products, by increasing its accessibility, understanding and attractiveness to tourists themselves (Chiao et al., 2018). Virtual reality and its application it the tourism industry reflect only a small percentage of the transformations brough by recent technological developments.

The concept of Tourism encompasses a variety of different experiences, applications, characteristics, in a way that makes it impossible to give it a unified definition. Although existing literature (Mura et al., 2016; Musil and Pigel, 1994) tends towards a refusal of virtual reality experience as full touristic experience or as a substitute, due to it lacking some key components (i.e., presence of the physical in the destination, lack of interaction, etc.), virtual reality travels might still be able to spark innovation in other fields. Indeed, the ability of virtual trips to create an immersive, engaging, and highly enjoyable environment has been demonstrated to be particularly useful in education and training activities, as well as in cultural preservation (Chiao et al., 2018).

Recently, VR has been pushed forward as an emergent and effective pedagogical approach in education and training environments. In particular, VR experience that include elements of immersion, interactivity, spatiality and real time are essential in making a technology-based virtual learning environment (VLE) more accurate and, therefore, realistic (Chiao et al., 2018). Educators who propose integrated learning or multidisciplinary approaches, including VR fieldtrips, films or interactive games to their curriculum, have concluded that interactive virtual tourism has a series of advantages (Ibañez-Etxeberria et al., 2020).

The efficiency of virtual reality (VR) approaches in education is influenced by both the innovative nature of VR as a teaching tool and the quality of its content. On one hand, the applicability of this technology in educational context is potentially very wide as it allows for the creation of virtual environments that can serve all purposes, from cultural heritage preservation and promotion to creating awareness on climate change, from visiting faraway destinations to entering a dystopic world. On the other hand, the nature and inherent characteristics of VR allow it to be an innovative teaching tool that can open many doors to educational inclusivity and new teaching techniques.

According to Ibañez-Etxeberria et al. (2020) the implementation of VR technologies in cultural learning environments has highlighted certain positive aspects of the experience, which are summarised in the following table (table 1).

Positive aspects of VR in cultural learning environments:
(a) the elimination of barriers of space and time,
(b) facilitation in the exchange of experiences among users,
(c) cooperation and collaboration among agents,
(d) the opening of new paths for transmission and communication,
(e) an increase in motivation,
(f) the development of attitudes of awareness and respect towards the role of heritage,
(g) the appearance of new ways of approaching heritage and educational experiences,
(h) the inclusion provided by new technologies in promoting the understanding of cultural assets and the global accessibility to heritage environments,
(i) generically new forms of interaction.

Table 2 - Positive aspects of VR in cultural learning environments (adapted from Ibañez-Etxeberria et al. 2020)

In this sense, Virtual Tourism represent a valid tool that can greatly enhance the educational experience by making learning more engaging, accessible and relevant to the modern world.

A virtual trip clearly does not represent a substitute for a traditional fieldtrip but can still prove useful to enhance traditional teaching and education. First of all, by allowing students to access global locations without leaving the classroom it represents a cost-effective, time efficient and safe solution. This is because a virtual trip does not require physical movement, which means that it cuts almost entirely the costs associated with transportation, tickets, and accommodation, as well as providing a safe alternative for students to explore various locations in situations where physical travel may be unsafe or impractical. Also, it can be carried out in a fraction of the time needed compared to physical trips, allowing educators to maximise the use of classroom hours and cover more content. Secondly, it represents a greener alternative to in-person field trips, as it cuts down on the environmental impact connected with physical travel, aligning with the principles of sustainable education. Thirdly, virtual trips allow users to immerse themselves in an interactive virtual environment carefully designed to pursue an educational purpose. The purpose may be to provide students with highly immersive experiences, making education more engaging and memorable, or to create multi-disciplinary lessons that encompass elements of history, geography, science to help the students understand the connections between the subjects. Finally, a virtual trip is an inclusive form of education that not only accommodates students with physical or mental disabilities, but also can be tailored to suit specific learning objectives or individual needs both on the part of the student and on the part of the educator.

When it comes to the current use of Virtual Tourism as an educative tool, the literature focuses mainly on its use to educate people and create awareness regarding sensible issues, such as climate change or human rights violations, as well as its role to foster global solidarity and interconnectedness, and to promote culture and heritage preservation practices.

In the field of tourism and education, VR is constantly evolving in the way it is used and developed. The main question however is how VR technology can maximise education in a way in which the learning content is respectfully and correctly represented, and the educational process is enhanced. Can virtual tourism and education coexist in an effective way? When VR is used to create engaging, interactive, and educationally relevant experiences, it has the potential to be more efficient than traditional methods. However, it's essential to recognize that the success of VR in education also depends on effective pedagogy, proper integration into the curriculum, and ongoing assessment of its impact on learning outcomes.

In both education and VR technology fields there are still many steps to take, and this thesis hopes to define the characteristics, identify the variables, understand the quality of the current educational proposals and the main advantages of using VR technology to promote educational improvement, increased sensibility and potentially foster human rights in educational contexts.

a. Promoting sustainable tourism

With regard to heritage preservation, particularly tangible heritage and protected environments, the opportunity given by VR tours is that of leading to a more **sustainable form of tourism** (P. Mura et al, 2016).

From a purely tourism perspective, VR tours could also alleviate the negative effects of mass tourism on the host county and natural environment (Cheong, 1995). Indeed, independently of any precautions taken by host countries, any touristic activity is bound to have a profound effect on the destinations' society and natural environment as a whole. Some of the most common adverse effects are the deterioration or destruction of the natural environment, as well as flora and fauna, and the development of a visitor resentment by the host population (Cheong, 1995, p. 420). Travelling virtually should significantly preserve the integrity of the destination's society, protecting and preserving both the local culture and the natural environment it lives in. At the moment, there are many experiences and activities that provide sustainable alternatives for appropriate destination management and protection, such as community-based tourism and responsible tourism practices (Thorsby, 2009). In this sense, immersive tourism experiences developed through the newest digital technologies can provide an alternative

visitor experience without compromising on the protection of the historical or natural remains (Bruno et al., 2010). Caneday (1992) adds that in specific touristic areas where it's required to limit entrance of tourists (such as the inner chambers of the Pyramids) virtual experiences could allow unlimited access. This would be especially useful in crowded classroom contexts where many students could access the same virtual environment without any limitations. Finally, it would also help reduce the carbon footprint by reducing greenhouse gas emissions derived from physical movement with cars, buses and plane rides and, therefore, promote sustainable tourism (Lu et al. 2022).

As mentioned in Chapter 1, most scholars disregard virtual tourism as a valid substitute for an in-person travel or fieldtrip. However, considering the fact that a virtual experience can be regarded as a sustainable activity, in terms of impact on the environment, it can still be considered an effective tool to sensitise the users on the impact that travels have on the environment. In this sense, from an educational perspective, virtual tourism experiences represent an effective tool to promote awareness on climate change and to foster environmental literacy (Fauville et al., 2020). It is important that individuals understand how much their daily actions are responsible for releasing CO_2 and other greenhouse gases that contribute to causing climate change, and VR may represent an opportunity to make the invisible visible by providing visual evidence. Through VR trips, educators can also create experiences that allow their students to access faraway destinations, inaccessible, or even inexistent places and to carry out scientific experiments that wouldn't be possible otherwise (Fauville et al., 2020). For instance, in 2022 the United Nations System Staff College (UNSSC) brought virtual reality tours to COP27, an international conference reuniting tens of thousands of climate change activists and practitioners. UNSSC also introduced VR to international leaders by bringing them to a virtual field trip to places where economic independence relies heavily on mining lignite coal, which has produced significant environmental waste throughout the years (UNSSC, 2022).

In a 2020 study Fauville et al. analysed the application of VR and virtual tourism to meet the four dimensions of environmental literacy: knowledge, disposition, competencies and behaviour. The first one is the *knowledge* dimension, which encompasses knowledge concerning planet Earth's physical and ecological

characteristics as well as how social, political, economic choices impact the environment. In a VR experience teaching the consequences of climate change, students embodied a coral and experienced the negative effects of ocean acidification both on their own avatar and on other species (Markowitz et al. 2018). The second dimension concerns the psychological *dispositions* of each individual toward sustainable development, taking into consideration the increase of sentiments such as environmental sensitivity and concern, or assumption of personal responsibility (Fauville et al., 2020) after a VR travel experience. For instance, in a study by Ahn et al. (2014) students were proposed to engage in a VR trip to a forest being cut down to understand the perception of personal responsibility in deforestation. Thirdly, the *competencies* dimension is concerned with the acquisition of skills and abilities (identifying, analysing, making personal judgements) concerning environmental issues. Finally, the last dimension is concerned with creating or improving an environmentally responsible *behaviour* (i.e. consumer behaviour, participation in initiatives and debates) in students taking part in VR trips (Fauville et al., 2020). For instance, in a study by Hsu et al. (2018) the attitudes of individuals regarding water conservation and consumption were analysed before and after taking part in a VR experience showing exaggerated feedback and consequences of water usage on the environment. The results indicated that the VR experience elicited higher levels of affective response and pro environmental and water conservation dispositions.

It is clear that virtual travels present a potential to promote environmental awareness and literacy, consequently educating also on sustainable development and climate change. VR Travels can not only educate people on environmental issues, as well as reducing the psychological distance between humans and the environment (Fauville et al., 2020). But it also has a great potential to investigate the effect of the implementation of different strategies and the extreme consequences of climate change, by creating virtual environments reproducing a scientifically accurate prevision of the future.

b. Promoting solidarity tourism

Durkheim (1995) defined solidarity as "a collective responsibility that binds people together through feelings and/or actions". Following this definition, tourism – as in intercultural activity which envisages the contact with different cultures and ways of

life – enhances collective responsibility and multicultural learning through the feelings and actions provoked by the whole touristic experience, which is an immersive one (Tucker, 2016). Dogan (2019) gave a definition of solidarity tourism as an experience that stems from "reciprocal sensitive and appreciative relationship between host and tourist for the host communities' economic and social necessities". Consequently, tourism can encourage social and environmental transformation in both the tourist and the hosts leading to a more solidaristic way of doing tourism.

The applicability of virtual tours with regards to solidarity tourism includes all logistic activities, such as management, marketing, planning, entertainment, education, accessibility and heritage preservation (Guttentag, 2010).

Dogan (2019) defined three interrelated elements that allow the creation of touristic solidarity: equality, empathy and sensitivity. When it comes to virtual experiences, however, the relationship between the host and the tourist is the most important element to be achieved and yet one of the most difficult since the tourist is not physically there. Indeed, it is the experience of 'being there' that allows a traveller to develop a connection with host communities through reciprocity, as well as promoting empathy and solidarity. On one hand, reciprocity is frequently defined as the mutual exchange of tangible benefits such as financial gains (Nautyal et al., 2022) and it implies a concern for others and establishes a relationship that generates emotive or moral values such as friendship, trust, and mutual understanding (Sabourin, 2013). On the other hand, empathy and solidarity are emotions that are frequently evoked through physical proximity. Hence, the struggle of virtual tourism is to be able to provoke the same feeling of reciprocity while not 'being there'. However, virtual tours are potentially very effective way of attaining in the tourist a sentiment of sensitivity, which represent a feeling of understanding of our own personal cultural beliefs and practices and awareness of the cultural differences between peoples while still maintaining a non-judgmental and respectful interaction with other cultures (Bennett, 1986). Through the use of digital technologies virtual experiences allows for the preservation of local heritage and environment, while still being able to spark a sentiment of sensitivity in the tourist.

Virtual experiences, ultimately, represent a great option to fulfil the desire of individuals to get to know destinations that might be inaccessible due to crisis or threatened by climate change (Nautiyal et al., 2022), while still providing a platform for people all over the world to show solidarity and support humanitarian relief. In this regard, storytelling can be vital to convey key values and messages while still sparking emotions. Indeed, storytelling has a potential to create evocative and transformative travelling experiences enabling connections between hosts and tourists. Virtual tours are ultimately a great way for environmentally and socially conscious travellers to gain access to travelling and solidarity with others.

c. Promoting cultural heritage preservation

Virtual tourism also represents a powerful tool for the promotion and protection of cultural heritages. Heritage tourism normally offers experiences that entail going to historical or cultural locations, seeing artifacts, or participating in activities that, despite frequent controversy, authentically represent the past. Some of the activities that these destinations include revolve around getting to learn about cultural and indigenous history, visiting historical architectures and places where historical events took place and exploring natural environments, such as parks, beaches and mountains.

The newest discoveries in terms of technology, such as virtual reality, have a potential to exponentially increase future opportunities and create a completely new way of experiencing tourism. Especially when the concern is heritage preservation, virtual and augmented reality technologies can be included into tourism experiences blurring the lines between what is real and virtual and increasing the immersion level within tourism experiences (Jung, tom Dieck, Lee, & Chung, 2016).

Moreover, Virtual Reality applied to culture and heritage preservation can represent a valuable alternative to foster accessibility and propose a new way of interacting with cultures (Ibañez-Etxeberria et al. 2020). The implementation of these technologies in heritage management programs is increasingly modifying the way through which tourists interact with cultural sites and experience them. Not only, but it also changes the way in which tourist relate to heritage, potentially leading to a broadening of knowledge and improvement in the understanding of cultural sites and assets (Ibañez-Etxeberria et al. 2020).

1. 3D scanning and Virtual Heritage

Protection and preservation of cultural heritage can also be done through 3D digital reproduction of specific objects or sites. Especially in tourism destinations where there is an urgency to preserve heritage, digital technologies are emerging in a way that allows for digitalization of the environment so that future generations will also be able to enjoy and experience them (Guttentag, 2010). According to a study by Lu et al. (2022), virtual tourism was found to be particularly suitable in cultural landscapes and heritage places, such as museums and exhibitions. Indeed, virtual reality allows for the creation of virtual tours where artworks are displayed in a high-quality 3D view together with a complete and detailed explanation. In a 3D environment as such the artworks would not risk being damaged. The participants of the study also pointed out that, if they had to choose, they would rather have a virtual experience in a museum or exhibition rather than a natural landscape, as they saw it as a more efficient educational tool – enhancing interest and learning outcomes – in art galleries and exhibits (Lu et al., 2022).

Noh, Sunar and Pan (2009) define Virtual Heritage as "the heritage that is visually represented using computer-based interactive virtual reality". Although both virtual reality and augmented reality are more commonly applied in museum contexts, these technologies have application also in other settings. For instance, in order to preserve physical artifacts and sites there are methods such as 3D scanning, digital archive repositories and photogrammetry (Yastikli, 2007). For instance, in New Zealand, 3D scanning technologies were used to create digital copies of sacred or traditional Māori artifacts, in order to protect them and, with them, Māori traditions and cultural heritage (Brown, 2008).

In a similar case, 3D reproduction was used to implement a mixed-reality environment. In a real-time case study by Papagiannakis and Magnenat-Thalman (2016), the concept of mixed reality was explored by using both its virtual and non-virtual components to create a realistic virtual setting and re-enact staged historical dramas. Their study featured realistic complete simulations of virtual human actors projected into the historical site of ancient Pompeii with the goal of allowing the VR content user to experience and witness first-hand the vibrant life that used to exist in the now ruins of the city of Pompeii (Papagiannakis e Magnenat-Thalman, 2016). The integrated system of

mixed reality is able to give concreteness to the 'narrative' part of history, realistically re-enacting them and providing "aesthetic, dramaturgical and emotional elements, objects and attitudes" (Papagiannakis e Magnenat-Thalman, 2016). Moreover, according to the study, the realistic interaction and superposition between real and 3D virtual objects generates a strong feeling of presence to the user, who is able to interact (although limitedly) with fully simulated living people from ancient Roman times (Papagiannakis e Magnenat-Thalman, 2016). This type of experience has been found to be particularly interesting and effective specifically when visiting historical sites, where the tourist is more prone to wondering how the ancient used to live and what where their social and cultural patterns. This is a way of giving a (somewhat) realistic answer.

2. Virtual museums and exhibitions

As already mentioned, virtual technologies can also be used through 3D scanning techniques to promote preservation, reconstruction, documentation of material and immaterial heritages (Bruno et al., 2010). Specifically, 3D scanning allows for the digital reproduction of both small objects (such as working tools, cooking tools etc.) and whole buildings or environments, allowing navigation through reconstructed cities and lost sites. Moreover, 3D scanning has been used recently to create 'Virtual Museums' which can be developed in two different directions. The first way entails the digital reconstruction of an already existing museum and its spaces, where the user can move using virtual reality and enjoy the museum's exhibition remotely (Bruno et al., 2010). This is in part already a reality for many worldwide famous museums, which decided to create digital copies of the artworks and make them available for free using Google's Art and Culture platform. The second way involves the creation of a whole new digital space which is scenographically set up to contain digital reconstructions of specific objects. The user can, therefore, explore the digital space and get to know the virtual exhibition from an unusual perspective, which allows for stereoscopic view and in-detail exploration (Bruno et al., 2010). Moreover, the idea of using mixed reality in an exhibition environment allows to create unique exhibitions that can easily overcome barriers such as glass showcases used in museums or geographical distance of different artwork pieces. The virtual exhibition allows the user to discover a unique collection of items which might be

scattered across multiple museums, immersing themselves in a very specific category of artefacts that would otherwise be impossible to see together (Bruno et al., 2010).

This innovative approach would be beneficial not only to spread knowledge and promote the exhibit or collection, but also to create awareness among a population of their own historical background and local heritage (Bruno et al. 2010).
In this sense, Bruno et al. (2010) devised a virtual exhibition called MNEME to diffuse knowledge of the ancient populations of the Oenotrians and Bruttians in the region of Calabria, Italy. They found that, with relatively low price and in short time, they were able to show a rich collection of artifacts that were no longer present in the territory in an interesting and realistic way. The MNEME exhibit was a success and was found to be useful, on one hand, for promotional purposes – especially in events such as fairs – to improve the cultural promotion toward young audiences and cultural tourism operators. On the other hand, it allowed the local communities to improve their knowledge of their cultural and historical heritage by 'bringing back' artifacts scattered in museum all over the world or lost, and by delivering an amazing visual experience to the visitors (Bruno et al, 2010).

3. Advantages and disadvantages

It could be said that there are conflicted opinions regarding the usage of VR and AR in the heritage tourism sectors. On one hand, studies have shown that both technologies represent alternative, innovative and dynamic ways to provide users with unprecedented experiences, both in museum environments and in real destinations (Yung, 2017). On the other hand, heritage site managers expressed concern regarding the adoption of these technologies in fear that they could reduce the objective authenticity of sites and physical objects (Dueholm & Smed, 2014). Objective authenticity refers to the authenticity of originals, implying that only the toured object is the authentic one and that its authenticity can be objectively measured. For this reason, digital copies of objects or spaces do not have the characteristic of authenticity and, therefore, their economic value is reduced.

Moreover, the advantages of using this type of technology in a virtual touristic environment are immersive visualization, as well as non-invasive and rapid capture of cultural and/or historical sites (Guerra et al, 2015, p. 51). Virtual tourism can also be a very effective way of managing and preserving fragile natural or historical spaces, by generating virtual experiences and, therefore, minimizing physical presence and – possible – disturbance in the heritage site (Guttentag, 2010). There is also a potential to provide these types of experiences to a general public, therefore diminishing the touristic pressure and avoiding the pollution and the inevitable damage brought by mass tourism.
Generally, one of the main issues when preserving cultural heritage – both material and immaterial heritage – is maintaining accuracy in the presentation of information, namely balancing the accurate facts with contested information. Indeed, especially when protecting and promoting immaterial heritages there might be contested histories, which often play an important role in the whole touristic experience and in the way the experience is perceived. Therefore, since the goal of experiences based on facts is to educate its visitors, it's of key important to provide them with the most accurate information (Mura et al., 2017).

2. Virtual Reality and education

Virtual Reality and Augmented Reality have existed in a variety of forms for a few decades now, and they have proven to be incredibly useful in many different sectors, ranging from entertainment to gaming, from engineering to design. One of the areas that have found VR technology particularly stimulating has been education. The concept of education refers to the process of acquiring knowledge, learning skills or values with the purpose of preparing learners for a specific task, work, goal or, more generally, life (Kaminska et al., 2019). Over the past decades, many studies have focused on the strengths and weaknesses of VR in education.
On one hand, thanks to the realistic, immersive environments, VR promises to enhance education in several disciplines, such as science, engineering, foreign language and social sciences (Boyles, 2017). It is also a powerful tool to guarantee inclusivity of education to individuals with disabilities. On the other hand, due to its high costs and ethical issues related, VR could also present some disadvantages.

Since an increase in the use of digital technologies at all levels of education has been registered (Rojas-Sanchez et al., 2023) in the last years, the challenge is to figure out how to use this technology successfully.

a. Overview of the application of VR in education

The application of Virtual Reality in education is widespread. As previously mentioned, virtual reality technologies are slowly being introduced into educational contexts. Although many applications of VR in education revolve around tourism-related activities, such as virtual tours placed into museums and exhibitions, these emerging technologies can be applied to many fields of knowledge.

In some areas VR is used as an enhanced or improved version of a service that already exists and is presented through other medias. This is the case of VR used in foreign *language acquisition* studies. In these contexts, VR experiences are used to understand how the interaction between students and native speakers through 3D virtual worlds can be beneficial to the overall learning process. While it has been found that the VR experience was beneficial to the students because it allowed them to bridge the gap of distance (Boyles, 2017), the same activity could still be carried out through a simple video call or meeting online.

Moreover, since the launch of the Metaverse in 2021 by Meta and the diffusion of VR headsets and VR glasses usable with portable devices, many educational platforms started to emerge. These platforms, Engage VR[22] is an example, are free virtual multiuser environment where each user can access and share information with people from all over the world. Specifically, it allows users to offer or buy public classes, private lessons, share presentations and hold meetings and access all content through the Metaverse platform (Elmqadden, 2019). Although the virtual immersion aspect clearly represents an innovative way of accessing and interacting with the platform, it must be said that platforms with similar characteristics already exist on the Internet and serve their purposes effectively without needing the VR element.

[22] Engage is a spatial computing platform designed for corporations, professionals, education organizations and event organisers. Available at: https://engagevr.io/

On another note, it is possible to use VR technologies to support education and boost the effectiveness of student learning (Fitria, 2023). When it comes to *medical education* VR has allowed big leaps forward especially regarding surgery trainers and simulators, which can be used by the students to practice procedures such as laparoscopy, temporal bone surgery, and dental surgery (Boyles, 2017). This is particularly useful because it allows medical students to practice procedures in a safe environment, with the plus of having an aid that helps them visualising anatomy, and organ dynamics. It represents a cost and time effective solution that allows students to visualize clearly and practice in a realistic setting (Fitria, 2023).

In other scientific areas – such as *chemistry*, *biology*, *astronomy* – VR has developed from a purely visual tool, allowing to visualize chemical reactions, molecules or the solar system in a VR environment, to a comprehensive medium (Boyles, 2017). Through virtual labs, experienced or training scientists can carry out tests and experiments without risking their own physical safety (Elmqadden, 2019). Thanks to the three-dimensional effect that allows to visualize the object, not only students are encouraged to engage and understand in the lesson, but it will also be easier for educators to deliver content (Fitria, 2023).

The relationship between VR technologies (AR, VR and virtual environments), heritage sites and education processes is currently an object of interdisciplinary research. In a study by Chiao et al. (2018), investigating the effectiveness of using an online virtual tour-guiding platform for *cultural tourism education*, it was found that students demonstrated learning improvement and curiosity when using VLE. Students become more aware of a destination's culture, characteristics, and surrounding environments after learning about them in the virtual world (Chiao et al., 2018). The findings of the study revealed that the whole student experience with VR technology and interaction interface, had a positive impact on learners' willingness and practice. Moreover, the 'touristic side' of the VR learning experience was found to be more effective when the student was prompted to actively explore and find spots on an individual basis, rather than being taken there passively (Chiao et al., 2018).

Fitria (2023) organized a categorization of all research articles produced on Virtual Reality and education, and their findings, which can be found in Table 4.

No	Research Article	Result of Study
1.	(Williams et al., 2018)	Virtual reality (VR) provides a lot of educational potential for developing clinical skills without taking any risks. A VR simulation could teach emergency skills and highlight any obstacles that need to be taken into account.
2.	(Taufiqurrohman & Sumbawati, 2020)	Learning with the Project Based Learning learning model using virtual tour (Virtual Reality) learning media in the experimental class shows an average learning outcome value of 85.54. So virtual tour media is very suitable to be used in the simulation learning process of a Tour Guide.
3.	(Pavlova et al., 2020)	Based on the material of Google Expeditions, StreetView, and Youtube 360, sample assignments for ecology students are designed. Virtual reality technologies may be used to study specialized terminology for issues of climate change, ecosystems, energy, forests, oceans, seas, and water. The authors believe that "virtual immersion" in authentic surroundings will enable students to master career-specific vocabulary when they are studying vocabulary.
4.	(Rachmatullah & Sukihananto, 2020)	Virtual Reality has an influence and impact on students' ability to clinical simulations following the real environment in increasing knowledge and skills. Virtual Reality (VR) is a simulation learning media that can improve the knowledge and skills of nursing students.
5.	(Bramantya, 2020)	Based on the average results obtained, it shows an increase in results higher learning after using Virtual Reality media. The existence of Virtual Reality-based learning media is expected to become a reference for the creation of more innovative learning media. Virtual Reality-based learning media can serve as a model for the development of more innovative learning media.
6.	(Purwati et al., 2020)	Virtual Reality application of Solar System Learning Media can facilitate the learning process related to the solar system. Users agree that the Virtual Reality Application of Solar System Learning Media is effective in facilitating learning related to the solar system as evidenced by the results of the questionnaire (60%) for the agreed value on the content aspect. Users agree Virtual Reality Application Learning Media of Solar System efficiently facilitates learning linked to the solar system, as indicated by a 60% agreement rate of the questionnaire.
7.	(Almira et al., 2021)	The test results of virtual reality-based learning media get an average percentage index of 86% and are in the "Very Good" category, so Virtual Reality-based learning media is effective to replace written learning media that is of interest to students. With the existence of virtual reality-based learning media, this media can be used by teaching lecturers and students in the teaching and learning process in the world of education, especially in basic photography subjects.

8.	(Arsadhana et al., 2022)	The VR method is believed to be used as a future learning method because it penetrates the boundaries of space and time and can be used in all circles, including early childhood and students with special needs. The disadvantages of VR are mainly in terms of health, expensive devices, and the limited internet network in Indonesia.
9.	(Ahmad et al., 2022)	By utilizing Augmented Reality technology, the anatomical shape of the human body can be visualized through three-dimensional (3D) virtual modeling using a smartphone. AR applications for cupping points on the anatomy of the human body can be operated on an android or smartphone has been built.
10.	(Darojat et al., 2022)	In learning Virtual Reality (VR) media is used as a complement to teaching materials for science subjects. The results of product tests that have been applied to media experts, material experts, and students have received many positive responses, so it can be said that the virtual reality system of the solar system is suitable for use in learning. This media makes it easy for students to analyze the arrangement of the solar system and provides an attraction for students so that an increased sense of learning arises. However, to use it, users must use a device that has a gyroscope capability.
11.	(Saepuloh & Salsabila, 2022)	After completing the teaching series, the use of VR in learning English vocabulary at SD Negeri Cipanas 2 makes learning more interesting, effective, and fun. This can be seen from the enthusiasm and active participation of students when participating in learning.
12.	(Fardani, 2020)	interest from users who tend to be very high in the use of Virtual Reality (VR) technology in learning. The use of VR media has a significant impact on the level of pleasure and students' understanding of the material being taught. VR also makes learning more effective and efficient because will save time as well as costs.
13.	(Ariatama et al., 2021)	The use of VR encourages innovation in learning media that is different from before in increasing students' participation and critical thinking perspectives and bringing students closer to VR technology. The characteristics of VR technology can be implemented in the teaching and learning process during a pandemic in attracting students' interest and feeling the atmosphere like in a classroom when offline learning takes place.

Table 3 - Previous research about Virtual Reality (VR) (from Fitria, 2023, p.18-19)

Other than the previously mentioned fields of virtual tourism, cultural heritage preservation and promotion, language acquisition and medicine it seems clear that this technology has numerous other applications in education. Some of them include simulator training, surgical procedure simulation, architecture planning, archaeology with site

reconstruction, virtual museum tours, phobia treatment, (Elmqadden, 2019) and various sorts of other learning.

Therefore, it seems clear that in addition to transforming the traditional classroom context, VR also gives students to conduct virtual field trips, exhibition tours, experiment in virtual labs (Fitria, 2023), and generally participate in experiences and activities that would not be available in a traditional classroom setting.

b. VR-based instruction and learning

VR-based instruction is a style of teaching which relies on the use of VR technology to enhance the learning process of students. Generally, VR learning tools have been proven to be especially effective in enhancing the acquisition of cognitive skills, such as spatial and visual knowledge, remembering and understanding information (Rojas-Sanchez et al., 2023). VR technology actively focuses on each student's own learning process and attempts to diminish the gap between the theoretical knowledge and the actual real-life task or experience. This means that it can be particularly important to complement or enhance traditional learning methods, such as classroom teaching, but also to adapt learning to different settings, for instance self-learning, distance learning, and others. According to Elmqadden (2019) Virtual reality-based learning "has been proven to increase learners' level of attention by 100% and improve test results by 30%". However, in order to enrich teaching and improve learning outcomes, it is essential to design user-friendly VR interfaces and devices, as well as entertaining activities and tasks (Rojas-Sanchez et al., 2023).

The values of using a VR-centred approach are related in part to the unique style of delivering knowledge represented by VR and in part to the contents of the lessons themselves. One of the most important strengths is the fact that VR inverts the student-teacher dynamic and puts the student at the *centre of the learning process*. In the conceptual orientation, the designer of VR experiences puts human processes – such as cognitive, emotional, social, etc. – at the centre and as the focus of the experience, and the operating system becomes only the tool in the learning process (Helsel, 1992).

The student, indeed, following the constructivist learning theory[23], has control over the learning process, turning the teacher from a "deliverer of knowledge into a facilitator" (Boyles, 2017, p. 4) who helps the student to explore and learn. This is because constructivist research focuses on "the way in which knowledge is created and negotiated in virtual environments and the influence of social learning in a multi-user environment" (Moore, 1995, p.97). In this way, the students feel more excited and engaged in the whole learning experience, because they have control over their leaning process and can proceed at their own rhythm and pace (Boyles, 2017; Foreman, 1999). This creates a stimulating and inclusive learning environment, not only for students who have learning difficulties or disabilities, but for all students.

Therefore, students who do not have disabilities but still struggle to perform well in traditional educational environment are also benefited from VR (Moore, 1995). All learners potentially can explore the virtual environment, learning by visualizing and experiencing, without having the risk of being left behind or the fear of making a mistake. Moreover, since the environment created in VR is artificial and carefully designed, it is a safe and controlled space, which enables a safe learning process. Not only it 'blocks out' any potential distractions and allows the students to completely focus on the subject (Boyles, 2017), but it creates simulated spaces useful for experimentation. For instance, because the setting can be structured to prevent extraneous variables from affecting the test findings and the experimental variables can be accurately controlled, virtual reality makes it easier to test different scenarios and hypotheses (Boyles, 2017).

Furthermore, VR has a potential to revolutionize the whole world of education, switching from a more book-based and text-based approach to an *imagery and symbol-base***d** one (Helsel, 1992). This relies strongly on the human brain's visual processing power, which has been defined as "an incredibly advanced system" by Larry Smarr, who also adds that "Looking at the world we absorb the equivalent of billion bits of information per second, as much as the text in 1000 copies of a magazine" (Smarr,

[23] Constructivism proposes that "*learners construct their own reality, or at least interpret it based on their perceptions of experiences, so an individual's knowledge is a function of one's prior experiences*". Jonassen, D. H. (1994). Thinking technology: Toward a constructivist design model. *Educational Technology*, April, 34(4), 34-37.

1991)[24]. On this matter, Elmqadden (2019) adds that when a content is present to the learner in a textual form (on a book or printed document, for instance), the brain will use a process of interpretation of everything being read, thereby increasing the cognitive effort. On the contrary, when using VR, the process of interpretation is reduced and so is the brain's cognitive effort due to the fact that the information is presented visually and there are less symbols to interpret (Elmqadden 2019). For instance, it will be much easier to understand how a machine functions by seeing the process in action, rather than by reading an explanation.

Also, Mikropoulos and Strouboulis (2004) hypothesized that the richness of the scene and the high level of involvement associated with VR experiences resulted in a greater sense of presence among all participants. Presence is correlated to high levels of cognitive performance and emotional development, which are factors that contribute highly to knowledge construction. Not only VR could revolutionize the traditional learning and teaching methods, but it has also proven powerful as a support within conventional educational contexts (Faloon, 2010). Several authors [Faloon, 2010; Foreman, 1999;] related positive changes from the use of VR in the classroom, ranging from enhanced engagement and interest in activities, to more focussed and effective communication, and, when used in group settings, improved collaboration and cooperation between students.

In particular, Faloon (2010) explored how the user's avatar[25] in VR has a potential to support connectedness and social interactions, especially among individuals who struggle with communicating on a face-to-face basis. Although their use in learning context is still limited – as for VR experiences – it has been found that 'avatar environments are leveraged most effectively when they support learner-centred teamwork' (Foreman, 1999).

Another important positive aspect related to the use of VR in education is the opportunity to develop *interactive platforms*. A significant advancement in the realm of virtual reality is the ability to manipulate the items of the virtual synthetic environment

[24] Smarr L. from "The Marvels of Virtual Reality", Fortune Magazine, June 1991, 138-150

[25] Defined as "online manifestations of self in a virtual world and are designed to enhance interaction in a virtual space" by Peterson, M. (2005). Learning interaction in an avatar-based virtual environment: a preliminary study. *PacCALL Journal*, *1*, p.30.

using controllers such as Oculus Touch[26] (Elmqadden 2019). This enables students, for example, to practice and learn in a more engaging way by interacting with objects in the virtual world. The creation of interactive platforms entails the development of a virtual environment that users can navigate and engage with. The interaction happens through various activities, contents or applications and the virtual environment provides a dynamic and user-centred experience, enabling real-time interactions, feedback, and collaboration (Fitria, 2023).

c. VR learning environments

If a VR-based learning approach is a broad instructional strategy or methodology that incorporates the use of VR into the learning process, encompassing pedagogical methods, curriculum designs and teaching techniques, a VR learning environment refers to the digital space where the educational activities are taking place through VR technologies. VR learning environments are contributing to shifting traditional learning and teaching methods to a more immersive, intuitive and exiting form of learning, which uses immersive technologies and trigger the imagination of the student (Rojas-Sanchez et al., 2023).

One of the uses of VR environments regards the acquisition of cognitive skills related to remembering and understanding spatial and visual information, as well as "psychomotor skills like head movement, visual or observational exploration and affective skills for emotional control and response to stressful situations" (Rojas-Sanchez et al., 2023; Jensen e Konradsen, 2018). These are particularly important because spatial cognition has been highlighted as an important aspect of childhood development in which children learn to use contextual clues to gain information about their surroundings (Moore, 1995) and visualization can substantially help in the acquisition process of these skills.

Moreover, VR leaning environments that allow the visualization of a certain setting have been found to be the ones that receive the most attention from students and motivate them the most. Some of the most common are resumed in the table (Rojas-Sanchez et al., 2023).

[26] Oculus Touch are controller devices that work together with Oculus Quest HDM. Available at: https://www.oculus.com/rift-s/?locale=it_IT

Examples of VR technologies that allow the visualization of situations
(a) virtual communities,
(b) educational games,
(c) interactive learning environments,
(d) educational technologies that improve the teaching process,
(e) online learning,
(f) user experience,
(g) immersive learning,
(h) immersive virtual reality and deep learning.

Table 4 - Examples of VR technologies that allow the visualization of situations (Rojas-Sanchez et al., 2023)

Thanks to these technologies educators are able to combine theoretical and practical approaches with instruction methods to allow for the full use of these virtual environments. Moreover, a field that has not been considered much by literature is using VR to enhance training of educators themselves. By creating a VR environment that simulates real-life classroom dynamics, teachers can train and test different materials and different ways of presenting them to their class (Fitria, 2023). By doing so they also improve their classroom management skills.

Clearly, as technology advances, there will be an increase of actors, avatars, virtual environments, as well as improved devices, better graphics, which will ultimately provide an improved and more enjoyable learning experience (Elmqadden, 2019) both for the student and the educator.

Interactive digital storytelling is a powerful element of the creation of a VR learning environment and it can also be created inside an educational game.

Games have been proven to be effective educational tools, as they increase motivation and interest in learners. They have a strong potential of engaging students, allowing them to explore independently the virtual space and to create social interactions, in cases of multiplayer games (Laamarti et al., 2014). In fact, some games are based on role-playing and social interaction, others are focused on environmental exploration and spatial perception. Depending on the educational goal they are trying to reach and on the disciplinary areas taught, each game is developed for individual, multiplayer or classroom

use. An example is Math Arena[27], a game designed for classroom use that teaches students mathematical and arithmetic skills at different levels of difficulty (Laamarti et al., 2014). Other educational games are developed for independent learning. Examples include the 3rd World Farmer[28], which wants to sensibilize players to the difficulties of managing a farm in a developing country by simulating a management context and allowing the learner to take control and make choices, or Clean World. The latter has the purpose of educating about contemporary environmental challenges and it is designed to adapt to the player's abilities and assessment performed to keep the challenge element balanced (Laamarti et al., 2014).

It is clear, therefore, that games, and virtual environments in general, have a huge potential as means of improving education thanks to the 3D and interactive aspects. However, it is of crucial importance to pay attention during the design, development and implementation of these in learning environments, in order for them to correctly serve their purpose. A field that has not been considered much by literature is using VR to enhance training of educators themselves. By creating a VR environment that simulates real-life classroom dynamics, teachers can train and test different materials and different ways of presenting them to their class (Fitria, 2023). By doing so they also improve their classroom management skills.

d. Training using VR simulation

When compared to traditional education, employing virtual simulation-based training provides safety, cost savings, and efficiency because training takes less time (Rojas-Sanchez et al., 2023). In this sense, visual simulation technologies have received substantial attention in learning. Simulation systems mimicking complex activities such as driving a car or flying a plane could be particularly useful when considering the various factors that can influence, positively or negatively, such activities (Rojas-Sanchez et al., 2023). Perspective pilots that train in Aviation, for instance, can practice flying planes of different sizes in safety, reducing the risk of accidents and at the same time learning through a realistically developed simulation (Fitria, 2023). This is particularly useful

[27] Available at: https://matharena.info/
[28] Available at: https://3rdworldfarmer.org/

because it wants to facilitate the transfer of practical skills from a controlled VR environment to the real-life one.

VR simulations are particularly prevalent also in the fields of combat training and health and medicine. The US Defense Force has reportedly employed virtual reality to teach personnel in combat methods as well as vehicle navigation, ranging from aircraft to helicopters (Moore, 1995). VR simulations are also heavily used in medical education to practice complicated surgeries or procedures. For example, Nolin et al. (2016) developed a virtual classroom to aid in the rehabilitation of children with attention deficit problems.

Nevertheless, the use of VR simulations to facilitate training is relatively common (Kavanagh et al., 2017). According to an analysis of 379 papers by Kavanagh et al. (2017) it emerged that 58% of all VR simulations were designed for training purposes. The training activities simulated in the papers were several, ranging from the already-mentioned flight simulator to chemical engineering and construction areas.

Ultimately, the value of VR simulations lies within the fact that learning using VR simulations allows to master how to correctly and efficiently perform a task, which can be subsequently transferred in the real world (Moore, 1995).

3. Opportunities for people with disabilities

Inclusive education aims to provide education for every group of children, and it is regarded as one of the most successful methods of combating discrimination and ensuring equal chances for all children (Chitu et al., 2023). The right to inclusive education is present in Article 24 of the Convention on the Rights of Persons with Disabilities and is regarded as one of the 17 Sustainable Development Goals (Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all). According to UNICEF, there are at least 93 million children with disabilities and this group represents "one of the most marginalized and excluded groups in society and they suffer from discrimination with regard to access to education"[29]. In this sense, VR could represent a good tool to overcome limits and open opportunities of learning for disabled children.

[29] UNICEF Introduction. Available online: https://www.unicef.org/disabilities/index_65841.htm

In order to reach the SDG 4, it is critical to focus on the group of children and students who require special education supports and to offer them the opportunity to achieve meaningful and effective learning outcomes while also boosting their prospects of academic completion and success (Sætra, 2023). Moreover, the use of VR in education can also be fulfil specifically Goal 4.a in providing "education facilities that are child, disability and gender sensitive and provide safe, nonviolent, inclusive and effective learning environments for all"[30].

As already mentioned, the aim of inclusive education is to ensure equal access to education and educational programs, improve diversity and inclusion for all students, not just the disabled (Chitu et al., 2023). Thanks to its fundamental characteristic of 'learning by exploring' VR could make the learning environment more accessible and stimulating, improving learning as well as social and emotional abilities.

a. Individuals with intellectual disabilities

The role of VR in inclusive education is to be a new and innovative tool that fulfils the "process of strengthening the capacity of the education system to reach out to all learners" (UNESCO, 2017). Since a significant number of traditional leaning methods have been developed for typical developing children, they are often non efficient for children with disabilities.

In particular, some initiatives involving VR technologies were developed to address emotional and social adaptation challenges of children in the **Autistic Spectrum Disorder** (Chitu et al., 2023). The possibility to recreate a real-world environment with customized characteristics in VR represents an advantage for kids who struggle with stress or feeling of anxiety for negative real-world consequences for a possible mistake because it allows them to practice various 'realistic' situations in a comfortable environment (Sætra, 2023). VR allows to combine a somewhat authentic experience – created by the virtual world, immersion, sensory feedback and interactivity – to a safe and controlled environment in which students can learn securely. For instance, Schmidt and Glaser (2021) explored the use of virtual reality by employing 360-degree video modelling and headset-based virtual reality to investigate skill acquisition in persons on

[30] United Nations, Transforming our world: the 2030 Agenda for Sustainable Development, A/RES/70/1. Available at: sustainabledevelopment.un.com

the autism spectrum in order to teach public transportation use. In similar instances, VR learning platforms exposed the children to specific social lessons such as “route to school”, “behaviour in class”, “interaction with peers” and “safety skills” (Chitu et al, 2023) to try and solve the socialization problem. By creating specific social lessons and delivering them in a simulated but authentic VR world, autistic children are more likely to find solutions to social problems in an effective way.

Moreover, the ‘navigation’ in the virtual environment is more likely to be easier and less stimulating from a sensorial point of view. In this case, the lack of hearing, smelling, feeling stimuli might be a positive feature, as many autistic children feel overwhelmed by the sensorial complexity of the world (Sætra, 2023). Hence, VR technology might be able to help individuals with neurodevelopmental disorders to develop communication abilities (Chitu et al., 2023) and to acquire various skills by exercising them in a adapted and stimulating environment from an early age (Sætra, 2023). This contributes to enhance skills, resistance to frustration, and improve coping with daily problems, which in turn is related to school refusal or dropouts (Sætra, 2023). Indeed, according to some authors, VR can prevent depression by overcoming disability barriers (Weiss et al. 2004), therefore increasing the individual’s self-esteem and sense of empowerment (Nosek et al. 2016).

It has also been noted that VR contributes to the development of creativity, attention, or language learning through multisensory and cognitive stimulation, which can result particularly effective in developing imagination skills in children with mental disabilities (Chitu et al. 2023).

VR technologies can also be useful as a support to other therapy treatments. For instance, in cases where children are suffering from certain crises, VR can allow them to immerse themselves into a familiar context that may help in the process of tranquilization. In other cases, a VR immersion with images accompanied by music can also prove useful for relaxation purposes (Chitu et al. 2023), as VR technology is effective in capturing people’s attention.

In addition to therapeutic goals, another asset of VR is that it can represent an opportunity to participate in leisure activities for people with intellectual and physical disabilities. Participation in leisure activities is an important factor of quality of life, but

often people with sever cognitive or physical limitations have very low chances of being included (Yalon-Chamovitz e Weiss, 2008). However, participation in leisure activities reportedly improves self-confidence and self-concept in people with cognitive impairments, as well as improves social and motor skills, communication ability, physical fitness, and weight loss (Suto, 1998). In a study by Yalon-Chamovitz e Weiss (2008), they explored the potential of using VR games and activities with young adults with considerable physical and intellectual disabilities. They found that participants were attracted to the activities presented, they performed consistently and maintained high levels of interest in the activities, by demonstrating preference in some games in comparison to others.

Ultimately, the capacity to adjust the virtual world relatively easily, grade task difficulty, and adapt it to the user's capabilities are the most valuable advantages of VR (Yalon-Chamovitz e Weiss, 2008).

b. Individuals with physical disabilities

As discussed in Chapter 1 inclusivity is one of the main strengths of Virtual Tourism. This is because numerous potential visitors face various obstacles to travel, including financial limitations, scheduling restrictions, or difficulties managing allergies or mental health issues. Many of these problems can be solved by choosing a VR touristic activity. Considering that consumers who are unable or unwilling to travel might still be looking for alternatives to the genuine travel experience, this could represent a valid alternative for them (Perry Hobson, 1995, p. 132). Therefore, virtual touristic experiences also lead to a more accessible and inclusive way of travelling for disabled individuals.

Throughout the years VR technologies have been proven useful to disabled children and adults in acquiring skills and knowledge in a creative way, other than allowing them to join virtual trips.

From a psychological point of view VR has been proven especially useful in teaching disabled individuals how to perform a variety of tasks and gain independence. According to Lampton et al (1994) the virtual environment is effective in developing perceptual-motor skills, namely spatial awareness and orientation. These types of skills are often poorly developed in physically disabled children due to neurological damage or simply

lack of opportunity for independent exploration of the space (Wilson, 1997). In this sense, it was further demonstrated that skills acquired in a VR environment are automatically transferred to the real-world equivalent (Wilson, 1997), thereby improving the overall skill acquisition process.

Another important application is related to the use of VR simulators to learn how to drive cars and even to teach children how to drive a motorized wheelchair (Inman et al. 2011). An important factor in this process is the fact that the exploration of VR environment or using a VR simulator is free of dangers or hazards, both social and physical. A disabled person, for instance, faces a variety of barriers that prevents them from moving around and travelling. Depending on the disability, some of these barriers may be environmental, such as architecture, ecology, transportation and mobility, attitude and rules/regulations of the destination (Smith, 1987). These barriers might be physical, which impede the accessibility to facilities, to transportation limitations, or even psychological ones, such as the apprehension or distrust on the part of the caregivers (Yalon-Chamovitz e Weiss, 2008). Clearly, the variety of options that a potential disabled tourist has when planning a trip are drastically reduced. Then, a virtual trip would give individuals with physical limitations the opportunity of enjoying an environment they wouldn't be able to access otherwise. In this respect, Hobson and Williams (1995, p. 133) claim that 'VR [virtual reality] could offer alternatives for those who are disabled but who want a tourism experience'. Also, thanks to the low cost of streaming and pre-set virtual tours, the price for accessing a virtual experience could be accessible to all people who wish to learn cultures and histories far from them. As a result, the frustration caused by some physical limitations would be considerably reduced (Chitu et al. 2023).

Not only it would offer an opportunity to travel, but a virtual experience could also have a positive impact on the mental state and mental health of the individual (Cheong, 1995, p. 420).

Furthermore, integrating VR into education curriculums could also be beneficial for children without special need by providing all students with a mean to be elsewhere for some time. This applies also to fieldtrips and on-site visits, which are activities often designed by and for abled individuals.

Concluding, although for some disabilities VR is not recommended – namely epilepsy and photosensitivity, claustrophobia and some forms of Autism – this technology entails several positive changes that represent a step towards making education inclusive. Some of the most important steps include changing children's information perception, allowing youngsters to access worlds that were previously inaccessible to them, and offering new ways to integrate information for children with disabilities (Chitu et al. 2023). Ultimately, this tool could represent an integration to in-person learning and could also facilitate the development of social and cultural competences of this category of students.

4. Limitations of Virtual Reality in education

Although VR technologies have vastly expanded in the last years, they have not necessarily been welcomed warmly by education institutions. It is safe to assume that there are also substantial issues and limitations connected to the use of these technologies in as educative tools or in educative settings.

VR technology has existed for many years, and it has proven effective in promoting inclusive education both for children and adults. However, there is still a certain resistance to adopting them at the educational level and incorporating them into official curriculums (Rojas-Sanchez et al., 2023). In many cases it was the new generations of students or learners themselves who have expressed interest in adopting a multidisciplinary approach in otherwise traditional educative environments. Unfortunately, to this day there is little evidence of incorporation of VR technologies into teaching-learning processes (Rojas-Sanchez et al., 2023), as many traditional educational institutions see them as disruptive processes or perceive them as having a purely recreational purpose.

Some scholars (M. Zhang et al., 2018) have pointed out disadvantages of using VR, such as unrealistic representations, lack of flexibility and customization, financial availability and the potential physical discomfort of users.

One of the first limitations of VR in education is related to the high costs connected to it. Indeed, the costs associated with the devices needed for the VR experience – namely a VR headset, controllers and software, are high which hinders the possibility of having widespread application of this technology. For reference, in order to use VR technology a combination of devices is necessary. A user can either use VR glasses controlled by a

smartphone or a VR standalone headset controlled by a computer. The following table explains the average selling prices connected to both options in 2020.

Option	Device	Average selling price (USD)	Total price (USD)
Option 1	VR HDM glasses	100[31]	409
	Smartphone	309[32]	
Option 2	VR HDM standalone	411[33]	1.041
	PC	632[34]	

Table 5 - Average selling prices of devices connected with Virtual Reality (2023)

This calculus does not include the costs associated with accessories, consoles and controllers that may be necessary to integrate the VR headset, as it does not include the cost of purchasing specifically designed games, 360° videos and films or other contents. This leads us to the large amount of funds that education institutions, both public and private, must have in order to integrate the use of VR into their academic programs. The initial cost for the purchase of the software and hardware can be very high and schools may be unable to justify the need for such an expense (Kavanagh et al. 2017). The availability, or lack thereof, of funds represents a big obstacle as institutions must invest millions in new purchasing new technological equipment, setting up the training courses (Fitria, 2023), maintenance and software updates.

In the same way, due to its high costs, VR represent a viable alternative only for a very limited number of individuals in the world. Considering that 9.2% of the world's population are living on less than $2.15 a day[35] and that 50% of world's population owns

[31] This is the average selling price found through a quick Amazon search. VR glasses' prices can vary from 20 USD to more than 500 USD.

[32] Global average selling price (ASP) of smartphones from 2016 to 2021 *(in U.S. dollars)* – Statista.com

[33] Average selling price (ASP) of virtual reality (VR) tethered head-mounted displays (HMD) from 2015 to 2020 *(in U.S. dollars)* – Statista.com

[34] Average selling price of personal computers (PCs) worldwide from 2015 to 2019, in actual and constant currency *(in U.S. dollars)* – Statista.com

[35] The World Bank Group, poverty overview. Available at: https://www.worldbank.org/en/topic/poverty/overview

just 2% of global wealth[36], it is safe to assume that the majority of the world would be unable to access such technology at the selling price it is found to be at the moment. Even at the individual level, the combined costs connected to the use of VR are very high.

Furthermore, even when using the ultimate generation devices there might be a risk of crashing, breaking or incurring in any type of OS or software breakdown. The risks of malfunctioning are, of course, always present, even when working with high tech devices. In some cases – for instance when there is a delay of communication between the HDM and the visual interface – the user might even feel a sense of uncomfortableness, nausea, minor headaches and motion-sickness (Boyles, 2017).
Some of the most common disadvantages connected to the devices themselves are related to insufficient realism and software usability (Kavanagh et al. 2017). The former may be a limitation if the image quality, sound, and overall development of the virtual environment fails to provide a realistic experience for the user. The latter, on another note, is connected to the nature of the software, which can have a series of problems such as interface design, interaction quality and readability (Kavanagh et al. 2017). Usability is also connected to understanding how the navigation in the system interface takes place. If a VR environment is badly designed, it will be more difficult for the users to orientate and to navigate the system (Falah et al, 2014).

One of the major barriers of utilizing VR solutions in the classroom is the potential overhead, in terms of software and hardware costs, set up time and cost and the training of both educators and students (Kavanagh et al. 2017). The trainings required for students and teachers to learn how to use the interfaces, in specific, can be a problematic, because the amount of training needed is not predictable. Some educators might need more training time and others less, and the same can be said for learners. Educators must instruct their students on how to use VR technology before introducing it in a lesson. This can be done by organizing student-oriented trainings and, therefore, detracting time from their lessons (Kavanagh et al. 2017).

[36] International Monetary Fund, World Inequality Report 2022 by the World Inequality Lab. Available at: https://www.imf.org/en/Publications/fandd/issues/2022/03/Global-inequalities-Stanley#:~:text=The%20poorest%20half%20of%20the,52%20percent%20of%20all%20income.

Moreover, in most cases, educators will not create their own VR application, but will resort to adopting third parties' programs and contents that they can modify and customize to cater to their own needs or their students' (Boyles, 2017). This is the case of teachers who have a positive attitude towards innovative learning methods and who are willing to take their time to explore these programs and learn how to properly use them. However, many educators might be resistant to using this new technology, adopting a sceptical and diffident attitude towards VR technologies. One reason for this wary attitude might be the complete change in the student-teacher dynamic: a teacher adopting a student-centred educative approach is forced to completely redesign their lesson plans, style of teaching, relationship with the students and overall role in the classroom. In a study by Faloon (2010) the educators expressed more technical difficulties, distrust and technical uneasiness when using VR technologies. From this it can be supposed that technological illiteracy could result in frustrating attempts at using VR devices, consequently causing aversive experiences and unwillingness to modify teaching methods.

Another limitation is related to the quality of content available to use in VR. Since VR is a relatively new tool in the learning environment, it might be difficult to understand how to correctly use it to deliver quality content in a captivating way. Ideally, when developing virtual material for use in the classroom, a variety of themes should be considered so that students can learn new things, enhance their knowledge, and broaden their perspectives (Fitria, 2023). It is important to still focus on traditional subjects and teaching approaches but also to present students with new content and new technologies that can be used as a plus or as an alternative (Fitria, 2023). Only by correctly integrating VR into traditional educational curriculums, the learning experience will be maximized. Regarding content, one risk is the misrepresentation of facts, which risks not only the spreading of false or incorrect information, but even the teaching of false information. The accuracy and quality of VR content can vary widely, and educators must ensure that the content aligns with educational standards and objectives.

There are also some ethical issues connected to data and privacy protection rights, which become more complex when dealing with educational contexts and minors. Issues such as informed consent, privacy and identity protection have emerged with the emergence of the Internet (Kavanagh et al. 2017) and apply in the same way to virtual reality worlds.

Some other concern raised are related to the collection of student data, tracking student behaviour, and the potential for misuse of the technology.
In the same context, considering the practical application of VR in training real life competences and skills through mediated VR platforms, it could be argued that this opens for misuse of the technology itself. It would be the case of educational games that, instead of being used for their purpose, can be misused in a variety of ways: from creating distractions to trying to cheat or scam the game, from circumnavigating control to inappropriate content creation and use.

Finally, some concerns are related to the rights to access knowledge and to the learning effectiveness of these devices. As already mentioned, VR devices and technologies might be useful to create inclusive learning environments, but the effectiveness of virtual reality in improving learning outcomes is still being studied. Depending on the environment and topic matter, some studies reveal favourable effects, while others show limited or mixed results (Kavanagh et al. 2017). They might also disadvantage the same people they were designed to support and further distance abled from disabled individuals.
For clarity, the main limitations connected to the use of VR in education can be summarized in the following table.

Limitations connected to the use of VR in education
(a) High costs and lack of funds
(b) Malfunctions of the devices
(c) Resistance to adopt by educators
(d) Quality of content
(e) Misrepresentation of facts
(f) Data and privacy protection rights
(g) Access knowledge
(h) Inappropriate use

Table 6 - Summary of limitations connected with the use of VR in education.

CHAPTER 3 - Virtual Reality as a tool to promote Human Rights

> *[Immersive technology] is just like the atom splitting. It can be used for helping mankind, lifting mankind, or it can be used for destroying mankind. That's where we are with virtual reality. We're on the cusp of having powerful tools like fire. What are we going to do with it? How are we going to use it? How are we going to put in safeguards so that we don't get burned?* [1]
>
> **DR. THOMAS FURNESS – DEVELOPER OF FIRST IMMERSIVE TECHNOLOGIES**

In a rapidly evolving digital age, the world of technology has become an influential force in shaping our perceptions and behaviours. Virtual Reality (VR), a groundbreaking innovation, transcends traditional boundaries by immersing users in digitally created environments. In recent years, individuals have started to gain access to Virtual Reality more and more. Not only the devices needed to experience VR are now for sale at reasonable prices, but there has been an increase in the availability also of VR filming cameras, editing tools, video distribution platforms and all VR-related technologies (Sora-Domenjó, 2022). Moreover, beyond its entertainment applications, VR films and videos have started to emerge at all media levels, and practitioners as well as researchers have promoted the gains of using VR storytelling to foster empathy.
A quick online search shows that many media outlets – for instance, BBC News, The New York Times, Al Jazeera – as well as many international organisations are all started using VR technology to produce videos and content categorized as Virtual Reality Non-Fiction VRNF) content. This type of content – such as interactive journalism, immersive journalism and even virtual tourism to dark sites – is believed to elicit empathy and through that foster understanding and connection between humans and promote better human rights promotion and protection.

This chapter explores the remarkable intersection of virtual reality, tourism and education, delving into the ways in which this immersive technology can revolutionize

our understanding of human rights, ultimately fostering a more compassionate and inclusive global society. By examining the relationship between virtual reality and empathy, we can understand the transformative power that this technology holds in driving positive change and advancing the cause of human rights.

1. Virtual Reality as an "Empathy Machine"

In the realm of tourism and education, VR has emerged as a transformative tool, offering viewers an unparalleled opportunity to step into the shoes of others, experience diverse perspectives, and promote genuine emotional connections with the narratives they encounter. In recent years, the press, immersive media practitioners, and researchers have promoted the virtues of virtual reality storytelling in fostering empathy (Sora-Domenjó, 2022), focusing on its ability in enhancing understanding, compassion, and positive change in a rapidly evolving digital age. The empathy model associated with VR entered also the world of media outlets, such as the New York Times and The Guardian, and has been adopted also by the UN and international NGOs to promote peacebuilding and social change.

The idea that VR films can elicit sentiments of compassion and empathy in the viewer has been a matter of discussion between VR developers for many years, but the idea that VR could become the "ultimate empathy machine" was popularized by Chris Milk in a Ted talk. In his talk, Milk (2015) affirmed that VR "is a machine, but through this machine we become more compassionate, we become more empathetic, and we become more connected. And ultimately, we become more human". In this sense, by the so-called "empathy machine" he refers to the empathetic mediated effects of immersive films, (VFXV, 2018), and their ability in promoting pro-social behaviours. In VR films and immersive experiences there have been many attempts to elicit empathy by placing the spectator in a distant place where they can witness the life of others. The purpose of this is to allow them to get into other people's shoes and, thanks to that, connect with each other (Sora-Domenjó, 2022). The following are the key VR impacts associated with empathy that have been documented in the literature: implicit cultural and group bias, embodiment, viewpoint taking, and virtual bodies (Sora-Domenjó, 2022).

The concept of empathy alone and what it entails has been studied in various disciplines ranging from psychology to anthropology, from neurology to sociology, and there is still disagreement in literature about its definition and nature (Sora-Domenjó, 2022). Sanchez-Laws (2020) argued that in the VR-empathy debate the first issue to be analysed and understood is precisely the concept of empathy. Singer, a neurologist who has extensively published on the neurological basis of empathy, describes empathy as a shared effect, in the sense of feeling what another person feels (Singer and Lamm, 2009). Also Susan Lanzoni's describes it in similar terms: "As many understand it today, empathy is our capacity to grasp and understand the mental and emotional lives of others" (Lanzoni, 2019, p.14). Many psychology studies have drawn that humans have an empathetic response to the pain of others. According to neurophysiological research, when people view or imagine the pain of others, their brain activity is similar as if they were experiencing the observed agony themselves (Singer et al., 2006). Building on this understanding of the concept of empathy, Sanchez-Laws (2020) argues that immersive experiences can generate empathy. This is especially true thanks to "data-rich facial recognition technology and expression fidelity that VR can produce, which activate this hardwired response and thus generate empathy" (Hassan, 2019, p.4; Sanchez-Laws, 2020). This means that potentially VR experiences could represent the perfect tool as the complete immersion into another context or life induces the viewer to feel closer to the narratives presented, which further fosters understanding and compassion. However, some scholars have questioned the benefits of using VR and affirmed that it is as effective in increasing empathy as 'less advanced' activities such as reading or imagining other people's experiences (Sora-Domenjó, 2022). Bollmer (2017) even questioned the whole idea of 'empathy machine' by arguing that it is impossible to generate a sentiment whose definition is still very problematic, and no academic consensus has been reached yet.

Literature also suggests that, due to evolutionary factors, empathy works better in groups who appear similar to us: "Individuals tend to have the most empathy for others who look or act like them, for others who have suffered in a similar way, or for those who share a common goal." (Riess, 2017). This entails that empathetic responses mediated by VR are influenced by interpersonal and social-cultural contexts and biases (Riess, 2017), such as racial bias and stereotypes. In this sense, embodiment through VR has been found

to be useful in combating these stereotypes, also because visualizing one's one body in a VR experience provides powerful evidence for place illusion (Sora-Domenjó, 2022). One example is Hyphen-Labs which developed a VR artistic project named *Neuro Speculative Afrofeminism (NSA)* aimed at challenging racial out-group perceptions. In this work all participants were embodied in black women's to understand the social struggles and discrimination suffered by black women.

Additionally, an important distinction must be made between the affective and cognitive aspects of empathy with the ability of understanding and seeing things from another point of view (POV). In this sense, studies showed that using POV in VR has been effective in reducing negative bias and stereotypes, as well as changing behaviours (Sora-Domenjó, 2022). This means that generally both implicit bias and cultural or personal stereotypes can change individual's VR experiences and their effectiveness in provoking sentiments of empathy. Empathy responses from a VR experience might also differ and vary based on the individual and their awareness of the emotional implications of what they are seeing (Sora-Domenjó, 2022). Role-playing is also a useful tactic to elicit empathy in the context of interactive media and digital games (Gutierrez et al., 2014). In this sense, studies found that perspective-taking in imagining another's situation mostly leads to empathy and altruistic behaviours not only towards the individual but even for the entire group. On the contrary, imagining oneself in a stressful situation can lead to empathy as well as distress and or increased stereotyping of the other (Sora-Domenjó, 2022). In general, in order to feel empathy, the viewer is required to move away from their visceral reactions to the scenes they are witnessing in VR and try and understand the other's situation in their own terms (Sanchez-Laws, 2017). Ultimately, empathy is not about the viewer but about the other, so the goal is to use the emotions provoked by the VR piece to engage the audience more deeply. For Rifking (2010), it is the prospect of mass communication that would allow the creation of a sentiment of 'mass intimacy', which in turn generates the conditions for mass empathy to emerge. The extension of empathy at the mass level is necessary in order to make it a social emotion and to become more than the singularly experienced emotion of the individual (Hassan, 2019). Ultimately, only by transforming empathy into a cultural issue or process it can bring to social change.

Possibilities provided by VR immersivity have been especially appealing to news medias and international organizations. Not only might it improve the attention of audiences to the content presented, but it also provides a means of strengthening the fourth estate's civic role in informing and enlightening the public through absorbing informational stimuli on political events, conflicts, natural disasters, and the like (Hassan, 2019). This means that the empathetic consciousness generated by witnessing a VR experience could be the key to social and political change (Hassan, 2019). Some research centres, such as MIT's Virtual Human Interaction Lab, have already put great effort into financing studies on VR's potential to enhance empathy with the overall goal of improving relationships in the real world (Hassan, 2019). Many others have also started using VR with this purpose, creating a whole new genre of storytelling known as Virtual Reality Non-Fiction (VRNF).

2. The landscape of Virtual Realty Non-Fiction content

Virtual Reality Non-Fiction (VRNF) is a relatively recent form of immersive interactive media content or filmmaking format created for consumption using VR devices. As the name suggests, it reflects the encounter between virtual reality (VR) and non-fiction (NF) content. If the former is a relatively new technology that is only now gaining popularity amongst consumers, the latter has played an important social and cultural role in many societies for many years. In this sense, VRNF borrows from and expands on existing forms of nonfiction content, such as interactive media, gaming, and immersive theatre (Bevan et al. 2019) and combines it with an innovative way of storytelling. It has the potential to provide thought-provoking and entertaining experiences, while still depicting a realistic story.

One of the first developers of a type of content was American journalist and filmmaker Nonny de la Peña, who began experimenting with the creation of non-fiction VR content, that she later defined as "immersive journalism". It was her studies that inspired Chris Milk to define VR as the "ultimate empathy machine", exploring the potential of VRNF as a driver for prosocial behaviours (Bevan et al. 2019).

Lately, many news outlets and international organizations have been developing innovative ways to deliver news stories and VR has been a big part in that. Not only,

VRNF films have also increased visibility thanks to their appearance in film festivals such as the Venice Film Festival and the Tribeca and Sundance[37] film festivals.

This type of content allows the viewer to transition from a passive spectator role to become an active participant, and it includes a variety of thematic genres, such as documentary, journalism, exploration and history (Bevan et al. 2019). VR non-fiction focuses on real-world events, people, and issues. It is used to tell actual stories, report on current events, or provide educational content in a more engaging manner. The most common themes of VRNF appear to be exile, refugee camps and diaspora (Sora-Domenjó, 2022). The purpose is to create deeper understanding and awareness of important topics by employing different storytelling techniques that guide the viewer through the experience.

In a study by Bevan et al. (2019), 150 VRNF titles were examined and categorised depending on the perspective or point-of-view (POV) taken on by the spectator. Indeed, the spectator can participate in first person, meaning that the experience is seen as if the viewer were a part of the virtual world; they can participate in fly-on-the-wall modality, where the camera is strategically placed and the viewer is external to the scene and must draw their own conclusions; or as omniscient, where the viewer is external to the scene but with a voice-over narration contextualizing and explaining the story. Bevan et al. also noted that, although VRNF could allow viewers to 'stand in the shoes' of the filmmaker's subjects and to experience and connect to 'the real' in ways that standard two-dimensional film cannot, in only 3% of all reviewed titles the spectator actually played the part of an active participant. The interaction, intended as a mechanism that allows the user to explore the space beyond movement of their head, was mostly (70%) gaze-based and mechanic, where the viewer only moves through a point-and-click function.

Therefore, they concluded that "there is a reticence among VRNF content producers to take the leap of inviting the viewer to take a participatory role in their experiences" (Bevan et al, 2019, p.10). Moreover, the participants did not feel like a co-present

[37] Nonny de la Peña was the fist journalist to debut with a VR film to Sundance. In 2012 she presented *Hunger in Los Angeles*, a piece about homelessness and hunger in the United States. Retrieved from Robertson A., Virtual reality pioneer Nonny de la Peña charts the future of VR journalism, The Verge, 25/01/2016. Available at: https://www.theverge.com/2016/1/25/10826384/sundance-2016-nonny-de-la-pena-virtual-reality-interview

participant in the virtual world and, when looked at or addressed directly, they felt like it was ‘breaking the fourth wall’, indicating that they saw themselves as mere spectators.

Virtual Reality Non-Fiction (VRNF) content spans a wide range of topics and formats, and it's continually evolving as developers experiment with new storytelling approaches. In this thesis only three types will be analysed: interactive journalism, immersive journalism and virtual reality tourism to dark sites.

a. Interactive journalism and the world of serious games

The use of interactive digital media by journalists had already emerged before VR through interactive journalism. This is a form of delivering a news story to people by engaging them in educational games or ‘serious games’. The concept of serious game has been developed by Abt (1970) and described as follows:

> *“We are concerned with serious games in the sense that these games have an explicit and carefully thought-out educational purpose and are not intended to be played primarily for amusement”. (Abt C.C., 1970)*

Gaming elements, in specific, have been a part of education for a long time and are useful to provide learners with an accurate simulation in VR academic environment, as they are a strong driver for motivation in students. As mentioned in Chapter 2, game based VLE allows for the development of contextual understanding, which is an important learning process in which students can solve "authentic problems in real-world situations" in the VLE and afterwards apply their knowledge in the real world (Chiao et al., 2018).
The seriousness of these games comes from the fact that they provide some message or information to the player, whether it is knowledge, skill, or in general some content (Laamarti et al., 2014). Serious games are defined as having three components: experience, entertainment and multimedia (Laamarti et al., 2014).
In the same way, interactive journalism is a form of journalism that involves engaging the audience in the news reporting and storytelling process. It goes beyond traditional one-way communication from journalists to readers or viewers and encourages active participation and interaction. The idea is that users enter a digitally represented world where there is an element of choice, so the user can choose between different options and possibilities, investigating different aspects or details of the news story. In this way, the

content offers the users a chance of navigating a plausible environment, occasionally presenting documents, pictures or content of the actual story, where the experience is the possibility to interact and to take decisions (De la Pena, 2010). An example is an educational game called *Global Conflict*[38] where the player plays the role of a journalist navigating through conflict-affected areas and interacting with individuals living in these areas. In *Liyla: The shadows of War*[39] the user is also a citizen affected by a conflict, the invasion of Gaza, and shall understand how to survive and how to keep safe their family. These games' scenes and missions represent plausible scenarios as they are inspired from news accounts, interviews of civilians or soldiers and reports (De la Pena et al. 2010). The idea is that the games test individuals' perceptions of conflicts and society while enabling them to examine and react to global themes such as media bias, globalization, corruption, democracy, terrorism, and human rights.

Even the United Nations produced a serious game called *Path Out*[40], following the adventures of a young Syrian artist that escaped the civil war in 2014. After its release this game was re-launched in a 'Teacher edition' by UNHCR for World Refugee Day in Austria to help schoolchildren stand in the shoes of a refugee (UNRIC, 2022).

Interactive journalism and serious games play a crucial role in adapting to the changing media landscape, where digital technologies and online platforms are central to news consumption. It fosters a more dynamic and inclusive approach to journalism, where the audience becomes an active participant in the news ecosystem.

b. Immersive journalism

Nonny de la Pena, the first developer who had the idea of using VR for journalistic purposes, defines immersive journalism as "the production of news in a form in which people can gain first-person experiences of the events or situation described in the news story", in this way it "elicits a connection, works against indifference and relies not on presentation but on experience" (De la Pena et al. 2010). Immersive journalism includes two fundamental ideas. The first one is that putting people in situations that feel as real as the original news event would increase participation. The second idea is that using a

[38] SeriousGames.net, Global Conflicts. Available at: https://www.seriousgames.net/en/portfolio/global-conflicts/

[39] Liyla.org, Liyla & The Shadows of War. Available at: https://liyla.org/

[40] United Nations Regional Information Centre for Western Europe, Path Out, 2022. Available at: https://unric.org/en/path-out-video-game/

first-person perspective might elicit a more intense emotional response (Sanchez-Laws, 2017).

The idea behind the experience is that the participants would be able to enter a virtual scenario which recreates the settings of the news story. The user joins through an avatar whose movements in the virtual world match the movements of the individual's body, and, as they access the location of the story, they can represent either a visitor or an actual character depicted in the news story (De la Pena et al. 2010). In this case, the integration of primary source material documenting a news story allows to create an authentic virtual space, which both validates and reinforces the sense of immersion and realism (De la Pena et al., 2010).

Three elements are particularly important to generate immersivity: place illusion, plausibility and virtual body ownership (De la Pena et al., 2010). The first refers to the strong sensation of presence that the users feel in a virtual environment, even though they know that they are not actually there. Plausibility, then, refers to the situation portrayed, and the dynamics of events represented, and the likelihood of them happening in real life. This includes how one carries out his/her actions, responses from environment and relatable events. Virtual body ownership, finally, is concerned with the psychological representation that our brain has of our body. Studies (Botvinick e Cohen, 1998; Petkova e Ehrsson, 2008) show that it is possible to give individuals the illusion that foreign objects pertain to their body, as well as inducing body experiences or giving individuals a feeling of ownership of their virtual body. This was practically proven with *Gone Gitmo*[41], a VR experience mimicking the real-life conditions of Guantanamo Bay prison. The experience involved a series of scenarios where the participant's avatar would be confined in a cell in Guantanamo Bay prison tied in body stress positions hearing an audio track of an interrogation taken place an adjacent cell, as documented by human rights advocates and NGOs. Moreover, the avatar's movements were perfectly synchronised to those of the participant, including heartbeat and breathing rhythm, thanks to HDM and chest strap that monitored the body's functions (De la Pena et al. 2010).

[41] Massachussets Institute of Technology, Nonny de la Pena, Peggy Weil, _Gone Gitmo, 2007. Available at: https://docubase.mit.edu/project/gone-gitmo/

The intention was to combine best practices of journalism to a specifically designed virtual space to intensify the user's psychological and emotional involvement in the scene (De la Pena et al. 2010). The combinations of illusion, plausibility and virtual body ownership created a sense of immersion so great that users reported feeling of discomfort and stress, even when they knew they were sitting in a comfortable position.

The important change that virtual reality is bringing to journalism lies not only in the possibility to present the facts and to experience them at the same time, but mostly in the transformation of the self that happens in the users (Jones, 2017), who end up as first-person participants in the events they are presented. This creates a strong sense of presence and illusion that has great potential to induce an emotional involvement in the event. It can be said that this form of journalism goes against all traditional journalism values, where a good report gives information in an objective and factual way, lacking emotional involvement (Jones, 2017) or the intervention of personal views (Sanchez-Laws, 2017). On the contrary, immersive journalism seeks to combine powerful storytelling with immersivity to elicit emotional responses from the audience. This further allows to put a focus on the role of the journalists by changing the narrative of news and bringing a personalised approach to the storytelling (Jones, 2017). Since the narrative part of a news story is fundamental to elicit emotions, Jones (2017) divided narrative in two categories: reporter-led and character-led stories. Generally, immersive journalism is reporter-led, and the audience plays the role of a passive observer, and, even if they are able to interact with the virtual environment, they cannot influence in any way the setting (Hassan, 2019). In a way, they can be considered guided news reports, in which the reporter tells the story and shows the audience where to look, also aided by texts on screen to convey more information (Jones, 2017). On the contrary, in character-led stories the one guiding the narrative is an individual being involved in the told facts, allowing the viewer to become totally immersed. Although the objectivity of this style of journalism has been questioned it remains an engaging way of telling individual's stories (Jones, 2017), as well as introducing innovative ways of reporting news, advocating and creating awareness on important topics.

c. Virtual Reality Tourism to Dark Sites

The idea of combining the emerging sector of VR tourism with VRNF and interactive storytelling has recently emerged. As discussed in Chapter 1, the hypothesis that virtual reality trips might be considered true journeys to a destination was dismissed. However, since tourism is also connected to a form of storytelling, which involves the learning of history and culture of the destination, a VR touristic experience may be considered as a form of interactive storytelling (Fischer e Schoemann, 2018) or VRNF content.

The connection between digital storytelling and tourism has been advocated by scholars as it is believed to be useful to integrate and explore various perspectives and historical experiences (Fischer e Schoemann, 2018).

Although controverse and at times problematic, the phenomenon of dark tourism has existed ever since the dawn of tourism. Dark tourism is a very peculiar type of tourism sees the traveller visit and explore only sites where death, suffering, crimes or tragedies occurred (Fischer e Schoemann, 2018). Although the whole tourism industry is at times problematic, as it may reinforce patterns of inequality, colonialism, consumption and structural injustice (Fischer e Schoemann, 2018), dark tourism is considered by some (McDaniel, 2018) one of the most ethically complicated forms of tourism . Visits to these sites usually come with specifically trained guides who present a historical recollection and often a reflection upon mortality, suffering and oppression occurred in each specific spot (Fischer e Schoemann, 2018). Some of the most famous spots of dark tourism are places like Chernobyl in Ukraine, or Auschwitz concentration camp in Poland.

Although different from the physical visit, options are emerging within museums or exhibitions to experience dark sites in VR. The intention behind this virtual representation of atrocity is to give the participant a pedagogical and cultural reflection on that specific dark site. According to Fischer e Schoemann (2018) the pedagogical infrastructure of the VR experience is meant to support the user's journey as they explore the site and elaborate their own understanding of death and suffering. This may involve the use of actual archive material, such as photographs, letters and documents that the user can uncover. In this case, the deliberate realism of a virtual experience is considered

an appropriate way to showcase historical horrors, in order to spark emotive responses in the user (Fischer e Schoemann, 2018).

In 2017 Wired wrote about a VR experience called *The Last Goodbye*[42] produced by USC Shoah Foundation which recreates a VR reproduction of Majdanek concentration camp in Poland. This experience represents an exploration of an actual historical site where the participant walks in the shoes of a survivor, learning and exploring the site through his eyes. This type of experience not only honours the legacy of survivors, but it also respects the learning autonomy of users. When developed, it was believed with the purpose of countering negationists beliefs and to maintain real and actual the remembrance of the few remaining survivors (Fischer e Schoemann, 2018). The idea behind a virtual trip of a dark site is that the site becomes less about the suffering that occurred in it and more about the feelings and reflections it sparks in the virtual visitor.

Although it might seem that virtual dark tourism and immersive journalism do not have much in common other than using immersive technologies to engage audiences, their content, style and emotional impact does not differ significantly. On one hand, virtual dark tourism is *tourism*, so it fulfils the curiosity of an individual to visit a particular destination and to learn more about it. It has mostly the purpose to educate and remember past historical events associated with human history, through the exploration of places where suffering has already happened (Fischer e Schoemann, 2018). The narrative approach involves storytelling and includes elements of history, culture and memory. On the other hand, immersive journalism is *journalism* and, therefore, focuses on ongoing events and news stories that impact or influence the viewer's life in some way (i.e. social issues and environmental crises). Its purposes are creating awareness and reporting news stories by immersing the viewer in the setting (De la Pena, 2010). The narrative approach is also more akin to journalism and less to storytelling, since it aims to inform of ongoing events by providing accurate information.

Although one is called tourism and the other journalism, they do not differ in offering a VRNF type narrative which aims to evoke an emotional response from the user. This is

[42] Watercutter Angela, The incredible, urgent power of remembering the Holocaust in VR, Wired.com, 28/04/2017. Available at: https://www.wired.com/2017/04/vr-holocaust-history-preservation/

the ultimate goal, meaning to educate, inform and advocate by sparking emotions in viewers.

3. Promoting Human Rights through Virtual Reality

As previously explained, interactive technologies are currently being explored as a potential mean to evoke empathy. In this sense, VRNF content, with its capacity to transport viewers into real-world situations and immerse them in compelling narratives, emerges as an effective tool to promote human rights. The intersection of Virtual Reality Non-Fiction (VRNF) and human rights advocacy is believed to hold the promise of transforming the way we perceive and champion fundamental rights and freedoms.

In this context, Bujic et al. (2020) produced a study investigating how immersive technology can change individuals' human rights attitudes. As seen in paragraph 1 of this chapter, from a psychological perspective, the "empathy machine" builds on the immersivity of virtual scenes to induce sentiments of empathy and compassion in the viewer. Since both these sentiments have been shown to have positive effects in endorsing human rights and social equality (Pratto et al., 1994), we can assume that VR could be an effective instrument to promote human rights. This assumption was confirmed by Bujic et al. (2020, p. 1418) who found that "*even the most simplistic immersive journalism content, such as an animated 360-degree video, can bring about a positive shift in users' human rights attitudes*". Also, in comparison with traditional medias and forms of doing journalism, VR and immersive experiences are more positively associated with a shift in human rights attitudes. This is because immersive experiences elicit a strong sentiment of involvement with the content, which in turn has a positive effect on human rights attitudes (Bujic et al. 2020). In specific, VRNF, by conveying the stories of the oppressed, marginalized, and those who dare to challenge injustice, can serve as a catalyst for awareness, empathy, and collective action. Additionally, it has the potential of reframing the human rights discourse from an abstract and institutional level to a more personal one, therefore making it more tangible.

The immersive direction in media production is especially important to promote human rights, when considering mass social issues related to the "collapse of compassion"

(Slovic, 2010). This term refers to the psychological perspective in which an individual's suffering is more impactful than that of many others; meaning the higher the number of people in need of help the lower the compassion. By bringing the viewer closer to the individuals suffering via perspective-taking, VR transforms the latter into subjects with whom the users can relate (Bujic et al. 2020).

Moreover, the way in which human rights attitudes are formed and maintained has been studied with respect to peer-influence, political ideology and personality (Bujic et al. 2020), although the last has been proven to be malleable (Cohen, 2003) depending on experience or specific interventions. In this sense, Passini (2014) suggested that an individual who has a conservative viewpoint at the moment of witnessing the VRNF content will be more likely to undergo a greater shift in attitude compared to liberal viewpoints. On another note, Bertrand et al. (2018) argued that an immersive experiences where the user is embodied could be even more effective than those where there is no embodiment, independently of individual political viewpoints. Additionally, by stimulating positive human rights attitudes, virtual reality (VR), has the potential to aid in the achievement of the SDGs relating to educational equality and facilitating access to essential assistance for all individuals (Sætra, 2023).

Concluding, with the ability to bear witness to human rights issues in a profoundly immersive and personal way, VRNF creates innovative advocacy efforts, potentially ushering in a new way of doing human rights promotion and activism.

a. Educating on morality

Besides evoking sentiments of empathy in the viewer, a VR film or experience also has potential to develop cultural understanding and to educate on ethical dilemmas. While VR itself doesn't teach morality directly, it can provide immersive and engaging environments for ethical discussions and moral education.

When it comes to children, however, the effectiveness of VR in this sense relies heavily on how VR is used and integrated into educational programs, as well as the quality of the content and the guidance provided.

In a 2023 study, Shim investigated the usefulness of VR in teaching moral education to children, starting from a report (2018) by the Organisation for Economic Cooperation and Development (OECD) affirming that “creating new value”, “reconciling tensions and dilemmas” and “taking responsibility” are the core competences required for humans of

the future. In particular, the focus was on the capacity to perceive moral issues, make moral judgements and choose to undertake reasonable actions in moral dilemma situations. In this sense, because morality is tied to interpersonal connections, it is vital to develop interactions among learners in the context of teaching and learning, such as discussion and cooperation. By creating a VR activity that includes the three main characteristics of VR-based learning environments (interaction, imagination and immersion) and combining it to both collaborative learning and moral issues, Shim was able to look into the development of moral sensitivity in children (Shim, 2023). In particular, he noted that the VR experience helped the students to consider moral conflict situations or dilemmas from different perspectives than their own's, while the group decision-making process gave them an opportunity to reflect on the issue both socially and rationally.

Although Shim's study proved an enhanced moral sensitivity in the students that took part of the VR experience, it did not show significant effect in improving moral judgement. This is because the VR experience is effective in motivating students and getting their attention, however there is a limit in presenting an environment that creates a sense of presence as to develop morality it would be necessary to practice it in daily life Shim (2023).

While VR has potential to enhance moral education and discussions, it is crucial that developers and educators use this technology responsibly and ethically. Not only it should be guided by well-considered educational principles and respect for individual beliefs and values. But it should also be accompanied with discussions and reflections to ensure a complete understanding of morality.

b. Promoting Global Citizenship Education

In an increasingly interconnected and interdependent world, the importance of global citizenship education has never been more significant and, thanks to VR technologies, the possibilities for promoting global citizenship education have expanded in many ways. Global Citizenship Education (GCED) is defined by UNESCO as "A framing paradigm which encapsulates how education can develop the knowledge, skills, values and attitudes that learners need to build a more just, peaceful and sustainable world and to thrive as global citizens in the 21st century" (UNESCO, 2014; Shaban Ahmed,

2023). In specific, UNESCO's work in this field is guided by the Education 2030 Agenda and Framework for Action, notably Target 4.7 of the Sustainable Development Goals (SDG 4 on Education). The purpose of GCED is to equip the youth with the necessary knowledge, values and skills to become citizens of the world, by educating them on concepts such as global context of human rights, diversity, inclusion, equality and peace (Shaban Ahmed, 2023).

In this sense, virtual reality non-fiction (VRNF) contents can provide effective learning tools to promote GCED, building on open-mindedness and intercultural communication skills (Shaban Ahmed, 2023). VR technologies, indeed, offer an immersive and interactive platform that transcends the boundaries of traditional education. Not only an interactive VR experience is an engaging and entertaining activity for students, but it is also student-centred. As seen in previous chapters, increased immersion and sense of presence can influence student attitudes and foster empathy, active learning, and intercultural understanding (Gorin, 2022). VR can also be used to achieve educational goals such as creativity, constructivist learning, empathy, and emotional intelligence (Shaban Ahmed, 2023).

Therefore, by leveraging this technology, educators and institutions can create dynamic and engaging learning experiences that take students beyond the confines of their classrooms and communities, into the heart of global challenges and cultural diversity. This is particularly important to encourage students to be global citizens, as VRNF can visually show how different cultures interact with one another, and the many similarities that civilizations share that extend beyond their flags and boundaries (Shaban Ahmed, 2023). Ultimately, VR represents an experimental tool for promoting open-minded education and intercultural communication in schools, as well as creating awareness on prejudices and politicized concepts.

Since the field of virtual reality is becoming increasingly interdisciplinary, and it is rapidly expanding to potential research venues in computer-human interaction, education, and training (Shaban Ahmed, 2023), VR could be a transformative tool for advancing global citizenship education, potentially creating a generation of well-informed and socially responsible global citizens.

c. Use of Virtual Reality by Humanitarian Organisations

Virtual Reality has also proven to be a valuable tool for international organizations and humanitarian groups to promote human rights in a variety of ways. Many different organizations have started adopting VR for humanitarian purposes. Popular initiatives include using VR to raise awareness, educate the public, and engage with stakeholders on humanitarian and global development issues, as well as documenting human rights abuses, and building powerful advocacy campaigns.

In 2022, Valérie Golin explored the use of Virtual Reality by Humanitarian organizations, exploring to what extent humanitarian VR can work as an empathy machine, bridging the distance between viewers and mediated others. In this regard, Golin affirms:

> *Since 2015, the UN and international NGOs have turned to VR for raising funds or awareness, targeting different communities such as diplomats, military groups or decision-makers. VR technology is considered to induce behaviour change and emotional resonance, which offers considerable potential in education, sports, mental health and humanitarian aid (ICRC Innovation Unit 2019). By pretending to erase the distance, to humanise the story and to elicit empathetic connections between viewers and affected populations, immersive storytelling thus questions the well-known paradigms of distant suffering and compassion fatigue (Campbell 2014; Moeller 1999) – GOLIN, 2022, P. 148*

In particular, Golin (2022) emphasises on the opportunity to move beyond the so-called 'mobilization of empathy' – a rhetoric long present in humanitarian sentiments and campaigning (Wilson e Brown, 2009) – to explore the potential of the 'mobilization of shame'. Mobilizing shame is also a dominant model in human rights activism (i.e., *naming and shaming* is a full confrontational strategy used to shed light on problematic or unlawful practices) building on shame "as an emotion that arises from knowledge or consciousness, an embarrassment that comes from others" (Gorin, 2022, p. 163). This is a tactic used in cases of lack of enforcement mechanisms and it aims at exposing the gaps between declared values and actual behaviours. This is mostly done by utilizing virtual movies which supposedly elicit sentiments of empathy and resonance with a distant other (Gorin, 2022). Hundreds of VR films on issues ranging from natural catastrophes to infectious diseases, climate change, migration, war-related violence, women's rights, and education have been made by organisations such as Save the Children, International Red

Cross, UN agencies and others. Empirical studies showed that responses to visual depictions of armed combat increase annoyance, resentment, wrath, and shame, but also resistance and delight in audiences (Cohen, 2001). People's reactions are complex, and they have mixed feelings, especially considering that audiences go through several emotional stages when confronted with visual evidence. Often the feelings that emerge are pity or empathy towards the victim, indignation or anger towards the perpetrators, and shame, guilt and powerless-filled feeling towards themselves (Hoijer, 2004). However, virtual films can also trigger stress, anxiety or other similar physiological reactions, as VR can induce in strong physical and mental stimuli (Gorin, 2022). Transforming distant audiences into witnessing publics is also based on the concept of "seeing is believing," which holds that visibility helps bringing evidence to light (Gorin, 2022).

The United Nations (UN) and several of its specialized agencies and humanitarian organizations have also started experimenting with virtual reality (VR) and augmented reality (AR) technologies. In specific, the UN is turning to immersive storytelling to inform decision makers in New York on international affairs, as well as using it to inspire humanitarian empathy. For instance, in 2019 UN Women co-produced four virtual reality films – created by Google with the support of Vital Voices – to tell the stories of four activists who are defending women's rights in different parts of the world. The goal was to amplify their voices through an innovative storytelling technology[43]. In December 2022, UN Department of Political and Peacebuilding Affairs (UNDPPA) invited diplomats from all over the world to try out Virtual Reality (VR) on the work of the UN Verification Mission and peace process in Colombia[44]. The goal was observing VR's impact on their thoughts to understand if it could be a valuable tool during decision-making processes. All diplomats who took part in the VR experiment expressed positive impressions about it and its possible uses in diplomacy and peacebuilding.

Moreover, in 2015 the United Nations Virtual Reality (UNVR) programme was established in coordination with the UN Sustainable Development Goals Action campaign (Golin, 2022). And in 2021 United XR Programme was launched "to improve

[43] UN Women, Virtual reality film series: Women human rights activists, 8 March 2019. Available at: https://www.unwomen.org/en/digital-library/multimedia/2019/3/vr-womens-activism

[44] The United Nations Virtual Reality Experiment – Innovating for Peace Series, 16 Dec 2022. Available at: https://media.un.org/en/asset/k12/k12aut27i5

and diversify the way the UN communicates, plans, educates, provides support and interacts across the globe" (UNGSC-TTDU, 2021, 1:59).

Other organisations, such as Médecins Sans Frontières (MSF), have been using VR films as a tool to lobby, influence and policy change. Indeed, since August 2017, it has been utilized in closed-door roundtables, lectures, and bilateral discussions with military groups, in collaboration with the Geneva Centre for Security Policy (Gorin, 2022).

The emerging world of VR and human rights has been a matter of substantial debate in many other organizational contexts. In 2016 Human Rights Watched organized a 'Special Event - Discussion Panel'[45] featuring a selection of video and animation clips and several experts to debate on risks and advantages of using VR to promote human rights. Recently, also UNESCO organized an event[46] to understand the implications of the use of VR on laws and legal systems, considering both the potentialities of using it in courtroom while also discussing how to ensure that it remains consistent with principles of justice and fairness.

The use of VR in humanitarian and development efforts continues to evolve, and new applications and initiatives may have emerged. While VR has enormous potential for promoting human rights, it's important to address the ethical considerations surrounding the use of this technology. These include issues of consent, privacy, and the responsible use of VR in sensitive contexts. Nonetheless, as VR technology continues to advance and become more accessible, its role in promoting human rights is likely to grow, offering new and innovative ways to engage with and address pressing global issues.

4. Sustainable Development Goals (SDGs) promotion through VR

The Sustainable Development Goals (SDGs) are a set of 17 global goals established by the United Nations in 2015 as part of the 2030 Agenda for Sustainable Development. These goals were adopted by all 193 member states of the United Nations and are designed to address a wide range of global challenges to achieve a more

[45] Human Rights Watch, The Emerging World of Virtual Reality and Human Rights, 2016. Available at: https://ff.hrw.org/film/emerging-world-virtual-reality-and-human-rights

[46] UNESCO, Virtual Reality Worlds and the Law: How Judges Can Keep Up with the Rapidly Evolving Technology, 6 July 2023. Available at: https://www.unesco.org/en/articles/virtual-reality-worlds-and-law-how-judges-can-keep-rapidly-evolving-technology

sustainable and equitable future for people and the planet. The SDGs are an urgent call to action for all countries – developing and developed – in a global partnership. They recognise that eradicating poverty and inequalities must be combined with initiatives to promote health and education, decrease inequality, and stimulate economic growth – all while addressing climate change and striving to protect our oceans and forests (UN, 2015) Each of the 17 goals is accompanied by specific targets and indicators to measure progress.

Figure 2 - Diagram listing the 17 Sustainable Development Goals © United Nations

The UN Secretary-General also established the UN SDG Action Campaign[47], which aims to inspire and mobilize individuals and organizations worldwide to take action in support of Sustainable Development Goals (SDGs). This Action Campaign engages all those committed to sustainable development in order to realize our common Goals by 2030. It is a campaign also dedicated to raising awareness about the SDGs, improving communications and networks, encouraging citizen engagement, and promoting concrete actions.

Virtual Reality (VR) lately has emerged from the gaming and entertainment realm and caught the interest of international organizations and NGOs as a powerful tool to

[47] Available at: https://sdgactioncampaign.org/about/

promote human rights and fundamental freedoms. In particular, thanks to the fact that it can offer immersive experiences, foster empathy, and drive awareness and collective action VR emerged as an instrument with the potential to significantly impact the pursuit of the SDGs. Since 2015 the UN have coordinated a UN Virtual Reality Series as a part of the UN SDG Action Campaign. According to the official website (https://sdgactioncampaign.org/about/), UNVR presented a series of 5 short films developed with VR technology with the aim of presenting some of the most pressing challenges to decision makers and citizens around the world. These VR short films told stories from all over the world, ranging from the already mentioned *Clouds over Sidra* dealing with the struggles of Syrian refugees living in Jordan, to *Nepal Earthquake Recovery* documenting the state of Nepal's capital Kathmandu just 3 days after the earthquake. From Haiti's *My destiny as a child at risk* telling the stories of many children living daily with threats of violence and lack of opportunities, to Liberia's *Waves of Grace* showing what it meant to live through the peak of the Ebola epidemic in Western Africa. By transcending geographical boundaries and engaging people in a profound and interactive manner, VR emerges as a tool not only to create awareness on the stories of those who are in danger, but also to amplify the voices of those who are often unheard (UN, 2016).

The SDG Action Campaign has the purpose also of collaborating with partners to establish advocacy platforms, awareness campaigns, and fundraising campaigns in addition to displaying the VR experience at high-level UN meetings. In particular, the programme had the quadruple intention of promoting SDGs by focusing on education, fundraising, advocacy and impact (UNVR, 2015).

However, the UNVR project was probably abandoned as its website looks like it was published online without being properly finished and it has not been updated since 2019.

Nevertheless, VR still has huge potential to promote the pursuit of SDGs even if there are still issues connected to accessibility, cost, and ethical considerations. Furthermore, the usefulness of VR in achieving the SDGs is dependent on how it is integrated into broader sustainable development plans and whether it is employed in a way that actually advances the goals while also benefiting disadvantaged and vulnerable people.

a. The 2030 Agenda for Sustainable Development applied to Virtual Reality

The 2030 Agenda for Sustainable Development applied to Virtual Reality. Can Virtual Reality promote the 2030 Agenda? Which Goals does it potentially promote?

Analysing the above-mentioned characteristics and positive implications of applying a VR comprehensive approach to the practical achievements of the SDGs on a global level, the following table expresses all the goals that VR could help meet.

2030 UN Sustainable Development Goals
Goal 4: Ensure inclusive and equitable education and promote lifelong learning opportunities for all.
4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations.
4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.
4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all.
Goal 5: Achieve gender equality and empower all women and girls.
5.b Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women
Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
8.6 By 2020, substantially reduce the proportion of youth not in employment, education or training.
8.9 By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products
Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation.
9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending.

9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.
Goal 10: Reduce income inequality within and among countries.
10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status
Goal 11: Make cities and human settlements inclusive, safe, resilient, and sustainable.
11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage
Goal 12: Ensure sustainable consumption and production patterns.
12.b Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products
Goal 13: Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy.
13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

Table 7 - A list of all SDGs that can be promoted through the use of Virtual Reality

5. Limitations of using VR to promote Human Rights

Virtual reality (VR) technology has undeniably opened up new avenues for advancing the cause of human rights on a global scale. Its immersive nature allows individuals to experience and understand complex human rights issues like never before. However, while VR holds tremendous promise in this context, it is essential to acknowledge the inherent limitations and challenges associated with its use as a tool for promoting human rights.

One of the most obvious limitations is technological, both related to the high costs of VR equipment and devices (discussed in Chapter 2, paragraph 4), and to the location and time needed for the experience. This refers to the fact that viewers' engagement in the virtual environment is often confined to a specific location and time. There is no opportunity to experience humanitarian films interactively unless specific hubs or digital installations are intended to allow complete participation with the characters or real people in the film (Gorin, 2022).

Some authors also question the theoretical basis of the capacity of these contents to be able to elicit empathy by affirming that immersion can only be a state of subjective experience. In this sense no person can experience the other's experience of immersion, meaning that even in the most immersive of experiences it would still be subjective (Hassan, 2019). Other authors, instead, argue that the idea of VR interactive environment is misleading: "Interactivity is not merely the ability to navigate the virtual world, it is the power of the user to modify this environment (Ryan, 1994). This means that a user can be involved in the virtual world, but his action would have no consequences in the virtual world, which does not respond to any user action. This is especially true for VR documentaries where only the user can undergo the experience (Hassan, 2019). They argue that VR is fundamentally a commodity spectacle: a sophisticated camera apparatus that produces an integrated spectacle; the ability to stupefy through an immersive representation that is technological before it is virtual—and where reality does not and cannot play a role, except as a representation of a distant spatial and temporal event (Hassan, 2019).

VR technologies and immersive experiences also introduce many issues that still need to be addressed: media embodiment, mind illusions generated by VR, problematic interactions with other participants in the virtual space (Sora-Domenjó, 2022) and others. As VR develops and becomes more widely accepted, human rights risks associated with these technologies become more prevalent (Rodriguez e Greene, 2022). On one hand VR opens up new possibilities for travel, education and leisure, on the other it increases the risk of eroding rights online.

a. Legal implications in Human Rights protection

Traditional human rights protection instruments were developed with the dangers of physical world in mind and are, therefore, less adapted to the many virtual worlds that are currently being developed. This creates a series of legal implications related to the potential abuses of human rights that might occur in the virtual world and how to deal with these violations from a legal standpoint.

Considering that the digital world is in most cases a mirrored version of the physical world – at least for what concerns VRNF – one would be led to think that the protection of 'virtual' human rights would work similarly to the protection of 'physical' human rights. However, due to its inherent characteristics of digitality some human rights that are considered fundamental in the physical world lose value in the digital one and vice versa. For instance, the right to life can be considered the most important human rights to be respected. Since human rights are structured in a hierarchical manner, this right is fundamental in the sense that all other rights are premised on it. In a virtual world, however, the right to life can be totally disregarded as an individual not only can have more than one life through avatars, but the avatar could die and be resurrected or be granted another life (Norwegian NHRI report, 2023). Considering that the right to life is very much connected to physical integrity it would not play a prominent role in a virtual world. On the contrary, the human right to privacy and to the protection of sensitive data would assume a fundamental role in a digital world. This is because in digital or virtual worlds everything is based on data: from freedom to make decisions, to identity rights (Norwegian NHRI report, 2023). The protection of this right becomes, in this sense, fundamental and a prerequisite to the enjoyment of other rights, such as right to freedom of thought and expression and protection against discrimination.

In virtual worlds massive amounts of personal data can be stored and used to map, analyse, and profile persons in unprecedented ways. Thanks to specifically designed VR devices (for instance, Apple Vision Pro launched in June 2023[48]), it's possible to collect biometric data of the physical user and tracking of movement of eyes and other body parts. In specific, behavioural data, such as involuntary psychological reactions, vocal patterns, facial expressions, heartbeat and even body temperature can be tracked and potentially used to make assumptions on the individual's personal life (Rodriguez e Greene, 2022). The increasingly intimate monitoring of how humans engage with stimuli in VR environments can be a risk to users' autonomy, since they represent involuntary and even unconscious behaviours which can be aggregated to generate powerful psychological profiles (Heller, 2020). Depending on the company's business model and ethics these data can be used in different ways. Eye tracking, for instance, can be used to

[48] Introducing Apple Vision Pro by Apple, 5/06/2023. Available at: https://www.youtube.com/watch?v=TX9qSaGXFyg&ab_channel=Apple

reduce disorientation in a VR environment, but it can also be used to reveal a person's interests on specific matters and in that way be used to discriminate (Rodriguez e Greene, 2022).

Moreover, some of the newest VR tech are built with cameras and sensors both inside and outside the devices, in a way that allows the user to visualize the VR apps as well as the 'outside world' seen through the cameras. This allows to gather not only biometric data but also data on the user's surroundings, capturing large amounts of video, images and audio (Rodriguez e Greene, 2022).

Figure 4 - Jacopo D'Alesio shows the camera vision of the new Meta Quest 3 - © Techdale "METAVERSO: RIVOLUZIONE O FALLIMENTO? Meta Quest 3" 17/10/2023

Figure 5 - Jacopo D'Alesio shows the room scanning function of the new Meta Quest 3 - © Techdale "METAVERSO: RIVOLUZIONE O FALLIMENTO? Meta Quest 3" 17/10/2023

The combination of data-tracking with the collection of biometric data of users, with additional emerging visual analytics emerging, could potentially lead to a level of

surveillance previously unknown to any society (Norwegian NHRI report, 2023; Rodriguez e Greene, 2022). This potentially creates tensions between privacy, freedom of expression, freedom of associations and many other human rights that might be infringed withing and thanks to VR.

Furthermore, the international legal structure ought to protect and promote human rights relies on the concept of accountability for states, where states are responsible for protecting human rights and for preventing human rights violations within their borders. Companies are also somewhat responsible for not contributing to human right violations, but this is true mostly only for their activities. So, how can a state be held accountable for protecting its citizens' human rights in a de-territorialised virtual world in which the state lacks primary jurisdiction and is dependent on tech companies that own the technology, control and develop the infrastructure, set its own rules, and run the show? (Norwegian NHRI report, 2023) Even if the user of the virtual world is under the jurisdiction of a state, the latter might have little to no power in a virtual world. Moreover, there is no guarantee that a private company will not put profit over protection of the users (Rodriguez et al. 2021). This is especially true for companies such as Meta – formerly known as Facebook – which has been involved in several scandals revolving around improper use of users' data, such as the Cambridge Analytica scandal and has been accused by its own employees to putting profit before public good[49]. Meta is pioneer in developing some of the most advanced VR tech devises and has even created in 2021 the Metaverse, defined by Matthew Ball as:

> *"A massively scaled and interoperable network of real-time rendered 3D virtual worlds that can be experienced synchronously and persistently by an effectively unlimited number of users with an individual sense of presence, and with continuity of data, such as identity, history, entitlements, objects, communications, and payments." (Ball, 2022)*

[49] Keri Paul and Dan Milmo, Facebook putting profit before public good, says whistleblower Frances Haugen, The Guardian, 4/10/2021. Available at: https://www.theguardian.com/technology/2021/oct/03/former-facebook-employee-frances-haugen-identifies-herself-as-whistleblower

Especially since the birth of the Metaverse, therefore, questions related to accountability, responsibility and jurisdiction over virtual worlds have started to emerge and to become more and more pressing. Further human rights issues also emerged at the intersection between physical and virtual, as human rights violations in the virtual realm could spill onto human rights violation in the physical world and vice versa (Norwegian NHRI report, 2023). This is the case, for instance, of all human rights violations that are already occurring online, such as privacy violations, hate speech, bullying, harassment and threats etc. Human rights violations as such not only could become more prevalent in virtual worlds, especially if the users can interact between each other, but they might even have worse consequences in reality. This is because the subjective experience of virtual harassment and abuse will most likely be more reminiscent of physical violations on the victim (Norwegian NHRI report, 2023). Heller (2020) relates that a study on the experiences of women in social VR experiences has already given interesting results on harassment: 49% of women reported experiencing at least one incident of sexual harassment during the VR experience. In the same study also 30% of interviewed men reported incidents of racist or homophobic comments on VR platforms.

To present date, it is known that data protection and ethical guidelines are not sufficient to limit the dangers of technology, and it would be important to approve and enforce appropriate regulations to protect privacy and other human rights (Rodriguez et al., 2021) in virtual worlds. It is also important to put the protection of human rights at the centre of the development of VR experiences and media, ensuring that human rights are not only protected but extended to the Metaverse.

b. Ethical concerns

Using Virtual Reality technology to promote human rights has the potential to be a very powerful tool, but it also comes with a set of ethical limitations or dilemmas. Generally, when considering newly developed technologies the concern and focus often falls on the relationship of information technology use and right of an individual as a user (Bujic et al., 2020). Rights to privacy, copyright and information access are commonly analysed, but there are many other ethical issues connected to accessing completely virtual platforms. In particular, it is important to consider both ethical concerns from

audiences or users of VR technologies, as well as from journalists and developers of VR content.

One issue highlighted by Yee e Bailenson (2007) revolves around the so-called "Proteus Effect" which builds on the concept of having a virtual identity. In fact, virtual environments, due to its fundamental characteristic of anonymity, allow users to modify their digital self-representations, or avatars. The Proteus Effect builds on the idea that the characteristics of digital avatars influence how individuals perceive themselves and act within the virtual world. Jia e Chen (2017) build on this theory by affirming that virtual environments could also affect how humans interact with each other in the real world.
Moreover, while some VR environments may reproduce real ones, others may create new worlds, in which basic laws can be flipped and turned. The fact that potentially every designer could craft completely different VR environments with completely different characteristics allows for an infinite number of worlds to exist. Many of these are unregulated by national or international laws or regulations, and this could lead to a progressive deconstruction of traditional values built on physical interpersonal relationships. Since this is an emerging domain of technology there are few regulations and laws concerning its functioning, which means that there is no conviction or punishment for any unlawful acts committed online (Jia e Chen, 2017). This may give the user the illusory feeling that everything is allowed in these spaces, as they belong to no one and are 'de-territorialized'. Ultimately, VRNF producers are an interdisciplinary group of stakeholders working in a medium where technology and equipment are fast improving, while there are few best practice guides to work from (Bevan et al. 2019).
An effective system of handling this might be the advancement of civil rights and legislation in the field of information technologies, as well as the upbringing and education of a culture of life in the information world, which contributes to the individual's socialization and adaptation to new technological conditions (Ibrahimova, 2023).

There are also important dilemmas connected to the concept of VRNF as a form of providing educative and informative content. Indeed, taking an individual through a virtual travel that allows them to witness and experiences sites and environments of

conflict, death, suffering for educative purposes, may be problematic. It must be questioned if the ends, namely provoking discomfort, empathy and ultimately a thought-provoking experience, are substantive enough to justify the disturbing images that may be represented in a VR dark tourism experience (Fischer e Schoemann, 2018). Given that an experience as such may cause feelings of discomfort or even emotional trauma in the participant, the way in which the content is presented is a very delicate matter. Since in many cases the goal of presenting a VR experience focused on real past or present events is to be educational, thought-provoking, empathy-seeking and heritage-based (Light, 2017), it may even be counterproductive to show realistic images that evoke feelings of misery and guilt. In fact, these negative emotions may lead people to want to distance themselves from the tragedy just (virtually) witnessed (Fischer e Schoemann, 2018). On the contrary, feelings of sympathy and positivity are the ones that encourage empathy and altruistic action (Pezzullo, 2009).

This is true also for humanitarian films which have the purpose of educating and advocating on specific human rights abuses, and there have been many criticisms connected to the idea of generating empathy on demand through digital media (Hassan, 2020). Immersion in the agony of others, through perception, story, and emotion, does not provide a more complete picture of the reasons of the suffering, as well as the will or capacity to act on them (Gorin, 2022). Moreover, it limits various emotional and cognitive capacities connected to feeling and experiencing empathy, such as knowing the other's thoughts or feelings, thinking how one might react in a comparable circumstance, and experiencing distress as a result of watching the other's suffering. To fully feel these other aspects, viewers of VR humanitarian films would need to interact with the protagonists and engage actively in the scenario (Gorin, 2022). The VR experience of humanitarian settings is purely visual and aesthetic, with the risk that the viewer will be privileging visual exploration rather than witnessing attentively to the stories and words of the suffering others. In this sense, Bloom (2018) analysed VR film *Clouds Over Sidra* arguing that:

> *In films such as the 360-degree documentary Clouds Over Sidra, the experience of being a refugee is fundamentally represented within the immediate physical environs of the refugee camp. The awfulness of a refugee experience is not about a particular space, or refugee camp, rather it has more to do with the entire experience of having been forced*

> *to abandon your own home for hopeless reasons and travel with your family and belongings during days and weeks, if not months, trying to find a place to settle and start a new life. Putting the participant in the middle of one particular scene without contextualizing the struggle and suffering of the people sharing their testimonies as a whole, will not succeed in creating impact and empathy. (Bloom, 2018; Sora-Domenjó, 2022)*

Since most VRNF production grants audiences a passive role rather than a first-person experience, the audience has little control over the events happening and does not have adequate context to ponder on the moral, social, and political consequences of what they are witnessing. The risk here becomes to victimize the subjects, rather than creating empathy (Sora-Domenjó, 2022).

However, some developers wish to provoke emotional shocks in users. It's the case of Brooks Brown who developed *HERO*, a VR experience recreating the 1999 massacre at Columbine High School in Colorado. Brown reportedly admitted that his goal was for users to feel empathy and act altruistically afterwards. However, research (Nawijin et al. 2016) suggests that trauma and shock represent an obstacle to empathy, not allowing the individual to learn or commemorate the site, but rather only facilitating a confrontation with pain and its consequences.

Another example was *Not a Target*, a VR film developed by Médecins Sans Frontières (MSF) recreating the bombing of Kunduz hospital in Afghanistan in 2015 (Gorin, 2022). The idea was that the viewer played the role of a patient of Kunduz hospital during the bombing to re-create a 'traumatic experience' and to engage their powerlessness. MSF (2017) affirmed that some viewers reported signs of panic, anxiety or suffocation, while many mentioned as feeling paralysed, watching but unable to do anything.

Moreover, critics also underline that the use of VR to evoke empathy in the context of humanitarian crises could potentially backfire and create negative feelings or aversion towards specific groups or races or even promote indirect discrimination (Sora-Domenjó, 2022). Indeed, as mentioned in paragraph 1, empathy is influenced by implicit bias or factors such as gender and race; indeed, when people are asked to take the point-of-view of 'competitors' or adverse groups they tend to be less empathetic (Pierce et al. 2013). When experiences demand the individual to imagine themselves in the observed situation, this can cause personal distress or increase stereotypes. This is the case of individuals

who are experiencing conditions of disability through VR, as the audience can project their (potentially negative) feelings into the disabled individual's life, in practice developing new stereotypes. For instance, an abled individual participating in an experiment to understand the world perception of blind people might develop the false belief that blind people experience more fear, anger, confusion and distress on a daily basis, since those were the feelings of the participant while taking the experiment (Sora-Domenjó, 2022). In this case, if the empathic distress is intense, it can cause personal suffering, resulting in worry, exhaustion, and other negative feelings that function as a barrier to empathetic attitudes toward others (Sora-Domenjó, 2022).

It must also be added that many humanitarian films are never fully participatory as the content is decided through editorial decisions by NGOs and VR film companies. Humanitarian VR films, with protagonists who are migrants, refugees, or communities victimized by various forms of violence, strive to give a voice to individuals who have long been anonymized, rendered voiceless, and disempowered in humanitarian imagery (Gorin, 2022). However, by not allowing them in the decision-making process revolving around the production of the film, or allowing them to have only a partial say, the result might be a content that does not adhere to the values and purposes it was created to fulfil.

Another ethical dilemma regarding VR experiences concerns the representation of sites where pain and suffering is still ongoing. It is the cases of places such as killing fields, active conflict areas, or detention camps. One example is the *War Up Close* project[50], a production house which released a VR experience involving the digital reproduction of refugee camps, demolished towns and houses in Ukraine. Clearly, field visits to such sites are very dangerous even for human rights activists and journalists, so VR could represent a viable solution to guarantee telepresence even in threatening environments. However, the more the experience focuses on the user's feelings and reflection, the more the suffering of others is dismissed. The result is a commodification and consumption of death, pain and suffering of other human beings (Fischer e Schoemann, 2018). It is of vital importance, then, that any VR experience should not treat with disrespect the individuals involved in the story, as well as not shedding light on survivor's pain or degrade the lost lives for commercial purposes.

[50] War Up Close. Available at: https://war.city/

Moreover, in the case of immersive journalism, ethic apprehensions have arisen from the journalistic production point of view as well. Some concerns regard the lack of editorial choice or the possible manipulation of pictures or videos in an immersive journalism experience (Sanchez-Laws e Utne, 2019). Concerning the former, many journalists reported that they consider 360° videos a more accurate way of presenting a news event, because it allows them to simply show the audience a particular scene or news story without the need of much explanation. In some cases, such as natural disasters, the pictures or videos speak louder than any word and allow the audience to have a quick and profound grasp on events. However, the lack of editorial guidance or of editorial choice of frame in the videos, could also make the user have inaccurate perception, as they do not know where to look and what is most important (Sanchez-Laws e Utne, 2019). On the other hand, manipulation of videos or pictures is forbidden by many news outlets, for instance, Sanchez-Laws e Utne (2019, p.2) report that "the New York Times ethics guidelines clearly state that no photography should be staged, directed or an environment or element of a scene modified". But what if a journalist decides to erase themselves from the 360° video or picture for the sake of aesthetics? Would this be considered appropriate action that safeguards authenticity, or would it be considered a manipulation of evidence? Since the potential for deep manipulation of technology is high, with the emergence of technologies such as *deepfake*[51], it is important that news organizations are aware of the importance of addressing ethical issues concerned with the adoption of VR media and act accordingly.

c. Ethical guidelines and guiding principles for the protection of Human Rights in virtual worlds

The use of immersive journalism brings with it a transformative potential to engage and inspire change on a global scale. However, beneath the surface of innovation lies a complex web of ethical implications and dilemmas that demand careful consideration. Not only it is important that VRNF producers are sensitive to the potential ethical implications and act accordingly, but it is as important not to consider audiences

[51] From Cambridge Dictionary "a video or sound recording that replaces someone's face or voice with that of someone else, in a way that appears real". Available at: https://dictionary.cambridge.org/dictionary/english/deepfake

as passive receptors or consumers of news stories freed of any ethical responsibility (Sanchez-Laws e Utne, 2019). Indeed, VR experiences do not guarantee that participants or users will engage respectfully with the digital sites. People may perceive the space as not real and therefore not deserving of the same respect they would have if visiting the same spot in person.

Nevertheless, news organisations have, in some cases, developed a set of ethics guidelines concerned with the use of immersive journalism. Guidelines are generally quite clear in their approach to factuality when it comes to the use of visual material, but very vague when it comes to the connection between journalists and audiences (Sanchez-Laws e Utne, 2019). Indeed, many news outlets' guidelines explicitly prohibit the digital manipulation or alteration of images, montages and illustrations and, if this occurs, it must be labelled as such (for instance The Guardian adopts this type of guideline). Not only, journalists must provide objective reporting, with balance, distance and neutrality from the story they are reporting. Even when writing photo or video captions they have a duty to report only what is factually known and not assumptions or guesses on how a subject might be feeling (Sanchez-Laws e Utne, 2019). Moreover, journalists and news outlets have a duty to provide accurate information to the audiences, but they assume no responsibility towards content that might harm the audience in some way. Sanchez-Laws e Utne (2019), noted that publicly funded broadcasters might adopt a more stringent ethical regime than private broadcasters. For instance, the BBC included in its Editorial Guidelines that "when representing events that cause suffering and distress, consideration must be given both to the impact upon victims as well as upon audiences" (Sanchez-Laws e Utne, 2019, p.5). Journalists working in these projects must, therefore, balance learning new technology and storytelling approaches while still attempting to apply guidelines to their works.

On this matter, Sanchez-Laws and Utne (2019) developed a proposal on how the dimensions of the audience can be better considered and implemented in ethics guidelines, by:

> *(a) establishing methods to assess early on how technologies change ethical practice,*

(b) making journalists and press ethics bodies more aware of the audience dimension, including the need to consider the principle of doing no harm as also involving doing no psychological harm to audiences, and

(c) establishing pathways to include news audiences as partners in the construction of ethics guidelines for immersive journalism. (Sanchez-Laws e Utre, 2019)

They also developed some proposal for press ethics when dealing with immersive journalism. First, ethics guidelines must include methods for assessing how technologies influence ethical dimensions of practice early on, and news organizations must acknowledge that VR technology might be challenging the paradigms upon which current guidelines were developed on. Second, the audience dimension must be considered in dispute resolution and ethical practice (for instance, the principle of doing no harm to audiences may also need to encompass doing no psychological harm). This is because the illusion of proximity created in an immersive experience highlights individual subjectivity and encourages also the journalists' understanding and emotional role in the story. Third, ethics bodies and news organizations must begin to see their viewers as participants in the development of guidelines, and audiences must recognize that this is a responsibility they must share. This is because watching others' sufferings is not entertainment and a shared responsibility between the audience and the journalist must be acknowledged (Sanchez-Laws e Utne, 2019).

Other organisations, such as Electronic Frontier Foundation (EFF) (Rodriguez e Greene, 2022) submitted recommendations to the OHCHR with guiding principles on business and human rights and the activity of tech companies investing in VR.

On this matter, Fischer e Schoemann (2018) produced a set of ethical advice or best practices for VR experiences involving disturbing scenes, scenarios or dark sites. They are summarized in the following table.

Foundational Ethics for VR experiences
1. Don't cause misery in the participant if the goal is to create awareness, 2. Support the users' emotional wellbeing and responses, 3. Violence for spectacle purposes is not constructive for pedagogical or altruistic purposes, 4. VR should not commodify dark events, 5. Understand that a VR recreation does not give a complete understanding of a traumatic event.

Table 8 - Foundational Ethics for VR experiences *(adapted from Fischer e Schoemann, 2018)*

It seems clear, therefore, that any form of innovation opens up a realm of new possibilities and frontiers, which should be alkalized and handled with caution. Human rights concerns and ethical issues connected to the development of VR should be considered seriously. More research is needed to understand its implications on human minds and bodies, as well as on the ways in which we communicate, educate and inform ourselves.

Conclusions

This thesis has sought to shed light on the transformative potential of Virtual Reality in advancing new ways of promoting human rights education and advocacy. By analysing the convergence of Virtual Reality technologies with education, tourism, and human rights advocacy, the advantages and disadvantages of using an innovative approach as such emerged. Through the analysis of the theoretical underpinnings, the original applications and the ethical implications connected with the use of VR, this thesis sought to give attention to the potential of virtual reality as a catalyst for the promotion of human rights education worldwide. In this sense, the transformative power of VR technologies lies in its ability to evoke empathy, promote compassion and sympathy in the user.

An integrative and multidisciplinary literature analysis has been carried out to understand VR technology from a variety of facets: from analysing its applications in tourism and education to examining the ethical concerns and legal implications of using it in human rights related contexts. Thanks to this analysis, it has come to realization that VR technologies can not only be a tool for profound innovation in the way human rights advocacy and NGOs communication strategies are developed but could also lead to the infringement of rights that are becoming increasingly important in the virtual world.

The use of VR in both virtual tourism and education has demonstrated exciting possibilities for the promotion of human rights.

Although virtual tourism cannot strictly be considered tourism, it still allows individuals to virtually visit regions of the world they might never physically reach, introducing a valid alternative for disabled individuals that still get to have a somewhat realistic experience. This does not create a substitute for an in-person trip as the complexity, randomness and uncertainty (McClure, 1994) of a physical experience is at the moment impossible to reproduce virtually. However, it provides for an inclusive, accessible and sustainable experience that simulates tourism while encouraging cultural understanding and empathy. By experiencing the destinations – even if only virtually – and hearing the stories of individuals suffering human rights abuses, users are more likely to get interested and engaged in these causes. This directly influences their sensitivity to the topics and the opportunity of them becoming informed advocates and supporters of human rights causes.

Meanwhile, if analysed through the lens of education, VR has proven to be a revolutionary tool in the way human rights are taught and learned. Not only it offers an interactive, dynamic and experiential learning platform capable of creating engaging learning experiences and of sensitising the learners on a variety of topics. It also represents an opportunity for educational organizations and institutions to integrate their educational approaches, expanding their reach and impact and making education more accessible and fruitful on a global level. However, to this day, the integration of VR into traditional educational curriculums is almost absent and, in most cases, VR experiences are relegated only to the world of arts and art exhibits. Not only adopting VR comes with large costs to be upheld by educational institutions, but this technology is still met with scepticism and resistance on the part of educators. It is clear that the inclusion of VR content in a formal educative setting shall be done with carefulness, taking into consideration the accuracy of information and quality of content, and the effect it might have on students. All of this while protecting the rights of educators, students, and VR content creators.

Virtual reality has the incredible capacity to immerse people into other individuals' environments and experiences, transcending geographical and cultural boundaries and stimulating connection and empathy in ways previously unattainable. In particular, it fosters a deeper understanding of complex issues by creating a sense of presence and emotional engagement, making complicated human rights issues more tangible and personal to the user. This builds on the fact that seeing things from a different point of view and waking into others' shoes is more likely to awaken a sense of moral responsibility and commitment to action.

However, the other side of the coin does not shine as much and the potential negative implications of introducing virtual reality technologies in education, tourism, as well as day-to-day activities are many and worthy of attention. Practical issues related to privacy rights, users' data protection rights, data tracking, informed consent and accountability are the most pressing legal implications of integrating VR alternatives to traditional tourism and education. Additionally, there are also some ethical implications of showing human rights sensitive content, including potential negative effects such as reinforcing stereotypes and biases, creating distress and antipathetic feelings in the user.

Moreover, VR technologies are increasingly made available to customers at relatively reasonable prices. Clearly, the more these technologies spread into the market and become regular consumption objects, the more individuals will feel tempted to buy them and use them, even if just to try out the new tech toy. This potentially creates data protection and privacy issues on a global scale, by magnifying an already existing dynamic where large multinational corporations – Meta and Google, to cite a few – hold on to data from billions of users. If the Internet has already brought out this issue, with data leaks and theft occurring more often than users know of, with VR the dimension changes to a different level. Through VR devices, which are mostly wearable headsets and remote controllers, data-tracking will also include biological information, such as heartbeat, breathing rhythm, movements of the eyes and involuntary expressions of the face. In this regard, the interests of worldwide corporations in commercialising user data might be significant, meaning that the rights of the costumer might not always be regarded with the care it deserves. The risks of data theft or leakage must be considered with the necessary care, especially if the targets of data theft are already vulnerable individuals.

Furthermore, the opportunities of this type of technology are those of infinite markets: from gaming to entertainment, from videochatting to online business meetings, from science experiments to building infrastructure engineering projects. It can all be done in VR. Not only, although no mention of Artificial Intelligence was done in this thesis, it has potential for positive advancements in various industries, and the encounter between VR technology and AI presents itself as the most probable next step in the ‘technological evolution' of humankind. This also poses questions on other ethical, privacy, health, and regulatory aspects related to the use of these technologies combined. At the moment, almost no study has been carried out on the opportunities and consequences of VR and AI for human rights protection and promotion, which opens up numerous possibilities for multidisciplinary research.

Eventually, if the world is destined to turn to VR more and more, building ever improved headsets and headphones and creating *ad hoc* VR contents for each type of market, there will be consequences also on human rights and how they are communicated, advocated and perceived throughout the world. It might be a positive change, by bringing attention to new rights that emerge as crucial in VR, or a negative change, eroding

‘physical’ rights that are seen as increasingly less important. If the technological advancements point towards an increased use of VR in everyday life, where interactions between humans also will be mediated by virtual reality interfaces, we must ask ourselves: “Is this the right direction?”. The innovations brought by VR are numerous and can potentially revolutionize all parts of life as we know it, but is it worth the downsides? From a human rights perspective, will VR increase the protection of human rights worldwide or will it contribute to causing even more human rights violations?

Appendix 1 - *The four-stage conceptual model of heritage preservation*

The usage and design of virtual reality or mixed reality in cultural heritage has a variety of applications, from videogame-like experiences which guarantee realism and fluid interactivity, to digital scanning and exhibitions.

Since many challenges exist in preserving cultural heritage and in developing virtual experiences that correctly do so, Bec et al. (2019) developed a four-stage conceptual model of heritage preservation for managing heritage into digital tourism experiences. There can be four approaches in categorising heritage presentation (figure 1):

(a) Historical facts

(b) Contested Heritage

(c) Integrate Historical Facts and Contested Heritage

(d) Alternate Scenario.

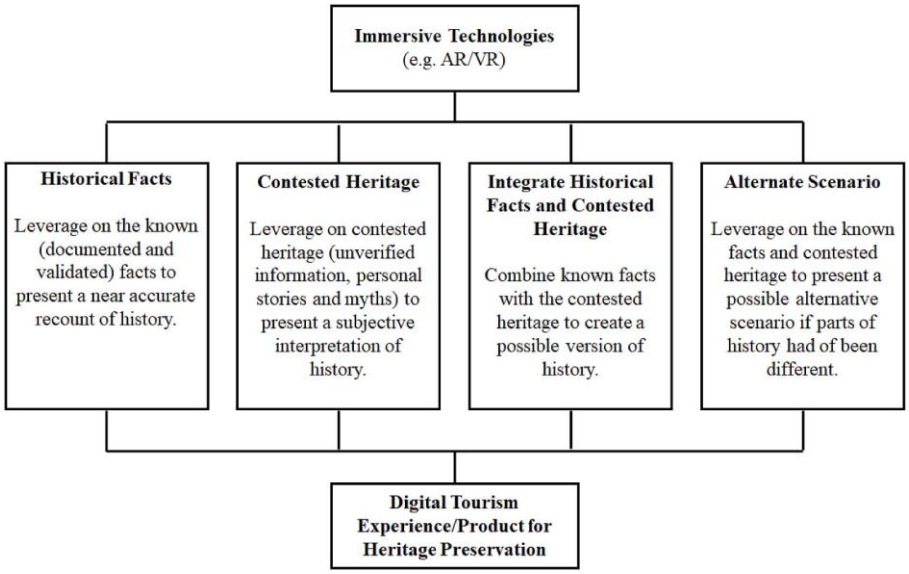

Figure 6 - Four-stage conceptual model of virtual heritage preservation for tourism experience (taken from Bec et al., 2019)

Firstly, the 'Historical Facts' approach is built on heritage and cultural information that has already been consolidated and validated and that can be used in tourism experiences to represent near-real scenarios or accurate accounts of specific historical moments. Some examples of practical application are virtual reconstruction of objects, artefacts or whole

cities and towns, which can be experiences by the user in an explorative way. This is the case of Pompeii reproduction just mentioned.

Conversely, the ‘Contested Heritage’ approach uses unverified data or facts regarding the local cultural heritage to present a subjective or imaginative interpretation of reality. It is especially used for visual representation of myths, local legends and beliefs, which generally lack scientific validation.

Subsequently, both validated and unvalidated facts can be combined to create different interpretations or versions of history, which are created by personalizing stories or by incorporating anecdotes or individual details. This approach, which combines both historical and contested facts is classified as the ‘Integrate Historical Facts and Contested Heritage’ approach.

Moreover, the ‘Alternate Scenario’ approach allows developers to create alternate worlds where both known facts and contested heritage details might be present. For instance, an alternate scenario might be a certain historical event rewritten to have a different outcome, such as if the Africans colonized Europe and not the other way around (Bec et al., 2019).

However, clearly more study is required across the four approaches and comparing the four ways to create prototypes of digital tourism experiences. Specifically, more study should be done on digital preservation techniques like 3D scanning in order to improve the accuracy of virtual recreations of real places and artifacts (Bec et al., 2019).

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Sitography

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