I SAGGI DI LEXIA

XX

I SAGGI DI LEXIA

Aprire una collana di libri specializzata in una disciplina che si vuole scientifica, soprattutto se essa appartiene a quella zona intermedia della nostra enciclopedia dei saperi — non radicata in teoremi o esperimenti, ma neppure costruita per opinioni soggettive — che sono le scienze umane, è un gesto ambizioso. Vi potrebbe corrispondere il debito di una definizione della disciplina, del suo oggetto, dei suoi metodi. Ciò in particolar modo per una disciplina come la nostra: essa infatti, fin dal suo nome (semiotica o semiologia) è stata intesa in modi assai diversi se non contrapposti nel secolo della sua esistenza moderna: più vicina alla linguistica o alla filosofia, alla critica culturale o alle diverse scienze sociali (sociologia, antropologia, psicologia). C'è chi, come Greimas sulla traccia di Hjelmslev, ha preteso di definirne in maniera rigorosa e perfino assiomatica (interdefinita) principi e concetti, seguendo requisiti riservati normalmente solo alle discipline logico–matematiche; chi, come in fondo lo stesso Saussure, ne ha intuito la vocazione alla ricerca empirica sulle leggi di funzionamento dei diversi fenomeni di comunicazione e significazione nella vita sociale; chi, come l'ultimo Eco sulla traccia di Peirce, l'ha pensata piuttosto come una ricerca filosofica sul senso e le sue condizioni di possibilità; altri, da Barthes in poi, ne hanno valutato la possibilità di smascheramento dell'ideologia e delle strutture di potere... Noi rifiutiamo un passo così ambizioso. Ci riferiremo piuttosto a un concetto espresso da Umberto Eco all'inizio del suo lavoro di ricerca: il "campo semiotico", cioè quel vastissimo ambito culturale, insieme di testi e discorsi, di attività interpretative e di pratiche codificate, di linguaggi e di generi, di fenomeni comunicativi e di effetti di senso, di tecniche espressive e inventari di contenuti, di messaggi, riscritture e deformazioni che insieme costituiscono il mondo sensato (e dunque sempre sociale anche quando è naturale) in cui viviamo, o per dirla nei termini di Lotman, la nostra semiosfera. La semiotica costituisce il tentativo paradossale (perché autoriferito) e sempre parziale, di ritrovare l'ordine (o gli ordini) che rendono leggibile, sensato, facile, quasi "naturale" per chi ci vive dentro, questo coacervo di azioni e oggetti. Di fatto, quando conversiamo, leggiamo un libro, agiamo politicamente, ci divertiamo a uno spettacolo, noi siamo perfettamente in grado non solo di decodificare quel che accade, ma anche di connetterlo a valori, significati, gusti, altre forme espressive. Insomma siamo competenti e siamo anche capaci di confrontare la nostra competenza con quella altrui, interagendo in modo opportuno. È questa competenza condivisa o confrontabile l'oggetto della semiotica.

I suoi metodi sono di fatto diversi, certamente non riducibili oggi a una sterile assiomatica, ma in parte anche sviluppati grazie ai tentativi di formalizzazione dell'École de Paris. Essi funzionano un po' secondo la metafora wittgensteiniana della cassetta degli attrezzi: è bene che ci siano cacciavite, martello, forbici ecc.: sta alla competenza pragmatica del ricercatore selezionare caso per caso lo strumento opportuno per l'operazione da compiere.

Questa collana presenterà soprattutto ricerche empiriche, analisi di casi, lascerà volentieri spazio al nuovo, sia nelle persone degli autori che degli argomenti di studio. Questo è sempre una condizione dello sviluppo scientifico, che ha come prerequisito il cambiamento e il rinnovamento. Lo è a maggior ragione per una collana legata al mondo universitario, irrigidito da troppo tempo nel nostro Paese da un blocco sostanziale che non dà luogo ai giovani di emergere e di prendere il posto che meritano.

Ugo Volli

Meaning–Making in Extended Reality

edited by

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Victoria Dos Santos
Gianmarco Thierry Giuliana

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Introduction

Extended Reality, Nothing New

Federico Biggio*, Victoria Dos Santos**, Gianmarco Thierry Giuliana**

Since Baudrillard's 1981 "Simulacres et Simulations", the topic of the contemporary mediation and alteration of reality has been a central one in the field of humanities. Scientific articles and books about the impact of technology on this mediation, with the dominant theme of virtual realities, are so numerous that already in the 90's Jonathan Steuer had "defined" Virtual Reality (1992) and Tomas Maldonado had deal with it in a philosophical perspective (1994). The technologies of the 60's, such as Heilig's Sensorama and Sutherland's first Head–Mounted–Display, continuously inspired the reflections of many thinkers inquiring on their philosophical, cultural and social impact. The scholars who dealt with these ones rediscovered the connections among human and social sciences on one hand and cognitive and neurosciences on the other, connections that had characterized the thought about computationalism and artificial intelligence since the Eighties (Marr, 1982; Minsky, 1985). Decades later, the evolutions of these technologies are still at the center of the debate on how the real has changed and is changing: a topic so widespread that six years ago the "Oxford Handbook of Virtuality" (Grimshaw, 2014) was published. So, the question is the following one: is there really something new to say? We believed so, for three main reasons.

First, both the quality and the distribution of technologies augmenting or virtualizing reality has drastically changed in the last five years: the

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headset for virtual reality analyzed in "Remediation" (Bolter & Grusin, 1999) is simply no more the same and the experience of a second reality in VR has profoundly changed. 2020's VR and AR are in fact about artistic creation, healthcare, professional training, tourism, religion, social interactions, and much more: the question is no longer *if* they can have an impact on society but already *how* are they doing it and in what direction. Today's condition is promptly adapting into a different state of being where digital technology became *ubiquitous* (Weiser, 1991) and the two worlds cohabitate in a high–tech environment of existence where the modern concept of reality seems to be disrupted. Yet, it is still rare to find in the recent scientific literature a unified perspective establishing some sort of causality between the specificities of these technologies and such hypothetical conceptual shift.

In this regard, semiotics is the right to discipline to fill such a gap, since several semioticians (Bettetini, Casetti, Eugeni, Metz are only few names among many others) have already faced the issues raised by the previous "new" media by looking at their multiple facets and inquiring on the interconnection between different dimensions of meaning–making (linguistic, cognitive, sociological and so on). Nonetheless philosophy, and in particular post–phenomenology, has given them wide spaces of analysis (Montani, 2014; Dal Pozzo, Negri & Novaga, 2018). Besides, semioticians have previously faced some of the issues related to the digital era (Volli, 2007) and inquired on the translation in virtual spaces of cultural practices such as in the case of religion (Leone, 2011). However, semiotics, which in many sense could be defined as the science of the inevitable mediation of reality and meaning (Paolucci, 2010) and which long ago already gave to virtuality a central place in the narrative process of meaning–making as one of the three modes of semiotic existence (Greimas & Courtés, 1979; Fontanille, 2018), has paradoxically not been very present in the most recent debate on the connection between the extension of reality and these new technologies. The lack of literature on this topic was the starting point of the volume.

Second, as a consequence of the previous point, the social discourses about VR and AR are changing together with the conception of what is actually virtual and augmented. The issue is no longer about cyber–enthusiastic theories or futuristic utopias, but how, due to the mediation of computational media in almost all human spaces, technologies such as

VR and AR are popularized among daily people's life, allowing profound experiences, new forms of social interactions and evoking true emotions through a human–computer interaction. In respect to this, there is not only a lack of literature in the humanities about how the new applications of VR and AR are representing the world, but also on how, if it is the case, these technologies and our contemporary technological environment are having an impact on our view of the world. If on one hand these emerging technologies are becoming even more meaningfully relevant within a mediatic contemporary panorama in which digital media supports are deeply mutated compared to them of ten years ago, on the other, the theoretical tradition which had tackled with the concepts of "virtuality", "augmentation" or "extension", by referring to a whole constellation of experience in the realm of computationalism, could negate an authentic "paradigm shift", by leading to realize the absence of a real "newness" in a *Zeitgeist* in which the "disruption" is the norm that governs the technological marketplace. Additionally, the contemporary technologies extending our reality are part of a not new visual culture (Pinotti & Somaini, 2016), they are often designed as classic hypertextual and cybertextual experiences (Aarseth, 1997; Landow, 2006), they can convey thoughts through digitalized forms of rhetoric (Bogost, 2007) and they can convey emotions through designed hardware interactions as first did the digital games, and so on. Yet, the existence of recent scientific literature attesting for the impact of a technology such as VR on empathy (Herrera *et al.,* 2018) and beliefs (Murphy, 2017: 4) is a new fact that cannot be overlooked and should not be overshadowed. Therefore, we decided to create this volume, being strongly convinced that the understanding of all the elements between technological myth (reproduced through social discourses) and its reality can be possible only by means of a humanistic approach, the use of which can also help in highlighting the points of continuity and rupture.

Finally, a whole set of concepts used to describe practices of mediation by means of computational techniques (from computer graphics to motion tracking, from machine vision to image rendering) have created an inevitable metalinguistic issue that refers to the vague concept of an experienced "virtual", "augmented" or "extended" reality. This is also true from an historical point of view, when acknowledging that in 1989 "Virtual Reality" was an umbrella term used by Jaron Lanier to bring all together the virtual projects developed during those times, referring particularly to

the world of computers. However, whereas this vagueness ended in the commercial sectors with the birth of new specialized terms, this was not really the case in the field of humanities. Indeed, the term "virtuality" is anything but trivial and by looking at the scientific literature it is possible to find a recent book titled "Real Virtuality. About the Destruction and Multiplication of World", which is not focused on digital technologies (Gehmann & Reiche, 2014). Moreover, in the philosophical field, in his seminal work Pierre Levy has referred to "virtuality" as a mode of existence, not by opposing this to that of "real", but to that of "actuality" in order to examine a series of emerging phenomena of digital world that can't be understood as pertaining to another ontological dimension. The same is true for that of "augmented" (Engelbart, 1962; Manovich, 2006) which could be traced back to device for human–computer interaction, or for that of "extended", which is detectable from McLuhan idea of media as "extensions of man" (1964) to the idea of a reality processed and experienced through an "extended mind" in cognitive sciences (Clark, 1997; Malafouris, 2017). In this regard, since VR, AR and MR are a composition of technical devices and cultural techniques used to create a sense of immersion into the real and of extension of the real, we believed that a new inquiry on the notions of virtual and augmentation was much needed to fully explain these experiences.

Considering this overview, the present volume is thought to take–on the challenge of developing a set of studies that would focus to the specific technologies of contemporary, i.e. augmented, extended and virtual reality, but only to analyze and highlight everything that is both behind and beyond them. This volume is thus about the *effet de sens* of what is currently conceived and defined as the extended, virtual and augmented experience: a critical inquiry made by investigating on the meaning–making occurring in and through them. The semiotic perspective thus adopted was however not intended to exclude other disciplines, on the contrary we invited authors with different approaches precisely to offer to the reader a more complete point of view on the issues raised by such topic. Moreover, even within the contribution of semioticians a strong interdisciplinary attitude was often adopted, which demonstrates how contemporary semiotics can have a fundamental cooperative role to shed light on the most relevant themes of our social and cultural context. Finally, despite the obvious differences of the different contributions, all the authors of

the book shared the conviction that the technologies extending our reality and influencing our conception of it cannot be understood by looking only at themselves. This is why each of the contribution will highlight different facets of the issue at center of this volume and all the different papers can be read in succession as part of a single and unique dialogue and reflection. This volume is divided in two main parts, with the first one being more theoretical and the second one which focus on the concrete examination of texts and cases study all related to how the technologies at the center of this book are both representing and changing the cities and the spaces in which we live.

The opening article is Ugo Volli's "Archeologia Semiotica del Virtuale" which analyses the history and the semantic of the term "virtual reality". By doing so he looks at all the most important related themes of these technologies, such as the concept of immersion and experience. Moving in and out between semiotics and philosophy, Volli end up with semiotically defining the virtual through a number of characteristics and offer to the reader a new and precious perspective to understand our own relation with the real through the mediation of technology.

In the second contribution "…" Claudio Paolucci examines a common features of both Virtual, Augmented and Mixed Reality: the dominant role of prosthetics through the use of audiovisual language. The author here concentrates on the semiotic dimension that is behind the characteristic sensorial and cognitive involvement offered by these technologies. Paolucci's work is thus fundamental in filling the beforehand mentioned gap between all the different disciplines interested in the technological extension of reality.

The article written by Valentino Catricalà and Ruggero Eugeni "Technologically modified self–centred worlds. Modes of presence as effects of sense in virtual, augmented, mixed and extended reality" then follows, with a comprehensive exam "of different forms of extended reality (virtual, augmented and mixed reality)" understood as manifestations of "technologically modified self–centered worlds (Umwelte)". Looking at both the technical and interpretative specificities of these technologies, the authors focus on the concept of presence and provide an interesting new classification of the media related to the idea of an

extended reality.

The fourth paper is Federico Biggio's "Towards a Semiotics of Augmented Reality" propose a taxonomy of distinctive aspects detectable in each augmented reality application, with a particular focus on the meaning–making processes derived by its actual adoption in popular media context. Adopting a mediological and semiotic approach, this paradigmatic attempt aims to propose a unified understanding of the phenomenon, both the cultural as well as the socio–technical one.

In "Deconstructing the Experience. Meaning–Making in Virtual Reality Between and Beyond Games and Films" Gianmarco Giuliana and Momchil Alexiev then focus on the specific technology of Virtual Reality by examining the similarities and differences on an experiential level between VR, digital games and movies. Unifying the perspectives of a semiotician and an artist, this contribution is a strongly interdisciplinary work that considers the different dimensions of the VR experience in a unifying perspective about the specificity of meaning–making in Virtual Reality and which takes consequently part in the contemporary debate.

Still focusing on Virtual Reality, in "The Digital and the Spiritual: Validating Religious experience through Virtual Reality", Dos Santos analyses how virtual worlds are acceptable spaces to perform and experience religious practices. By discussing the dualism virtual/real and the conception of a digital materiality she proposes to consider VR technologies as a unique tool when it comes with spiritual pursuits.

Lastly, the first part of the book is concluded by the precious contribution of Antonio Allegra's article "Tecnica, Virtualità, Paura. Su una Versione dell'Angoscia Contemporanea" which focus on the social fear about these new technologies. Taking also in consideration researches on the use of VR to cure some forms of fear, he offers an original and very actual reflection on the topic of technophobia which becomes a philosophical and anthropological thesis on the extended forms of Virtuality intended as an ousted Reality.

The article by Mattia Thibault and Mila Bujić "VRBAN Strategies of Representation and Degrees of Freedom in Virtual Cities" investigates on how urban spaces are represented through VR technologies and opens the second part of the volume. It is a work that looks at tens of different VR

application and games to outline several types of urban representations as well as several types of avatars, and then highlight the relationships between these two dimensions. The outcome of this paper is however not only a classification but also a precious reflection on the role of analytical tools and epistemological strategies to study new media and texts.

In Oğuz Buruk's article "Virtual Wearables: Envisioning Future Scenarios for Wearables in Extended Reality Environments" a rich palimpsest of extend reality application for entertainment is proposed and analysed, with the aim of dealing with the augmented body in experiences within virtual environments. In particular, his analysis lead to detect transformational processes, culturally meaningful, of tangible entities ending to propose a new path for wearable design.

In the fourth article of the second part, "Virtual Reality Tourism: A Journey Across Time and Space", Chen, Xi and Xue discuss how tourist can be provided, through VR, with simulated, immersive and unique travelling experiences. In their contribution "Virtual Reality Tourism: A Journey Across Time and Space", the authors explore the impact and limitations in the relation between VR and tourism, and how VR technologies can be integrated into that industry in order to enhance the user's experience.

In "The Augmented Dead. Videogame in Realtà Aumentata, riconoscimento facciale e immaginari zombie" Lino traces a correlation between the cultural and allegorical figure of the zombie and the imaginary of invasion with that of human condition in–between real and virtual spaces, by going to finally take into account the technology of face recognition for gameplay purposes.

Finally, in "Unsatisfied with Space: Hyper–readers in the Cybercosm of the 21st Century", Valdivieso analyses the meanings of the reading exercise in contemporary times, where texts and hypertexts surrounds the reader, proposing new directions to understand how we are connected to multiple textual universes in a hybrid reality, as well as the functioning of the cyber–cosmos.

To conclude, we would like to express our whole–hearted appreciation to all the authors who have contributed for the realization of this book as well as to their working institutions.

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Part I

MAKING SENSE OF THE VIRTUAL

Meaning–Making in Extended Reality
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Archeologia semiotica del virtuale

Ugo Volli*

English title: Semiotic archaeology of the virtual

Abstract: There is a certain terminological confusion around the notion of "virtual reality", so much so that to someone this phrase appears as an oxymoron, if not exactly as a strident *contradictio in adjecto*. Semiotics can therefore be useful first of all by clarifying the meaning of the word, or at least the history of its semantics.

Keywords: semiotics; virtual; semantic; philosophy; language.

1. Virtuale = Potenziale

"Virtualis" è parola creata nel tardo Trecento nell'ambito della filosofia Scolastica (http://www.treccani.it/vocabolario/virtuale/; https://www.etymonline.com/search?q=virtual) allo scopo di tradurre l'espressione aristotelica *dynamis*, che era già stata volta in latino classico con *potentia* cui sarebbe dunque equivalente (o quasi, come vedremo). In effetti l'origine di *virtualis*" è ovviamente il vocabolo latino *virtus*, a sua volta derivato dalla stessa radice di *vir*, "uomo", nel senso di "eccellenza", "potere", e in particolare "forza", "efficacia", come scrive per esempio Cicerone: "Appellata est enim ex viro virtus. Viri autem propria maxime est fortitudo". (Cic. Tusc. 2.18.43) Il senso moderno di "virtù" come "disposizione di un individuo a fare del bene", deriva da un riuso molto ideologico del termi-

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ne da parte della letteratura cristiana dei primi secoli. Il punto di svolta è chiarissimo in Gregorio Nisseno (IV secolo) quando scrive che "Il fine di una vita virtuosa consiste nel divenire simili a Dio"[1] e ribadita da Agostino con il sostenere (*Contra Iul.* 4,3.14–32) che le virtù dei pagani (il coraggio ecc.) in realtà sono vizi perché motivati da egoismo e l'origine di ogni virtù è invece l'umiltà, che pure agli antichi sembrava piuttosto il contrario, una mancanza di dignità di rispetto per il proprio ruolo, di coraggio e per l'appunto di *virtus*, virilità.

Il mediavale *virtualis*, però, risente ancora del significato originario, e va inteso come ciò che ha il potere, la *potentia,* per ottenere certi *effetti*, in particolare per *realizzarsi* come una certa cosa, ma ancora non l'ha fatto. Nell'uso scolastico essa si contrappone a "reale", come *potentia* si contrapponeva ad *actus* nella terminologia filosofica latina classica, e in Aristotele *dynamis* (etimologicamente "forza", "capacità di fare") a *energheia* (letteralmente, "l'essere in opera") e *entelechia* (ancora letteralmente, "l'aver raggiunto il proprio fine") o addirittura *morphé* o *eidos* ("forma"). Fra questi diversi termini vi è in Aristotele una rete di sottili distinzioni, che descrivono differenti aspetti dello stesso stato di compiutezza. Non indagheremo questa teoria complessa, che introduce anche i termini *ousia* (da tradurre in genere in questo conteso come "sostrato" e non come "essenza" e che è dunque legata alla *yle*, materia, e quindi alla *dynamis* e non all'*enegheia*. Non è possibile infatti neppure esporre qui sommariamente questa teoria aristotelica che occupa per intero i libri Eta e Theta della *Metafisica* (1042b–1052a), e ne costituisce uno dei punti nodali più ricchi e problematici, perché si sforza di caratterizzare in maniera unitaria non solo il cambiamento e il movimento, ma anche la costituzione concreta degli enti per cui siamo in gradi di differenziarli.

In ambito semiotico vale la pena di rilevare che l'organizzazione degli oggetti semiotici in "materia" "forma" e "sostanza" dei "piani dell'espressione" e "del contenuto" proposta per primo da Hjelmslev (1943: 53–69) e da allora largamente riproposta come articolazione fondamentale del senso dalle teorie semiotiche strutturali non è altro che una ripresa (nella maggior parte dei casi inconsapevole) di parte di questa terminologia ari-

1. *De beatitudinibus*, oratio 1: Gregorii Nysseni opera, ed.W. Jaeger, v. 72 (Leiden 1992) p. 82.

stotelica e della problematica filosofica che la sottende. Anche in questa teoria semiotica a materia (*yle*) per esempio della voce è una *dynamis*, una virtualità di senso, che ha bisogno di una forma (*morphé*) per attualizzarsi e in un *synolon* cioè diventare sostanza o *ousia* di una realtà sensata. I termini e l'impianto di Hjelmslev e poi Greimas sono gli stessi di Aristotele. Del resto l'influenza aristotelica sulla teoria semiotica, perfettamente consapevole in Eco, è fortissima anche in quelli come Greimas che non ne parlano mai e probabilmente non la riconoscono. Si pensi ad esempio al quadrato semiotico. Per questa ragione è interessante richiamare sempre queste origini, e far presente per esempio che la teoria semiotica usa una propria versione del concetto di "virtuale".

Noi oggi useremmo per rendere il concetto aristotelico piuttosto un termine che deriva dalla traduzione romana classica di *dynamis* come *potentia:* "potenziale" (un'equivalenza fra "virtuale" e "potenziale" è stabilita per esempio nel *Dizionario di Filosofia* di Abbagnano). Per esempio, il seme si può considerare qualche cosa che potenzialmente è un albero, un uovo fecondato è potenzialmente un animale e così via. Secondo alcuni però in *virtualis* si può trovare una sfumatura diversa, una maggiore *maturità d'essere* rispetto alla semplice potenzialità, come sostengono Alberta Rebaglia *ad vocem* nell'*Enciclopedia Garzanti di Filosofia* (2004: 1179) e soprattutto Daniele Gambarara e Domenico Lamedica:

> Virtuale, nel gergo della filosofia scolastica, indica un essere in potenza che si sta realizzando in atto. Un esempio è quello dell'albero e del seme. Il seme ha dentro di sé in potenza l'albero, mentre l'albero adulto è l'atto in cui il seme si realizza. Più precisamente, l'idea di virtuale individua il momento in cui il seme ha iniziato a germinare ma non è ancora cresciuto completamente. Infatti, una cosa è virtuale quando non è più potenza, ma non è ancora completamente atto. (http://www.educational.rai.it/lemma/testi/macchina/virtuale.htm)

Secondo questa derivazione da *dynamis* a *potentia* a *virtualis*, il corrispondente italiano più prossimo al concetto starebbe dunque probabilmente nella parola "potenziale": l'uovo è *dinamei* una gallina e così il seme per l'albero, i mattoni e le travi per la casa. Aristotele aggiunge però una precisazione che può lasciare perplesso il lettore ingenuo. Secondo la sua

teoria, l'essere compiuto, l'*energeia* ha sempre la precedenza sulla *dynamis*, logicamente e anche fattualmente e casualmente, perché l'oggetto "virtuale", per realizzarsi, ha bisogno di un ente compiuto, come il seme che dev'essere fecondato. È una visione gerarchica e non evoluzionistica della realtà, un'osservazione che potrebbe sembrare illogica, almeno se si identifica in maniera troppo semplicista *dynamis* con ciò che è modalmente possibile e *energeia* con ciò che fattualmente esiste: non vi è realtà che non sia anche preliminarmente possibile. Lo rileva Heidegger (1939) in un saggio dedicato a un altro termine molto problematico in Aristotele anche per la apparente vicinanza al linguaggio moderno, *physis:*

> Pensata in modo greco, *energheia* significa stare–in–opera; l'opera è qui intesa come ciò che sta compiutamente nella "fine". Ma qui daccapo, il "compiuto" non è da pensare come il "concluso", così come *telos* non significa conclusione, ma, pensati in modo greco, *telos* e *ergon* sono determinati dall'*eidos* e indicano il modo in cui qualcosa sta "finalmente" nell'aspetto. […] I Romani hanno tradotto *energeia,* lo stare–in–opera nel senso del venire alla presenza nell'aspetto, con *actus* […]; da *actus, agere,* agire, venne *actualitas,* la "realtà". *Dynamis* divenne *potentia*, il potere e la possibilità che qualcosa ha. […] Certo, *dynamis* significa anche potere, anzi è impegnata persino nell'accezione di "forza". Solo che quando Aristotele usa *dynamis* in contrapposizione a *entelecheia* e *energheia*, assume la parola (analogamente a *kategoria* e *ousia*) per pensare e denominare quel concetto fondamentale essenziale in cui è pensata l'enticità, *ousia*. *Dynamis* l'abbiamo già tradotta con attitudine, con essere–adatto–a… [il che significa] il modo di quel venire fuori nell'aspetto che ancora si tiene indietro e in sé […] *Dynamis* è un modo del venire alla presenza […] L'*energeia* realizza l'essenza del puro venire alla presenza in modo più originario, perché significa quall'aversi–in–opera–e–nella–fine che ha lasciato alle sue spalle ogni "non ancora" dell'attitudine–a, anzi meglio, lo ha *pro*–dotto e *con*–dotto nella pienezza dell'aspetto compiutamente "finito".

Al di là della terminologia heideggeriana, che qui più che "gergo dell'autenticità" si presenta come un faticoso calco dall'etimologia greca del lessico aristotelico, il semiotico può essere tentato di individuare in questi passi della *Metafisica* letti da vicino il punto di partenza di teorie che conosce bene: per esempio la *dynamis* occuperebbe la posizione del segreto e l'*energeia* della verità nel quadrato della veridizione, il che induce a pensare che vi siano segreti "non ancora" pienamente espressi nella loro

manifestazione effettiva, il cui "essere" (*ousia*) non appare ancora. Così il piccolo seme che diventerà (potrebbe diventare) un albero maestoso. Bisogna aggiungere che secondo Aristotele (Met. 1047b) "non può essere vero dire di qualcosa che è virtuale [spesso si traduce "possibile", perché la parola è la stessa, *dynatòn*] che non sarà" perché in questa maniera si perderebbe la nozione stessa di virtuale (o possibile) perché essa risulterebbe applicabile a tutto. È il famoso "argomento vittorioso" di Diodoro Crono, riportato da Aristotele poco prima del passo che ho citato (1046a), ripresa poi spesso in varie forme nella storia della filosofia.

Del resto questo accostamento fra le categorie ontologiche di *dynamis* e *energeia,* non essere e essere e quelle epistemologiche o perfino argomentative di vero e falso è affrontato da Aristotele in una digressione molto densa proprio alla conclusione di questa sezione della *Metafisca* (1051b–1052a). La prevalenza dell'*energheia* sulla *dynamis* del resto è alla base di molti tentativi di dimostrazione dell'esistenza di Dio, in cui si presuppone che non può esservi un essere incompleto o imperfetto senza che esso presupponga l'essere compiuto. Ciò vale tanto per le "cinque vie" di Tommaso[2] che per la prova ontologica di Anselmo[3], con le successive riformulazioni di Descartes, Leibniz ecc. Vale la pena di citare qui questo sviluppo, perché esso certamente ha peso anche nella considerazione dei rapporti fra "realtà virtuali" e "mondo reale". Vi può essere un mondo "virtuale" se prima non è dato quello reale in cui esso è progettato?

La lettura di Heidegger del ragionamento aristotelico, molto discussa come tutte le analisi storiche del filosofo tedesco, non toglie però il movimento centrale dell'archeologia del concetto di virtuale così come è nato nel Medioevo ed è ancora conservato in molta terminologia scientifica (le "memorie virtuali" dell'informatica, il "lavoro virtuale" della fisica, ecc.): cioè come qualcosa che "1. che non è o non è stato fino a d oggi realizzato; 2. (*per estensione*) che si ha intenzione di rendere effettivo"[4] (beninteso questa accezione non coincide affatto con l'uso attuale di "virtuale" inteso come ciò che può essere percepito e con cui si può interagire solo nel quadro di

2. *Summa Theologiae*, I, questione 2, articolo 3.
3. *Proslogion*, capitolo 2.
4. Così: https://it.wiktionary.org/wiki/virtuale.

schermi e apparati elettronici. Ci sono delle eccezioni: per esempio i progetti architettonici e meccanici in CAD–CAM sono virtuali in entrambi i sensi. Un caso intermedio interessante è quello del segno, almeno nella sua definizione classica (*aliquid pro aliquo*) o in quella saussuriana (*signifiant/signifié*). Il segno degli antichi, o il significante saussuriano identificano non una cosa ma un "concetto" o "un'unità culturale"; dunque in un certo senso sono portatori di quell'*eidos*, che manca alla *dynamis* per realizzarsi. Ma è evidente che l'accezione originaria della parola non comprende ciò che oggi si intende prevalentemente con essa.

Prima di concludere questa discussione sull'uso filosofico del virtuale e sui suoi rapporti con la nozione di possibilità, vale la pena di citare un passo piuttosto complesso di Deleuze (1971) che riecheggia riflessioni bergsoniane, perché il virtuale che qui viene lumeggiato non è altro che una revisione della "durata" di Bergson:

> Abbiamo opposto virtuale a reale: anche se non avremmo potuto essere più precisi prima d'ora, questa terminologia deve essere corretta. Il virtuale si oppone non al reale ma all'attuale. Il virtuale è completamente reale nella misura in cui è virtuale. Ciò che Proust ha detto degli stati di risonanza deve essere detto del virtuale: "Reale senza essere reale, ideale senza essere astratto"; e simbolico senza essere immaginario. In effetti, il virtuale deve essere definito come strettamente parte dell'oggetto — come dire che l'oggetto ha una parte di se stesso nel virtuale in cui si è immerso come fosse una dimensione oggettiva. Le spiegazioni del calcolo differenziale spesso paragonano il differenziale a una "porzione della differenza". Oppure, seguendo il metodo di Lagrange, viene posta la domanda su quale parte dell'oggetto matematico presenti la relazione in questione e debba essere considerata derivata. La realtà del virtuale consiste in elementi e relazioni differenziali insieme ai punti singolari che corrispondono loro. La realtà del virtuale è la struttura. Dobbiamo evitare di dare agli elementi e alle relazioni che formano una struttura un'attualità che non hanno, e di ritirare da loro una realtà che hanno. Abbiamo visto che un doppio processo di determinazione reciproca e determinazione completa ha definito quella realtà: lungi dall'essere determinato, il virtuale è completamente determinato. Quando si afferma che le opere d'arte sono immerse in una virtualità, ciò che viene invocato non è una determinazione confusa ma la struttura completamente determinata formata dai suoi elementi

genetici differenziali, i suoi elementi "virtuali" o "embrionali". Gli elementi, le varietà di relazioni e i punti singolari coesistono nel lavoro o nell'oggetto, nella parte virtuale del lavoro o dell'oggetto, senza che sia possibile designare un punto di vista privilegiato sugli altri, un centro che unificherebbe gli altri centri. Come possiamo quindi parlare contemporaneamente sia della determinazione completa sia solo di una parte dell'oggetto? La determinazione deve essere una determinazione completa dell'oggetto, eppure farne parte. Seguendo i suggerimenti di Descartes nelle sue risposte ad Arnaud, dobbiamo distinguere attentamente l'oggetto in quanto completo e l'oggetto in quanto intero. Ciò che è completo è solo la parte ideale dell'oggetto, che partecipa con altre parti di oggetti all'Idea (altre relazioni, altri punti singolari), ma non costituisce mai un intero integrale in quanto tale. Ciò che manca alla determinazione completa è l'intero insieme di relazioni appartenenti all'esistenza reale. Un oggetto può essere ens, o piuttosto (non) ens omni modo determinatum, senza essere interamente determinato o effettivamente esistente. (1971: 208–9, *trad. mia*)

In sostanza in *Differenza e ripetizione* il virtuale viene inteso come una nozione puramente modale, ben diversa da quella di possibile, mentre in quest'ultima si raggruppa l'insieme di casi che non si sono (ancora) realizzati, ma sono già ben costituiti e definiti:

Il virtuale non è semplicemente "latente"; esso individua un livello dinamico, plastico della realtà. È un fattore che "destabilizza" quanto attualmente realizzato e ne rimette in gioco i caratteri ed è un nodo di tensioni le quali, per attualizzarsi, necessitano di interagire attivamente con l'ambiente in cui si esplica il divenire stesso; esso costituisce in definitiva un substrato da cui può scaturire una novità effettiva. (Alberta Rebaglia, *voce citata*)

Tutto sta dunque nella contrapposizione fra "possibile" e "virtuale". Come dice ancora Deleuze poco sopra:

Il possibile è già interamente costituito, ma rimane nel limbo. Si realizzerà senza cambiare nulla della sua determinazione e della sua natura; è un reale fantasmatico, latente. Il possibile è esattamente come il reale: gli manca solo l'esistenza. La realizzazione di un possibile non è una creazione, nel senso pieno del termine, poiché la creazione comporta anche la produzione innovativa di una forma o di un'idea. La differenza tra possibile e reale è dunque puramente logica. […] Il

> virtuale per attualizzarsi non deve procedere per eliminazione o limitazione, ma deve creare, con degli atti positivi, le sue linee d'attualizzazione. E questo per una ragione molto semplice: mentre il reale si realizza ad immagine e somiglianza del possibile, l'attuale, al contrario, non assomiglia alla virtualità che incarna. La differenza è l'elemento principale nel processo d'attualizzazione.

Benché di evidente interesse semiotico, questa discussione ancora non si avvicina alla nozione di virtuale più diffusa nella nostra semiosfera, com'è definita nei dizionari più diffusi: Simulato, ricostruito al computer e che appare come se fosse reale" (Sabatini/Colletti[5]); e "Realtà virtuale, situazione simulata dal computer, con tutte le caratteristiche di quella reale, rispetto alla quale è possibile interagire || Comunità virtuale, insieme di utenti accomunati da interessi condivisi, in comunicazione tra di loro tramite Internet o rete di telefonia"[6].

C'è un evidente legame, anche terminologico, fra l'analisi di Deleuze e le affermazioni apologetiche della "virtualizzazione" che si ritrovano nella prima opera teorica sviluppata sul virtuale in questo senso, il libro di Pierre Lévy (1997) intitolato per l'appunto *Il virtuale*:

> Solo nel reale le cose sono nettamente delimitate. La virtualizzazione, passaggio alla problematica, spostamento dell'essere sull'interrogazione, è necessariamente una rimessa in discussione dell'identità classica, pensata servendosi di definizioni, di determinazioni, di esclusioni, di inclusioni e di terzi esclusi. Per questo la virtualizzazione è sempre eterogenesi, divenire altro, processo di accoglimento dell'alterità. Non bisogna naturalmente confondere l'eterogenesi con il suo contrario prossimo e minaccioso, la sua sorella nemica, l'alienazione, che definirei come reificazione, riduzione all'oggetto, al reale. (Lévy, 1997: 7)

> Tutto ciò che rientra nell'ordine dell'evenemenziale è riconducibile a una dinamica dell'attualizzazione (territorializzazione, determinazione del qui–e–ora, soluzione specifica) e della virtualizzazione (deterritorializzazione, svincolamento, condivisione, elevazione a problema). (Lévy, 1997: 50)

5. https://dizionari.corriere.it/dizionario_italiano/V/virtuale.shtml.
6. https://dizionari.repubblica.it/Italiano/V/virtuale.html.

Ma questa linea Bergson–Deleuze–Lévy è lontana dalla nozione condivisa di virtuale, o meglio, nell'ultimo caso, la dà per presupposta e non la spiega, certamente non sul piano semiotico. È necessario dunque proseguire con la nostra archeologia.

2. Virtuale = illusorio

Vi è dunque un passaggio successivo, o meglio più d'uno. Nel corso della storia della parola, si è avuto uno slittamento, in particolare nella lingua inglese, che sarà decisiva per l'uso informatico: da "potenziale" si arriva a "being such in essence or effect though not formally recognized or admitted"[7], cioè il virtuale diventa ciò che è qualche cosa ma non è ancora riconosciuto o ammesso come tale. O a esserlo in maniera incompleta "though not actually or in fact" (testimoniato alla metà del Quattrocento, "probably via sense of "capable of producing a certain effect"[8] cioè una sorta di surrogato e di qui a essere qualcosa sì, ma non del tutto: "almost complete"[9].

Questo senso generico di "virtuale" come "quasi", si è mantenuto in certe forme di discorso, come quando si dice che lo studente è "virtualmente promosso" (ma ancora non lo è) e che il secondo arrivato in una competizione è "virtualmente il vincitore", nel senso che c'era poca distanza dal vincitore vero, o che ha avuto altri meriti. Ma di qui viene uno sviluppo diverso più interessante per noi.

Un senso particolare di questa "quasi completezza", che prelude all'uso attuale, sottolinea infatti nel virtuale quella dimensione dell'*apparire ma non essere* che Tomas Maldonado (1992) definisce polemicamente "illusorio", non per denigrarlo, ma per valorizzarne la continuità antropologica. Vale la pena di riportare per esteso il suo ragionamento:

> Virtuale e realtà virtuale appartengono a quella categoria di espressioni che, per la loro ambiguità di fondo, hanno creato, e continuano a creare, malintesi di ogni

7. https://www.merriam-webster.com/dictionary/virtual.
8. https://www.etymonline.com/search?q=virtual.
9. https://dictionary.cambridge.org/us/dictionary/english/virtual.

> genere. Alcuni di questi sono tanto radicati che cercare di superarli è ormai un'impresa disperata. […] Per me virtuale è sinonimo di illusorio […] Diciamo che il virtuale non è una novità, e meno ancora, come pretendono alcuni, una stravolgente novità. Da sempre, noi umani abbiamo avuto la possibilità (e l'impellente necessità) di arredare illusoriamente il mondo. È superfluo ricordare, perché troppo ovvio, la nostra propensione a illuderci, a farci illusioni, sulla realtà, e su noi stessi, e a rendere irreale il reale, e viceversa. Mi riferisco, di preciso, alla nostra capacità affabulatoria, ossia, alla nostra attitudine a generare illusioni e a credere (e far credere) che esse siano reali. Non c'è dubbio, del resto, che questa capacità di immaginare, raffigurare e produrre mondi illusori sia una delle caratteristiche più distintive della nostra specie. Poiché noi umani siamo, prima di qualsiasi altra cosa, infaticabili mitomani, prolifici facitori di mondi simbolici. Mondi simbolici che svolgono un ruolo di mediazione tra noi e il mondo reale. Ed è appunto questa sfera della mediazione simbolica il luogo nel quale si sviluppano le diverse pratiche creative di rappresentazione, tramandatesi per millenni, che forniscono la nostra versione del mondo reale. Basta pensare, per esempio, alla lunga storia della rappresentazione visiva — dai dipinti sulle pareti della grotta di Altamira alla realtà virtuale — e a quella della narrazione letteraria da Omero a Joyce.

Nel pensiero di Maldonado, insomma, "virtuale" va messo in serie con termini come "finzionale", "fittizio", "artificiale", "simulato", "rappresentato", "illusorio" e ne condivide il destino. Non è qualcosa di incompleto, che però abbia la possibilità, la *dynamis,* per compiersi ed apparire infine dopo l'opportuna gestazione come ciò che *potenzialmente* è già dall'inizio. Al contrario l'illusorio designa qualcosa che solamente *appare ciò che non è* e non potrà mai essere, perché le manca la condizione fondamentale, l'esistenza.

In sostanza — e in termini semiotici — si tratta di una menzogna, sia pure consensualmente accettata secondo la classica definizione di "sospensione dell'incredulità" che risale a Coleridge (1817, cap. XIV):

> A human interest and a semblance of truth sufficient to procure for these shadows of imagination that willing suspension of disbelief for the moment, which constitutes poetic faith.

È un salto logico assai notevole, che da "virtuale" come ciò che ha tutte le qualità per diventare "attuale", porta a "virtuale" come *apparente ma non reale*, essenzialmente e definitivamente incapace di attualizzarsi. È

difficile trovare l'origine di questo rovesciamento metafisico della terminologia. Sul piano delle cose, naturalmente, ma non dei nomi, l'intuizione di dispositivi che *appaiono ciò che non sono*, del potere e del pericolo che deriva da questa condizione è estremamente antica nella cultura europea, risalendo almeno all'accenno nell'Odissea al "cavallo di Troia" ("il cavallo intagliato, ove sedea,/ Strage portando ad Ilio, il fior de' Greci". *trad. Pindemonte* IV, 360), sviluppato poi da Virgilio nel discorso di Laocoonte del libro II dell'*Eneide*: "chiusi in questo legno si tengono nascosti Achei, o questa macchina è fabbricata a danno delle nostre mura, per spiare le case e sorprendere dal alto la città, o cela un'altra insidia: Troiani, non credete al cavallo!" Il virtuale non va *creduto*, dunque; ma si può e si deve ammirare, secondo il punto di vista degli artisti. Il luogo più chiaro e più esaltante di questa idea della rappresentazione come inganno si ritrova nel celebre episodio della gara dei pittori ateniesi narrato da Plinio il Vecchio:

> Si racconta che Parrasio venne a gara con Zeusi; mentre questi presentò dell'uva dipinta così bene che gli uccelli si misero a svolazzare sul quadro, quello espose una tenda dipinta con tanto verismo che Zeusi, pieno di orgoglio per il giudizio degli uccelli, chiese che, tolta la tenda, finalmente fosse mostrato il quadro; dopo essersi accorto dell'errore, gli concesse la vittoria con nobile modestia: se egli aveva ingannato gli uccelli, Parrasio aveva ingannato lui stesso, un pittore. Si racconta che poi Zeusi dipinse anche un fanciullo che portava l'uva sulla quale, al solito, volarono gli uccelli; onde, con la stessa spontaneità, si fece dinanzi al quadro adirato e disse: "Ho dipinto l'uva meglio del fanciullo, perché, se avessi fatto bene anche lui, gli uccelli avrebbero dovuto averne paura". (Plinio il Vecchio, *Naturalis historia*, XXXV, 65–66, tr. it. *Storia naturale*, vol. V, Einaudi, Torino 1988, pp. 361–363)

L'opposizione ben nota di Platone (*Repubblica X 596a–597a.*) a questo "virtuale" si spiega proprio per l'inganno e la degradazione ontologica che necessariamente contiene. Tutto ciò e i successivi passaggi della rappresentazione naturalistica e della lotta ideologica e religiosa che ripetutamente si scatenò intorno ad essa, per esempio col movimento iconoclasta a Bisanzio, non appare però sotto l'etichetta di "virtuale", che non ha rapporto con l'illusionismo visivo fino al Novecento avanzato. Per le linee principali di questa vicenda, inclusi i suoi episodi scientifici, di solito sottovalutati, è molto utile il libro di Tomàs Maldonado, che forse è il primo a identificare questa vicenda con l'etichetta di "virtuale".

Ma dov'è avvenuto lo slittamento terminologico? Un passaggio molto significativo e piuttosto inatteso è senza dubbio opera di Antonin Artaud, che probabilmente per la prima volta nella cultura europea impiega il termine "virtuale" per definire il frutto di operazioni simulative. Nel libro più visionario sul teatro dell'intera storia delle sue teorie, (Artaud, 1938), l'attore francese insiste sul carattere *virtuale* del teatro, attribuendolo non al suo "linguaggio", che gli appare invece "reale", bensì della presenza scenica, che accosta all'alchimia, utilizzando forse per la prima volta l'espressione "realtà virtuale":

> Une vraie pièce de théâtre bouscule le repos des sens, libère l'inconscient comprimé, pousse à une sorte de révolte virtuelle et qui d'ailleurs ne peut avoir tout son prix que si elle demeure virtuelle, impose aux collectivités rassemblées une attitude héroïque et difficile. […] l'alchimie comme le théâtre sont des arts pour ainsi dire virtuels, et qui ne portent pas plus leur fin que leur réalité en eux–mêmes. […] Tous les vrais alchimistes savent que le symbole alchimique est un mirage comme le théâtre est un mirage. Et cette perpétuelle allusion aux choses et au principe du théâtre que l'on trouve dans à peu près tous les livres alchimiques, doit être entendue comme le sentiment (dont les alchimistes avaient la plus extrême conscience) de l'identité qui existe entre le plan sur lequel évoluent les personnages, les objets, les images, et d'une manière générale tout ce qui constitue la réalité virtuelle du théâtre, et le plan purement supposé et illusoire sur lequel évoluent les symboles de l'alchimie. [Un vero momento teatrale sconvolge i sensi, libera l'inconscio compresso, porta a una sorta di rivolta virtuale che però mantiene il suo valore solo se rimane virtuale, impone un atteggiamento eroico e difficile alle comunità riunite […].l'alchimia come teatro sono per così dire arti virtuali, e non portano in se stessi né la loro fine né la loro realtà. Tutti i veri alchimisti sanno che il simbolo alchemico è un miraggio quanto il teatro è un miraggio. E questa perpetua allusione alle cose e al principio del teatro che si trova in quasi tutti i libri alchemici, deve essere inteso come il sentimento (di cui gli alchimisti avevano la coscienza più estrema) dell'identità che esiste tra il piano su cui evolvono i personaggi, gli oggetti, le immagini e in generale tutto ciò che costituisce la realtà virtuale del teatro e il piano puramente supposto e illusorio su cui si evolvono i simboli dell'alchimia. (*trad. mia, UV*)]

Non è possibile in questa sede neppure accennare alle utopie teatrali visionarie e affascinanti di Artaud. È chiaro che per lui "virtuale" indica una finzione "efficace", trasformativa, come pretendono di esserlo i riti religiosi (per la Chiesa i sacramenti sono "simboli efficaci", ma anche pratiche magiche come l'alchimia. È proprio la sua ripugnanza per il naturalismo convenzionale, la sua sete di "realtà" nell'azione scenica, condivisa con alcuni grandi maestri del teatro novecentesco, da Stanislavskij a Grotowski a Book, che lo porta all'identificazione di teatro, alchimia e "virtuale". Del resto l'alchimia era stata l'ossessione di un altro grande rivoluzionario e "pazzo" del teatro moderno, August Strindberg.

Mi preme qui sottolineare che l' impiego da parte di Artaud dell'ossimoro "realtà virtuale" precede di circa mezzo secolo le prime utilizzazioni cui di solito ci si riferisce, cioè il romanzo di fantascienza *The Judas Mandala* di Damien Broderick del 1982, mentre il primo uso commerciale sarebbe da attribuire a Jaron Lanier e alla sua startup VPL Research, nel 1987. Del 1995 è il rapporto conclusivo del Committee on Virtual Reality. Research and Development, pubblicato nel 1995 dal National Research Council degli Stati Uniti con il titolo *Virtual Reality. Scientific and Technological Challenges*. Quel che ci interessa invece molto è il riferimento molto preciso di Artaud al "il piano su cui evolvono i personaggi, gli oggetti, le immagini e in generale tutto ciò che costituisce la realtà virtuale del teatro" come "miraggio". Ciò che Maldonado chiamerà "illusorio", con i suoi riferimenti a quadri e romanzi, cioè la rappresentazione naturalistica, è insomma pensato da Artaud come superato dal teatro, in cui in gioco vi sono persone in carne ed ossa, il che lo porterebbe al massimo grado di "realtà", grazie al suo "linguaggio nudo, linguaggio non virtuale ma reale". È evidente che Artaud come poi farà Maldonado, sta parlando della capacità di certi tipi di narrazione di creare mondi in cui lo spettatore è coinvolto, è messo *in gioco* (questo è anche il significato del termine accuratamente scelto da Maldonado, invece di "diegetico", "narrativo", "fittizio" o "finzionale", che erano alternative possibili: il fruitore di questi costrutti è portato "in ludum" dentro i limiti, le regole, ma soprattutto la metafisica alternativa che è propria dei giochi). Stiamo insomma parlando di un grado particolarmente alto di intensità nella rappresentazione.

3. Virtuale = mondo possibile

Per un semiologo è chiarissimo di che cosa si parla innanzitutto con queste descrizioni: di quell'operazione che trasferisce ogni narrazione dal piano dell'enunciazione a quella dell'enunciato (e poi ancora per incassamento, in caso di enunciazioni enunciate o di atteggiamenti proposizionali come sperare, credere, volere ecc. che a loro volta aprono nuovi mondi possibili): nella semiotica contemporanea si è generalizzato l'uso per questo scarto del termine greimasiano *débrayage*. Ma già sul piano grammaticale *débrayage* è una parola d'azione, che denomina un'operazione e non il suo risultato. Per parlare di quest'ultimo, di ciò che il *débrayage* apre o crea e che è conveniente invece far ritorno alla terminologia proposta da Eco nel 1979, quella dei "mondi possibili". Non a caso nel libro dedicato alla *messa in gioco* che il lettore inevitabilmente subisce *entrando* nel testo narrativo per goderne, Eco riprendeva la nozione leibniziana di mondo possibile, riattualizzata dalla semantica delle logiche modali dovuta principalmente a Saul Kripke, con le successive applicazioni ai controfattuali di David Lewis e alla semantica del linguaggio naturale, intesa in senso fortemente infinitario e sintatticista, di Richard Montague.

Se posso introdurre una nota personale, avendo dedicato la mia tesi in logica a quest'ultima teoria nel periodo in cui collaboravo strettamente con Eco, credo di essere in parte responsabile dell'ispirazione di questo momento del suo pensiero; in seguito, proprio per aver segnalato l'inadeguatezza di un approccio narratologico che usava la nozione logica di mondo possibile in modo soprattutto metaforico (Volli, 1976), vi fu un espresso dissenso con Eco com'è testimoniato da una nota fortemente sarcastica dedicatami dal *Lector*. Accenno a queste vicende non per ragioni personali, naturalmente, ma perché aiutano a capire la posta in gioco nella nozione di mondo possibile. Eco classificava i mondi a seconda della loro accettabilità rispetto alle conoscenze comuni e alle leggi naturali vigenti nel mondo reale ("verosimili" e non, "inconcepibili" e "impossibili"); prendeva a prestito dalla teoria logica la nozione di "accessibilità" fra mondi per indicare l'asimmetria di conoscenza che è conseguenza dei débrayages, accennava insomma a una gerarchia di mondi, si poneva il problema di "proprietà essenziali" dei personaggi, secondo una variante del "battesimo" dei nomi che aveva tratto da Kripke, cercava di risolvere, con la distinzione fra le diverse categorie di mondi possibili, rompicapo

narrativi come "Un drama bien parisien" di Alphonse Allais. Tutte queste intuizioni però non si traducevano in strumenti analitici applicabili. A differenza dei mondi possibili della logica, che cosa fossero quelli narrativi non era e non divenne mai chiaro.

Il modello a mondi possibili riformulava in sostanza l'intuizione comune secondo cui le vicende narrate si svolgono non "qui" ma *in un altrove* che non ha interazione materiali né causali con il mondo reale, che in sostanza non esiste, dove qualunque cosa può essere statuita, anche vicende che contrastano con le leggi di natura (il genere fantasy, per esempio) e perfino con la logica (*Alice nel paese delle meraviglie*). Anche se il "realismo modale" di David Lewis (1986), lontana eco delle posizioni di Mainong sugli oggetti inesistenti, nega quest'ultima limitazione, attribuendo ai mondi possibili una forma di esistenza che sarebbe in linea di principio la stessa del mondo nostro cui ci è accaduto di appartenere e che solo per questa illogica ragione ci sembra "reale", si tratta di una posizione rimasta quasi del tutto isolata nel pensiero filosofico contemporaneo e che comunque è insostenibile nel caso di mondi narrativi di cui conosciamo in partenza il carattere artificiale e magari anche l'autore. La proposta di Eco prende in considerazione anche l'inevitabile "povertà" di questi mondi narrativi, dovuta al fatto che essi sono costituiti esplicitamente sullo sfondo del mondo reale e ne danno per presupposte implicitamente tutte le caratteristiche non esplicitamente negate o modificate, aggiungendovi solo alcuni dettagli costitutivi della storia, che proprio per questo carattere statuito diventano le loro "proprietà essenziali". Dunque sul piano teorico la nozione di mondo possibile aggiunge poco o nulla all'intuizione e alla convinzione narrativa. Dicendo che l'ambiente in cui si svolgono *Promessi sposi* o *Supermario* è un mondo possibile con certi gradi di distanza dal nostro, non diciamo niente di nuovo., anche se precisiamo che Renzo e Lucia hanno la proprietà essenziale di volersi sposare o che l'abbigliamento preferito di Mario sono le salopettes blu.

Questo modello ha dunque certamente dei limiti, il primo dei quali è di essere sì enunciato ma di non sapersi specificare in strumenti analitici precisi. Non abbiamo modo di decidere quanti mondi possibili siano generati da un racconto, soprattutto se vi comprendiamo modalità e atteggiamenti proposizionali; il loro "arredamento" è poco significativo, perché dipende da scelte stilistiche (per esempio il grado di dettaglio delle descrizioni) o tecniche (la risoluzione delle immagini).

Si rischia di ridursi in definitiva a qualcosa come l'elenco dei personaggi con relativa qualifica che si trovava una volta nella pagina iniziale di certi romanzi polizieschi.

Soprattutto la teoria dei mondi possibili non tiene conto del fatto che il significante dei testi narrativi è fatto di parole, lettere, immagini, pixel, inquadrature, ecc. e che il mondo che il lettore ne deduce è l'effetto di questi dati materiali, corrisponde cioè a un livello del significato percepito dei complessi significanti testuali di un romanzo, di un film o di un videogame. Come mostrano chiaramente le traduzioni interliguistiche e soprattutto quelle intersemiotiche, la realizzazione di un mondo possibile da una narrazione dipende da operazioni interpretative che sono influenzate dall'enciclopedia dell'interprete. Se lo consideriamo letteralmente come realtà alternative, non c'è a rigore *un* mondo possibile dei *Madame Bovary* o di *Frankenstein*, ma tanti quanti sono le sue ricezioni.

4. Virtuale = iper–iconismo

In realtà ciò che si intende oggi per virtuale, dal punto di vista semiotico riprende alcune caratteristiche di entrambi i paradigmi appena discussi. Partiamo dal tema della rappresentazione. È chiaramente assai difficile parlare di virtualità a proposito di una rappresentazione verbale. Per quanto dettagliate e *magiche* possano essere certe narrazioni e descrizioni, dalle battaglie dell'*Iliade* ai campanili che si inseguono *du coté de chez Swann,* difficilmente si potrebbe attribuire loro quel carattere di *virtualità* che ci interessa caratterizzare. È ragionevole pensare che "virtuale" così come è inteso oggi, sia una specificazione della categoria dell'iconico, naturalmente con alcune caratteristiche distintive, come l'alta definizione, la produzione per via elettronica, l'interattività. Ma quel che conta di più, dal punto di vista semiotico, è l'iconismo. Non a caso Maldonado, nel saggio che ho citato sopra, accosta l'esperienza dell'"immersione" in un dispositivo virtuale all'"esplorazione" di un quadro. Certo, i dati materiali sono assai diversi, ma non è detto che il funzionamento semiotico lo sia.

Senza la pretesa di riaprire lo storico dibattito sull'iconismo e sui suoi gradi (su cui rimando a Polidoro 2015; per una posizione su quest'ultimo

punto che in fondo mi convince ancora rimando al mio Volli 1974), vale la pena di ripartire da una delle numerose definizioni di Peirce, quella del 1886 contenuta in "An Elementary Account of the Logic of Relatives" (Peirce 1982, [W] 5: 379–80)

> The icon represents its object by virtue of resembling it. It thus depends on a simple feeling. Mental association has nothing to do with it. The icon has no generality, because it does not analyze the character it exhibits. There is thus no more generality in the icon than there is in the object. Nor has the icon anything to do with the sense of contact with the world, nor with the actual existence of its object. It is a mere dream. Icons comprehend all pictures, imitations, diagrams, and examples.

Ad essa vale la pena di aggiungere, per la nostra discussione, una precisazione contenuta in un testo del 1902 (CP 2.304): "An ***icon*** is a sign which would possess the character which renders it significant, even though its object had no existence". Oltre ai soliti temi definitori della somiglianza e delle proprietà in comune fra oggetto e segno, che qui sono dati per presupposti, ci sono tre idee molto interessanti in questi testi e in altri analoghi che Peirce ha seminato qua e là nella sua gigantesca produzione. Il primo è che il segno iconico ha necessariamente un rapporto con un oggetto, poi che questo rapporto non è mai generale o generico, perché l'icona "non analizza il carattere che esibisce", il che significa che non lo concettualizza e che dunque esso resta individuale; infine che l'oggetto può anche essere non esistente. Riformulando queste idee secondo una diversa terminologia, il rapporto dell'icona riguarda un referente preciso, perché non passa attraverso significati concettuali; ma che questo referente può benissimo non esistere.

Un esempio per chiarire questo punto può essere tratto dai diagrammi geometrici che Peirce considerava icone particolarmente importanti: non è possibile fare il diagramma di un triangolo generico: lo schema rappresenterà per forza un particolare triangolo, per esempio un triangolo rettangolo o isoscele; ma non potrà essere un generico triangolo rettangolo, dovrà essere uno in cui per esempio i cateti sono in rapporto di tre a uno ecc. Naturalmente l'oggetto triangolo di cui il disegno è segno non esiste in quanto tale, perché in natura non vi sono segmenti senza spessore, ma lo schema funziona lo stesso, anzi per un certo verso si identifica con il suo

oggetto. In termini appena un po' diversi, lo stesso vale per le immagini rappresentative: la pittura di un volto non è mai generico, avrà i capelli lunghi o corti, le ciglia folte o rade, le labbra di una certa forma.

E se si tratta di una testa di sirena o di dea, potrà essere benissimo la raffigurazione di un oggetto inesistente. Che la fotografia fosse necessariamente immagine *di* qualcosa, com'è noto, è stata una tesi sostenuta da Roland Barthes, che ne traeva anche l'idea che si trattasse più di un indice che di un'icona (Barthes, 1980). Insomma, mentre una parola in genere (con le discusse eccezioni dei nomi propri e dei pronomi) rimanda a un concetto e una locuzione più complessa, magari con un "gancio" indicale o con una "descrizione definita" (nel senso di Russell, 1905), può arrivare a designare, l'icona punta sempre a cogliere direttamente un oggetto. Le teorie che puntavano a risolvere il funzionamento della significazione iconica in termini simbolici (nel senso di Peirce, cioè arbitrari) non hanno resistito alla prova dei fatti e delle analisi. Dopo l'iniziale tentativo di Eco (1968) di dissolvere il funzionamento specifico dell'iconismo in "convenzioni" (p. 117), ben presto abbandonato, anche la strada suggerita da Greimas (*Dizionario ragionato della teoria del linguaggio*, "Iconicità") di pensare piuttosto a "processi di iconizzazione" che "facendosi carico delle figure già costituite le dotano di investimenti particolareggianti, in grado di produrre l'illusione referenziale" è rimasta solo una petizione di principio incapace di spiegare il funzionamento effettivo delle immagini. Di fronte per esempio alla produzione tecnica di immagini (TAC, RMN, microfotografie istologiche ecc.) il processo è esattamente l'inverso: dalla presupposizione di un riferimento oggettuale si estraggono dal testo visivo dettagli che il ricercatore tenta di identificare come figure pertinenti di uno stato di fatto (patologie, microstrutture della materia ecc.)

Il punto che Peirce sfiora spesso ma che, per quanto ne so, non approfondisce davvero teoricamente, è che questo oggetto può anche non esistere, come si è visto prima, nel caso di schemi geometrici, ma anche di immagini fantastiche o di certi cartoni animati e altri film. Essi, in un certo senso, dovrebbero venir *generati* dall'immagine che li intenziona. O almeno questo è il modo in cui noi siamo portati a interpretare la referenza delle immagini: anche quando *sappiamo* che un'immagine è *impossibile*, come nel caso di certe illusioni ottiche, non possiamo non vederla se non come rappresentazione di un oggetto, sulla base del funzionamento naturale del nostro apparato percettivo.

Su questo effetto si basano numerose operazioni artistiche, come certe stampe di M.C. Escher. Sono sì oggetti e non concetti, individui non generici, ma *inesistenti*. Questo ci riporta alla teoria dei mondi possibili, sempre che la si intenda non semplicemente come una combinatoria di proprietà, ma in maniera *realistica*, secondo la linea Meinong–Lewis. Non è questo il luogo neppure per iniziare a discutere, ma è importante sottolineare il nesso fra teoria peirceana dell'iconismo e questa prospettiva, con la conseguente opportunità di riaprire una ricerca semiotica teorica su questo tema.

Un altro problema semiotico connesso che vale la pena di indicare qui è quello più specifico del virtuale, inteso nel senso consueto oggi. Ho richiamato prima la questione dei *gradi* dell'iconismo. È evidente che da questo punto di vista c'è differenza fra uno schizzo a matita e un quadro a olio, una pittura o una fotografia, un'immagine in bianco e nero o a colori, statica o in movimento, bidimensionale o tridimensionale, contenente o meno dispositivi che simulano la percezione come la prospettiva o il puntinismo, prodotta in stile naturalistico o meno, circoscrivibile (come una statua) o circoscrivente (come certe istallazioni), fornita o meno di effetti tattili, uditivi, olfattivi, cinestetici (cioè di movimenti che sono percepibili dal fruitore attraverso il corpo, come in certe sperimentazioni di effetti speciali al cinema o più banalmente di certe "attrazioni" dei parchi giochi), ecc. Tutte queste diverse caratteristiche sono state sfruttate largamente a teatro, nei riti religiosi ecc.

La semiotica si è occupata poco o niente di questa problematica, o rimandandola con Eco a "modi di produzione segnica" o rifugiandosi nel concetto di "illusione referenziale" con Greimas. In genere la semiotica strutturale si è occupata poco di problemi di "manifestazione", come questi, ritenendo che fossero poco importanti, e in particolare non ha lavorato quasi sulle grammatiche di genere (nel senso di *genre*, non di *gender*). Per le immagini c'è stata una parziale eccezioni, con la teoria del plastico e figurativo; ma essa è fortemente incompleta riguardo ai gradi di iconismo e inoltre si occupa soprattutto di immagini bidimensionali.

Il virtuale è evidentemente realizzato innalzando al massimo il grado iconico, in rapporto alle tecnologie disponibili (Maldonado elenca fra le tappe del virtuale le statue irrealistiche di cera delle preparazioni anatomiche, e val la pena di ricordare qui l'episodio inaugurale della storia del cinema quando i fratelli Lumière riuscirono a spaventare il pubblico pro-

iettando su un telone l'arrivo di una locomotiva che oggi appare di scarso effetto[10].

Come scriveva Maldonado già 25 anni fa, la frontiera oggi si è spostata, il virtuale è colorato, dettagliato, circoscrivente (cioè avvolgente) e soprattutto interattivo:

> Per realtà virtuale intendo quella particolare tipologia di realtà simulata in cui l'osservatore (in questo caso spettatore–attore–operatore) può inserirsi interattivamente, con l'aiuto di particolari protesi ottico–tattili–auditive, in un ambiente tridimensionale generato dal computer. (Maldonado, 1994: 48)

Beninteso tutto ciò non deve essere realizzato con allestimenti fisici, come nel caso di certe istallazioni artistiche o attrazioni dei Luna Park (perché esse non sarebbero giudicate virtuali, ma attraverso una manipolazione diretta della percezione basta soprattutto sulla tecnologia degli schermi grandi o piccoli, in quanto "equivalenti generali" della comunicazione contemporanea (Volli, 2007). Il punto centrale qui è questo "inserirsi attivamente" dell'"osservatore", che è il grande cambiamento introdotto dalla tecnologia informatica nella dimensione dell'"illusione". La prima espressione di questa illusione non è narrativa né iconica, ma consiste nei dispositivi di puntamento che permettono di inserire informazioni e scegliere operazioni rappresentate su uno schermo elettronico (ma in realtà presenti in un computer) per mezzo di azioni codificate svolte nel mondo reale. Come è noto, la tecnologia per fare agire un movimento fisico della mano di un operatore su un puntatore elettronico risale a dispositivi militari elaborati durante la Seconda guerra mondiale (la *trakball* realizzata dall'inglese Ralph Benjamin nel 1946 pere la RAF) e la sua applicazione a un normale computer risale al primo mouse prodotto per il computer "Xerox Alto" del 1973. Di qui alla sperimentazione di dispositivi interattivi più complessi (guanti, visori, ecc.) il passo fu breve.

Non è questo il luogo per delineare la storia di tali sviluppi. Quel che conta è il principio: un movimento compiuto nel "mondo reale", che in esso sarebbe senza scopo senza il legame con un "altro mondo" che semioticamente è una costruzione enunciata, costruita attraverso un débrayage, in quest'altro mondo diventa un'azione precisa: il mo-

10. https://www.youtube.com/watch?v=-t1fztfz96A.

vimento del mouse sul suo tappetino diventa posizionamento di un puntatore su un comando dello schermo e poi la sua attivazione grazie all'uso di un pulsante; oppure un gesto di un videogioco; la rotazione del capo con gli occhi coperti da un visore modifica la vista del mondo finzionale; il joystick accelera o fa curvare un'automobile rappresentata e così via. Questa interazione permette al corpo dell'operatore di porsi come ponte o traduttore fra i due mondi, stabilendo un punto di vista (non importa se *eterodiegetico* o *omodiegetico,* Genette, 1972), in terza o prima persona, attraverso un "avatar" o direttamente. Comunque questo tipo di virtualità richiede una testualità aperta (Eco, 1962) nel senso preciso di non essere stabilita prima dell'intervento dell'interprete. La modulazione del débrayage esiste anche in testi letterari, almeno a partire dagli anni '60 del secolo scorso (un esempio illustre è Cortazar, 1963). L'aspetto caratteristico del virtuale, connesso con il suo carattere iconico è la densità, la continuità e la molteplicità delle azioni possibili, e la concreta che producono qualcosa di più di un'"illusione referenziale": l'obiettivo di questo grado di iconismo non è solo quello di sembrare vero, ma di apparire come il mondo circostante in cui il fruitore–destinatario è incluso come attore–produttore. Questo intreccio di ruoli e di livelli narrativi e ontologici, già intuito da Maldonado, può ben essere chiamato iper–iconismo. Esso costituisce una sfida alla teoria semiotica, che attende ancora di essere affrontata in maniera sistematica.

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Technologically Modified Self–Centred Worlds

Modes of Presence as Effects of Sense in Virtual, Augmented, Mixed and Extended Reality[1]

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Abstract: This paper aims to consider different forms of extended reality (virtual, augmented and mixed reality) as manifestations of "technologically modified self–centered worlds (*Umwelte*)". Consequently, the problems of the subject's *presence* into the world and that of the mutual world's presence with respect to the subject, becomes central. From this perspective, we argue that different extended reality technologies constitute different "modes of presence" for the user; and that these modes of presence, conceived as meaning effects, are linked to specific enunciative configurations implied by the hardware and implemented by the software of extended reality dispositives. The paper consists of two parts: the first one examines the development of various forms of extended reality and their uses in the art world, with a specific focus on Jakob Kundst Steensten's work. The result of the first part is a reasoned classification of extended reality forms, which distinguishes between *bystanding media* (e.g. cinema), *bystanding–immersive* media (e.g. hypertexts, video games, and various forms of augmented reality), *moderate immersive* media (e.g. cinematic virtual reality) and *radical immersive* media (e.g. mixed reality). The second part analyzes various debates conducted in recent years on the concept of "presence" in the field of engineering and VR psychology, media studies, philosophy and semiotics. It then resumes the classification previously introduced in order to highlight how the modulation of different roles of co–enunciator entrusted to the user determines in each case different modes of presence in technologically modified self–centered worlds.

Keywords: immersive media; virtual reality; augmented reality; mixed reality; extended reality; media art; semiotics; enunciation, presence.

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1. This work has been jointly discussed between the two authors. Paragraphs 2.1, 2.2. and 2.3 were written by Valentino Catricalà, while the rest of the article was developed by Ruggero Eugeni.

1. Introduction

This intervention questions the subject's *presence* within different forms of virtual, augmented and mixed reality. We summarize these phenomena under the meta–term of "extended reality".

The basic idea of this paper is that various types of extended reality construct different forms of *technologically modified self–centered worlds* (or *Umwelte*); as such, they determine the mutual presence between the subject and the world as a particular meaning effect. Furthermore, the different forms of extended reality do not merely constitute a single effect of presence, but rather modulate different "modes of presence"; in particular, these modes of presence are determined by the activation of specific enunciative configurations or "postures".

The paper consists of two parts. At first, we build a reasoned map of different forms of extended reality that have gradually emerged in media history. The second part explores the concept of "presence" and proposes a semiotic articulation of the modes of presence constituted by extended reality according to different enunciative configurations.

2. Forms of Artifice

2.1. *From Illusionism to Virtual Reality*

The manipulation of body sensory capacities through an illusion of immersiveness is not a recent phenomenon. Previous examples of virtual reality were already developed in the Renaissance perspective and in baroque illusionism[2]. Grau (2003) traces back even further the archeology of virtual reality to the frescoes of Roman houses, emphasizing the passage from an illusion of presence characterizing the role of the spectator in the past, to a sensorial immersion typical of new technologies. From this point of view, the author describes the Roman frescoes from Villa dei Misteri in Pompeii,

2. With regard to virtual reality, Bettetini (1996: 90) states that this "tendency was already present in many forms of pre–informatics representation, from Renaissance perspective paintings to the inventions, in the Fifties, of stereoscopic cinema […]".

> Through the device of seeming to extend the wall surface beyond a single plane, the room appears larger than its actual size and draws the visitor's gaze into the painting, blurring distinctions between real space and image space. The most effective examples of these frescoes use motifs that address the observer from all sides in a unity of time and place, enclosing him or her hermetically. This creates an illusion of being in the picture, inside an image space and its illusionary events.[3]

The separation between all these phenomena and the immersive forms proper of modern times is determined by *technological* instrumentation: in fact, technology generates the passage from ancient forms of *illusionism* to modern forms of *immersiveness*. The roots of contemporary immersion therefore date back to the nineteenth century and in particular to the rise of cinema. Cinema constitutes a first model of technological immersiveness: although through forms that were still limited[4], it introduced the principle that technology can intervene on the subject's sensory capacity and manipulate their ways of being in the world[5]. The cinematographic spectator experiences for the first time a *technologically modified self–centered world* — that is a "world in which an organism lives, the one that recognizes and makes"[6] as constituted or co–constituted by technological means —.

The subsequent development of media accentuates this trend by creating boundaries between a pure visual experience and some forms that we would define as "semi–immersive", typical of experiences such as the video games. A moderate possibility of subject interaction determines the relationships between the subject and life worlds offered by cinema and video: "virtual systems allow obtaining from the computer the user's interpretations and the device's consequent answers in real time"[7].

From here, we can get to the present day, characterized by a further technological and cultural transition. This evolution is determined by the

3. Grau (2003: 25). On the history of "immersion" through arts see also Wolf, Bernhart and Mahler (2013) and Guelton (2014a).

4. "Cinema is evidently not an immersive medium in a strict sense: the adjective normally refers, in fact, to a perceptive immersiveness to which cinema can tend […]" Carocci (2018: 93).

5. On these aspects, literature is very vast: we therefore refer here to Casetti (2008).

6. Kull (2010: 43). On the concept of "Umwelt" see von Uexküll (2010) and the comments of Brentari (2015). For an application of the Umwelt concept to virtual environments, see Casetti and Pinotti (forthcoming).

7. Bettetini (1996: 90).

overcoming of the traditional cinematographic device (based on the frontal position of the viewer with respect to the screen), through the introduction of *wearable* devices. In addition to specific softwares such as Unity or Unreal and computers able to process information, the use of display and listening devices (*headsets*) with position *sensors* becomes decisive[8]. The headset is a stereoscopic helmet able to reproduce the three spatial dimensions of reality (depth, horizontal and vertical). Most headsets have side bands that allow complete estrangement creating an internal/external dualism, inside/outside the world. The sensors or trackers contribute to trace the user's position in the virtual universe and therefore allow a complete simulation of the movement, guaranteeing the sense of immersion in a new environment through motion and interaction. Compared to other forms of pictorial illusionism and semi–immersiveness, these two elements — the helmet and the trackers — bring out the main feature of a third new phase. The device is thus conceived as a dress to wear while entering another world, different from the "real" one[9].

Virtual reality products represent today the most innovative examples of *technologically modified self–centered worlds*. Through an advanced manipulation of the subject's sensory experience, it immerses the user in a new world model, leaving them free to explore and interact with it[10].

2.2. *Augmented Reality, Mixed Reality and other Hybrid Forms*

The latest generation of immersive devices has brought with it another innovative aspect: the immersive vs. non–immersive distinction was over-

8. Fuchs *et al.* (2017)

9. The first forms of interactive and wearable virtual reality can be traced back to SIGGRAPH exhibition in 1989. Since 2016, the real leap was represented by the introduction of a new generation of low–cost high–tech viewers. Immersive virtual reality is today a continuously growing market. It is estimated that it will grow up to 30 billion dollars by 2020: see Aa.Vv. (2017: 5). Some recent surveys can be found in Arnaldi *et al.* (2018), Bailenson (2018), Chen and Fragomeni (2019), Harris (2019).

10. The transition from the perceptive–sensorial dimension to the interactive–experiential one is not entirely automatic, as we shall see more clearly in paragraph 2.4. It defines the transition from a moderate to a radical form of immersiveness. As an example, Penny (2017: 275) criticizes the emphasis on virtual reality by stating: "In simulating only visually stereoscopic spatial experience, VR dissected the body into hand–eye coordination and everything else. Yet regular users of what we now call immersive environments will attest that they can achieve a fluency or flow in which every space and turn of the virtual environment are known".

come by a wide range of apparatuses aimed at extending our experience in different forms. Let us take the example of devices such as CAVE (Cave Automatic Virtual Environment), a cube in which images are rear–projected to give the feeling of being in a virtual environment. Other examples are flight simulators that do not even require the use of helmets, or technologies that simulate the sensation of touch, often integrated within the same virtual reality devices.

To clarify some aspects in this field, we can recover two useful terms from the present debate. The first one is "augmented reality". In this case, the reality that surrounds us, seen through a device screen, is "increased" through the superimposition of visual information created by the computer operating system. Unlike the virtual one, augmented reality is not limited to the use of wearable glasses, as it happens through mobile devices such as smartphones, tablets, or even a simple PC, if connected to a webcam. Although we can find pioneering examples of augmented reality in the Nineties[11], the definitive commercialization and fame of augmented reality began in 2013, when Google launched the first commercial prototype of Google Glasses: "it is no longer a question of correcting and expanding ocular functions, it is real augmentation. Google Glasses build an expanded sensory universe around the eye together with a reality that is modified by visual data[12]". Even if the so–called "Glass Explorers" started testing the prototype at that time and produced a previous consumer version of the Glasses, several errors in both technology and marketing contributed to the project's failure. However, a new aggressive advertising campaign has contributed to generate interest in augmented reality technologies: as a matter of fact, Google recently acquired Magic Leap for 500 million dollars.

Magic Leap, on the other hand, operates in a sector that is close to that of augmented (and virtual) reality. We introduce here the second useful term about different technologies, that is, "mixed reality". At present, mixed reality is above all linked to specific technologies such as Microsoft

11. A pioneering example is 1992 Virtual Fixture developed at the Armstrong Laboratories: see, among others, Schmorrow and Fidopiasdtis (2017).

12. Arcagni (2018: 79). On the aesthetic possibilities of Google Glasses, see Montani (2014: 88–93). Eugeni (2017) has brought the origins of the Glasses and in general of augmented reality technologies, to the HUD (Head Up Displays) developed and used by military aviation for weapons pointing devices since the Second World War.

Hololens[13]. If augmented reality overlaps the real level with the virtual one, mixed reality integrates the two levels, allowing the user to move in a world that is at the same time real and virtual. Mixed reality glasses, in fact, scan the location (e.g. a room) thanks to a series of sensors, and reconstruct a three–dimensional model of the real environment that replaces the one we would directly perceive if we took off our viewers. The three–dimensional digital contents generated by the system can perfectly integrate with the environment and interact with it, allowing us to start our own interaction with them: the virtual elements change and act according to our position, gestures and use of prosthesis. It is not a simple addition of information, but a real *integration* in a system that could be defined "phyrtual"[14].

Virtual, augmented and mixed reality thus constitute three different forms of extended reality. It is evident that the difference between them is not only technological, but more deeply concerns the type of experience designed for the user and especially their "being in the world" — that is, their living and active relationship with the life world that surrounds them, with the objects and subjects that inhabit it, and with its temporal and spatial dynamics —. It is precisely in this sense that we speak of different forms of *technologically modified self–centered worlds*.

2.3. *Extended Reality and Art: Jakob Kundst Steensten's Case Study*

The idea that various forms of extended reality constitute many experimental transformations of our ways of being in the world seems to be confirmed by another perspective: the *artistic uses of extended reality*. By experimenting with different extended reality devices, artists have rethought the relationship between humans and the world by highlighting the role of technology as an essential form of mediation. The uses of these technologies have therefore introduced a kind of hybrid artist that combines the profile of the inventor with that of the creator[15].

We can distinguish between two great trends of artistic practices with immersive technologies: a first trend that began in the early Eighties and a

13. Hololens are smartglasses for mixed reality developed by Microsft in 2016. The new version is Hololens 2 has been developed in 2019.

14. On the concept of "Phyrthual", see Molina (2015).

15. On this aspect, we refer to Catricalà (2019).

second one linked to the return of these themes in recent times, towards the end of 2000.

The first trend was part of an era in which digital technologies began to be affordable and thus accessible to a wide audience. In this context, the most interesting element is undoubtedly the idea of a relationship between gaze and virtual architectural structure. It is no coincidence that many artists have been passionate about the theorist and architect Marcos Novak's concept of "liquid architecture" that emerged with the advent of cyberspace: "to the extent that this development inverts the present relationship of human to information, placing the human within the information space, it is an architectural problem; but, beyond this, cyberspace has an architecture of its own and, furthermore, can contain architecture. To repeat: cyberspace is architecture; cyberspace has an architecture; and cyberspace contains architecture"[16].

The artists' interest in virtual liquid architecture had already started in the early years of virtual reality advent; the focus was not the creation of virtual forms, but mainly the continuous attempt to discover and create a completely new virtual world. There were artists and/or scholars such as William Letham with his generative forms of new worlds, or others such as Jeffrey Shaw, among the first to experiment new immersive forms, both wearable (the various "helmets") and total (the CAVE cited above). This is therefore the path of the artists: laying the foundations for a new architecture that may create in turn the basis for a new idea of immersive reality.

The second and more recent trend of artistic practices with immersive technologies is placed in a different technological and aesthetic context, that leaves aside an "experimental" attitude towards the technological medium. Although virtual reality is increasingly widespread and the opportunities to display technologically equipped installations are now part of the art system (e.g. festivals sections, exhibitions, pavilions in art fairs, and so on), contemporary artists feel now free to express complex concepts and poetics, as well as original narrative forms.

Today, virtual or augmented reality is not a novelty to be explored, but rather a tool for creating a more complex language. However, even in this new key, the relationship between the subject and the environment

16. Novak (1991: 226). To deepen some of Novak's insights, see Dogramaci and Liptay (2015).

represents a core theme, and is related to concepts such as post–anthropocentrism, the overcome of the posthuman classical vision, the return of natural elements within the art world, a new holistic vision of the relationship with nature and the idea of Gaia[17].

In this context, the figure of Jakob Kundst Steensten's — a Danish artist based in New York– seems relevant. This artist has a dual background: first, he comes from animation, and only later enters the world of art. The transition from animation to contemporary art is not obvious, since it seems to be the union of two apparently distant worlds. The knowledge of animation techniques reported within contemporary art allowed him to develop a new and extremely advanced technical language. Secondly, his interest in anthropology should not be underestimated: from this point of view, Steensten's work could be contextualized within the trend of post–human interest mentioned above.

The starting point of Steensten's work is the concept of *"swamp"*, a metaphor for humanity in his new ecosystem: "The idea of living in a swamp future and everything combining to create new kinds of structures and relationships of power is really interesting. I think about all those things when I build work. It's not always what the audience thinks of right away when they see it, but the process is very important in terms of ending at a result"[18].

In Aquaphobia (2017) — a work inspired by the psychological studies on water phobia — virtual reality is used as a connector for internal psychological landscapes and external ecosystems. The virtual landscape combines red clay materials with pre–urban plant species and futuristic scenarios. It is a journey through an imaginary place in which natural elements such as mud, water, underground infrastructures, roots and plants weave together to form a symbiotic landscape.

Along the same trend, *The Deep Listener*, a work exhibited in the prestigious setting of the Serpentine Gallery in London in 2019, uses augmented and mixed reality. Developed together with Google Arts & Culture and Sir David Adjaye, OBE, the work is conceived as a sculpture located near the Serpentine in Hyde Park. By downloading the app on a smartphone or tablet, it is possible to frame the sculpture and get access to a combination

17. Catricalà (2019), in particular last chapter.
18. Wallace (2018).

of true natural (e.g. Hyde Park) and virtual elements. Through the device, it is possible to move within the park and follow the birth of an ecological system parallel to the real one starting from sculpture.

At the end of this détour dedicated to the relationship between extended reality and art, we find confirmed the idea that artists understand the profound ecological significance of these forms of technology: the construction of technologically modified self–centered worlds raises the question of the subject's different ways of "staying in the world". Moreover, what we have observed about Steensten also allows us to take a step forward. The key problems that come into play are: the subjects' relationship with the environment that surrounds them; the instruments that mediate this experience; and the forms of *presence* — also intended in this case as forms of *responsibility* — of the subjects themselves with respect to the world. We will focus the question of presence in the next section of this paper.

2.4. *A Typology of Technologically Modified Self–Centered Worlds*

Before deepening the question of presence, at the end of this first part we trace a reasoned map of different technologically modified self–centered worlds. Our intent is to summarize the various forms of extended reality so far emerged in a coherent typology that considers increasing degrees of "immersiveness".

The starting point is constituted by traditional media like cinema, video or television. In this case, spectators are mainly excluded from the device sensory flows management, and therefore they cannot decide neither the regulation of the points of perception of the diegetic world, nor the narrative developments within that world. We speak in this case of bystanding media, as the spectators finds themselves playing the role of bystanders placed in front of a screen.

We therefore find a first degree of development towards immersiveness in bystanding–immersive media[19]. In this case, spectators remain in front of a screen; however, thanks to a series of instruments and prosthe-

19. According to Pinotti (forthcoming), the transition from what we call "bystanding media" to the "immersive" ones corresponds to a transformation of the status of the image towards a condition of "unframedness, presentness and immediateness" summarized in a state of "an–conicity" — in which images phenomenologically deny their ontological status —.

ses (e.g. touch screen, touchpad, mouse, joystick, etc.), users can modify the flow of sensory elements delivered by the screen. This new situation allows them to transform both the points of perception and (possibly) the states of affairs of the diegetic world, thus regulating its narrative developments.

We can identify two types of bystanding–immersive media, depending on the degree of *screen transparency*. On the one hand, we find *opacifying bystanding–immersive devices*, in which the screen does not allow the users to see what is hidden behind it; it is the case of hypertexts or computer video games, mobile phones, tablets or television consoles (including the ones that require gestural interaction tools, such as Nintendo Wii, Microsoft Kinect, etc.). In some cases, there is a multiplication of opaque screens (as in some video–art installations) or at least a complete physical wrapping of spectators (as in the case of the CAVE mentioned above). On the other hand, we have *transparent bystanding–immersive devices*; in this case, the screen shows a portion of reality beyond its frame, while a series of visual information generated by the machine and manipulated by the users are superimposed on this reality portion. On one side, examples of the *macro version* of transparent devices are tablets or smartphones cameras (as in *The Deep Listener* by Jakob Kundst Steensten). On the other side, *micro version* of transparent bystanding–immersive devices range from Google Glass to glasses and viewers used in piloting aircraft. As mentioned above, we meet here *augmented reality devices*.

A third type of media devices further oriented towards immersiveness implies that subjects are wearing helmets or virtual reality glasses that isolate them from the world. Although they wear headsets provided with micro–screens and micro–speakers, users do not perceive these devices as such, and feel to be inserted in an alternative visual and auditory reality: we therefore have a first type of *immersive media*. More exactly, we speak here of *moderate immersive media*. Indeed, users can modify the points of perception of the diegetic world in coherence with their own movement, so to align the changing perception of the diegetic world and their own movement proprioception; nevertheless, they cannot affect the narrative development of the diegetic world, mainly because they are invisible to themselves and to others. In other terms, users present themselves as incorporeal subjects of vision, incapable of managing prostheses and instruments inside the diegetic world so to affect its narrative transformations

Within moderate immersive media, we find two levels of immersiveness, according to the users' freedom of movement — that is, the type of movement that transforms his or her point of perception with respect to the diegetic world —. In a first case, the users can only move in three directions without moving their body axis: in this state, called the three Degrees of Freedom or 3DOF, they can perform movements such as yawing, pitching and rolling[20].

This is the case of VR–cinema (or cinematic–VR) performed through cost–effective systems or smartphones installed on devices such as Google Cardboard. Spectators cannot choose the spatial positioning of the incorporeal perception point, nor can they intervene on the narrative development of what they see and hear. They can only manage the 360–degree rotations of the perception point around his own axis[21]. The second level of immersiveness consists of a 6–degree of freedom (6DOF) state. In this case, the users wear not only headsets, but also suits equipped with sensors capable of tracking their movements in the space. The new equipment allows them to move freely in the virtual world. In addition to the three movements already described above, we also find forward or backward (sway), up or down (heave), right or left (surge) — and all the possible combinations between them —. Even in this case, however, the immersion in the diegetic world does not imply neither the possibility of seeing one's own body or that of other subjects, nor the consequent possibility of operating on the narrative developments of the indirect world. This is for instance the case of the installation *Carne y Arena* by Alejandro González Iñárritu, inaugurated in 2017 at the Prada Foundation in Milan[22].

A fourth and final degree of development is *radical immersive media*. In this case, users are not only able to move within a digitally reconstructed world enjoying 6DOF, but they can also see their and other subjects' bodies. Users are therefore able to interact effectively with the environment that surrounds them, helping to define the narrative processes that take place within it. For this to be possible, we need to move from *virtual* to

20. Chandrasekera *et al.* (2019).

21. See the analysis of this type of solution applied to "humanitarian" documentaries in Zucconi (2018: 149–181).

22. http://www.fondazioneprada.org/project/carne-y-arena/ Last visit 4/10/2019. Among the numerous interventions on this installation, see Montani (2017: 132–138), D'Aloia (2018), Acquarelli (forthcoming) Casetti and Pinotti (forthcoming).

mixed reality. Indeed, headsets are here equipped with sensors that capture the surrounding reality or some of its aspects and re–elaborate it in order to reconstruct three–dimensional environments and insert within them other elements produced by the machine in real time.

Even in this case, we find two possibilities. The first one is represented by *Reality disguising devices*, where reality elements are captured by sensors and transfigured into elements of the virtual diegetic world thanks to the intervention of the machine and its algorithms. As an example, mixed reality productions of *The Void* company allow the user to live radically immersive experiences inspired by successful movies such as *Star Wars* or *The Avengers*. Users here move in "real" spaces set up with colourless walls and passages, and handle anonymous tools together with other users. Within the virtual world, users contribute to develop a story in which spatial structures, objects and subjects are transfigured so to become spaces, tools and characters of the fictional world[23]. The second mixed reality form is represented by *Reality blending devices*. In this case, surrounding reality is reproduced with cine–photographic fidelity in a viable three–dimensional model without being digitally disguised. Here, objects and stories created by the machine are combined with various forms of blending. At first sight, the result may appear similar to that of augmented reality observed in transparent bystanding–immersive media such as Google Glass or smartphones and tablets cameras. Nevertheless, both procedure and results are different, because in this case "reality" has been three–dimensional digitized so that the integration with the artificial elements can be homogeneous. This is the case of Microsoft Hololens as well as Magic Leap eyewear Lightwear.

We can therefore summarize our typology according to the following table:

1. Bystanding media (cinema, video)
2. Bystanding–immersive media
   2.1. Opacifying devices (single or multiple screens) e.g. hypertexts, video games, interactive installations, CAVE, etc.

23. "The VOID is the most immersive virtual reality destination… ever. The VOID allows you to travel into your favorite film, be your favorite character, and experience the impossible. Guests are encouraged to explore their physical surroundings while interacting with a dynamic, virtual world. You don't just experience The VOID, you're in it". https://www.thevoid.com/, last visit 1/11/2019.

2.2. Transparent devices (Augmented reality)
2.2.1. Macro: apps for Smatphones, Tablets, etc.
2.2.2. Micro: Google Glass, etc.
3 Moderate immersive media (Cinematic Virtual reality)
3.1. 3DOF: basic cinematic VR e.g. Google Cardboard
3.2. 6DOF: advanced cinematic VR e.g. *Carne y Arena*
4. Radical immersive media (Mixed reality)
4.1. Reality disguising devices e.g. The Void
4.2. Reality blending devices e.g. Hololens, Magic Leap's Lightwear, etc.

3. Presence as Meaning Effect

3.1. *The Question of Presence*

During our analysis of extended reality conducted in the first part of this paper, we observed that there are many models of technologically modified self–centered worlds. From this premise, we identified the question of the subjects' role and experiences in the extended reality worlds, and more precisely the question of their *presence* in it. In this second part, we first try to define what we mean with the term "presence"; subsequently, we resume the typology of extended reality forms analyzed in the previous part with the aim of adding to it a typology of modes of presence constituted for the users.

We begin by examining some definitions of presence that emerged in the last twenty years or so in different disciplinary fields. The concept of presence is deeply linked to research and development of virtual reality. The *technical discussions* in the context of VR[24] originally used the term "presence" as a substitute for "telepresence", an expression coined by Marvin Minsky in 1980 to describe the feeling of "being there/with" developed by remote device operators using VR systems. The term entered the scientific debate with the foundation of the magazine *Presence, Teleoperators and Virtual Environments* published by MIT Press since 1992. It was then introduced the concept of "virtual presence", not necessarily connected to telepresence.

24. Ijsselsteijn *et al.* (2000).

Later on, the ISPR (International Society for Presence Research) started a specific debate about the exact definition of the expression:

> Presence (a shortened version of the term "telepresence") is a psychological state or subjective perception in which even though part or all of an individual's current experience is generated by and/or filtered through human–made technology, part or all of the individual's perception fails to accurately acknowledge the role of the technology in the experience. [...] Presence occurs when part or all of an individual's experience is mediated not only by the human senses and perceptual processes but also by human–made technology (e.g., "second order" mediated experience) while the person perceives the experience as if it is only mediated by human senses and perceptual processes (e.g., "first order mediated experience").[25]

Psychological literature has worked on the theme of presence in technological fields and in VR. Psychologists complain of a vision of presence that is too tied to the technological factor, defined according to the hardware (the so–called *Media Presence*), and not quite rooted in human sensor–motor mechanisms (*Inner experience*) nor in interpersonal relationships (*Social presence*). In some cases, immersiveness (the degree of material isolation assured to the user by the hardware) is opposed to presence (the user's both somatic and mental involvement)[26].

However, these two different trends agreed on the opportunity of building "presence constitution scales" defined by various factors, e.g.

25. ISPR (2019). Other definitions are: "presence is a state of consciousness, the (psychological) sense of being in the virtual environment" Slater and Wilbur (1997); "presence is [...] the subjective experience of being in one place or environment, even when one is physically situated in another; [it is] a normal awareness phenomenon that requires directed attention and is based in the interaction between sensory stimulation, environmental factors that encourage involvement and enable immersion, and internal tendencies to become involved" Witmer and Singer (1998); "presence is when the multimodal simulations (images, sound, haptic feedback, etc.) are processed by the brain and understood as a coherent environment in which we can perform some activities and interact. Presence is achieved when the user is conscious, deliberately or not, of being in a virtual environment (VE)" Gutiérrez *et al.* (2008: 3). "In [the] blend of the digital and the physical [world] we would experience an integrated and unitary sense of presence. [...] We define presence as the feeling of being located in a perceptible external world around the self. We see this as a universal animal faculty that allows an organism to distinguish the self from the non–self — what is part of the organism and what is not". Waterworth and Hoshi (2016: 11–12).

26. See a theoretical assessment in Guelton (2014b).

measurable degrees of immersiveness and isolation of the subject, number and type of sensory channels involved, subject's types of movement and possibility of interaction with objects and subjects, subject's speed of reaction[27]. Ultimately for psychologists in immersive media environments

> 'Presence' is just this "feeling of being inside the mediated world". It is a crucial and increasingly necessary element in both design and usage of many recent and developing interactive technologies. In the same way that 'feeling present', or consciously 'being there', in the physical world around us is based upon perception, physical action and activity in that world, so the feeling of presence in a technologically–mediated environment is a function of the possibilities for interaction.[28]

From a more specifically *mediological* point of view, Sobchack (2004) studied "presence" in relation to media and their development (although limited to the type of media defined above as "bystanding"). The author takes up Fredric Jameson's distinction based on three levels of transformation of the experience conditions, all of them linked to cultural logics of perception technologies: realism with photography, modernism with cinema, postmodernism with electronics media. Photography, isolating the *moment*, considers presence as a distance from and within the time of experience; cinema considers time as a *flow* thus determining a centered and fluid presence linked to a continuous process of sense making; finally, electronics media are related to the *instant* and the absolute presence of a dematerialized and polycentric subject, thus renouncing to any form of temporal retention or protention[29].

From the point of view of the *theoretical and philosophical debate,* the issue of *presence* has taken a decisive part in recent discussions, especially against some claims of postmodern, post–structuralist and deconstructionist thought. On the one hand, some authors have strongly emphasized that the core of aesthetic and hermeneutical experience is a "real

27. Riva *et al.* (2006).

28. Riva *et al.* (2014: 1).

29. Sobchack V. (2004). Friedrich Kittler's "existential" reflection on media and presence is different and complementary to Sobchack's pheonomelogical one, since it resumes the Heideggerian idea of (media) technology as a place of presence and manifestation of Dasein: see Gumbrecht (2014). For the debate in the field of Theater and performance studies (which we cannot address here), see Giannachi *et al.* (2012).

presence", *against* the idea of an incessant avoidance of the world and the Being in an infinite game of slips and *différances*[30]. On the other hand, various neo–phenomenological trends have enhanced the sensorimotor, embodied and enactive exploration of the world, considered as the place and moment in which an authentic experience of presence is achieved. The relationship between forms of presence and active interaction with the world thus becomes a core issue, also supported by aesthetic studies devoted to new digital immersive environments[31].

One of the most interesting results emerging from these studies is the recognition of an intrinsic limit of the existentialist phenomenology debate on presence: it would in fact be limited to the definition of presence as a kind of *unique* experience, with the risk of denying its existence. A different and more productive point of view would rather be to admit the existence not of "one", but of *multiple and different types of presence*:

> Two mistakes blind the existential phenomenologists to the fact that readiness–to–hand is a form of presence, a way thing show up. The first of these is the idea that presence (but not absence) is adequately accounted for by the modern account; the second is that the intellect is a realm of detached contemplation. […By this way] existential phenomenologists […] discern problems with the modern way of thinking about presence, but because, […] they can imagine no alternative way of grasping the phenomenon, they jettison the very idea of presence. What they really discover are new ways of thinking about presence, not alternatives to it. They discover the v*arieties of presence.*[32]

Semiotics has also profoundly rethought the theme of presence over the years. The starting point could be the relative lemma of the Dictionary of Greimas and Courtés, according to which:

> In a semiotic perspective, presence ("being there") is considered as a determination attributed to an entity that transforms it into an object of knowing of the

30. Steiner (1989), Nancy (1993), Gumbrecht (2004). A presentation of the debate in Ghosh and Kleinberg (2013).

31. References are quite extensive; see Featherstone and Burrows (1995), Wood (1998), Hillis (1999), Massumi (2002), Broadhurst and Machon (2006), Hansen (2006), Hezekiah (2010), Diodato (2012), Kwastek K. (2013), Montani (2014).

32. Noë (2012: 7 e 9–10.).

> cognitive subject. Such a meaning, essentially operational, established in the theoretical framework of the transitive relation between the knowing subject and the knowable object is very extensive: all possible objects of knowing are present in this case; and presence is identified in part with the notion of semiotic existence[33].

Presence is therefore a concept that works with narratological tools to the constitution of a "cognitive space"[34] linked to epistemological concerns.

Starting from the Nineties, with the passage from structural to (explicitly) phenomenological semiotics, the picture deeply changes; moreover, the theme of presence takes a central role within this transformation. The new concepts of subject and of relationship between subject and object — in addition to the enhancement of the foric, thymic, estesic, dynamic and tensive aspects vs pure cognitive ones — defines presence as "le surplus phorique issue de la prégnance de l'objet esthétique qui affecte un sujet percevant (corps sensible)"[35]. We find here different definitions; as an example, Herman Parret underlines the importance of the *temporal* aspects of the question[36], while Eric Landowski focuses on the *intersubjective and interactional* aspects[37].

In this context, the contribution provided by Fontanille and Zilberberger (1998) appears particularly relevant. The two authors consider the perceptive presence of an object in relation to a subject in terms of a *modulation of presence and absence* defined by two parameters. The first one is represented by the possibility of catching the object either within a field of presence or outside it. In the first case, they speak of tonicity (*tonicité*) and in the second one of atony (*atonie*) of the perceptive activity. The second parameter refers to the perceptive attitude of the subject, that can be considered either as orientation (*visée*) to the object (intensive aspect) or as a grasp (*saisie*)

33. Greimas and Courtès (1982).

34. Bastide (1986).

35. Chalevelaki (2010) See also Rosenthal and Bourgeois (1997) and Marble (2008).

36. La "'présence' est objectale ou personnelle, matérielle ou non matérielle, réelle ou fantasmatique. Elle peut impliquer l'existence ou ne pas l'impliquer. La présence est fortement modalisée, et sa reconnaissance affective. Et la présence est fondamentalement temporelle, elle ne peut être pensée qu'à partir du temps de la subjectivité" (Parrett, 2006: 11).

37. "La sémiotique doit permettre de parler … des *pratiques réelles* dans lesquelles nous sommes quotidiennement engagés. Par exemple, de cette pratique sémiotique en situation qu'est précisément la production de la présence de l'Autre, comme faisant sens" Landowski (1997: 12).

of the object (extensive aspect). From here, we find four modulations of presence/absence: Fullness (*Plénitude*: tonic orientation and tonic grasp), Lack (*Manque*: tonic orientation and atonic grasp), Inanity (*Inanité*: atonic orientation and tonic grasp) and Emptiness (*Vacuité*: atonic orientation and atonic grasp). In addition to this passage, the two authors underline how the four modulations of the perceptive presence give rise to the four *existential modalities* or modes of existence recognized by semiotics: "la plenitude est *réalisante*, le manque est *actualisant*, la vacuité est *virtualisante* et l'inanité est *poténtialisante*"[38].

At the end of this quick review, we can draw some general conclusions:

a. the sense of mutual presence between the subject and the world is a subjective experience linked to the sensory and practical relationship between the subject's body and the living, self–centered world in which he or she feels inserted.
b. some technologies are able to manipulate the sense of presence, by constituting technologically modified self–centered worlds.
c. media have been and still are the technologies most explicitly working on the constitution of the sense of presence by operating on the user's self–centered world.
d. presence should not be considered in a unitary and absolute sense, but as a modulation of different "modes of presence (and absence)".
e. consequently, media can be analysed not only as devices for the *construction* of presence, but rather as devices for *modulating* multiple modes of presence within technologically modified worlds.

Based on the above, and in particular starting from the semiotic discussions, we finally hypothesize a further point:

f. The modulation of presence is linked to the enunciative configuration in which the user feels he or she is inserted, and to the consequent postures and responsibilities for which they feel appointed.

38. Fontanille and Zilberberg (1998: 97).

3.2. *Technologically Modified Self–Centered Worlds, Enunciative Configurations And Modes Of Presence*

We can now resume the reasoned typology of extended reality we discussed at the end of the first part (par. 2.4), in order to ask ourselves *which modes of presence are constructed for the user in each of the four cases, and how different enunciative configurations contribute to define them*[39].

Pure bystanding media such as cinema or video are devices for presenting or delivering perceptive materials placed in a situation of alterity with respect to the users, who "attend" what is presented on the surface or the interface without being able to intervene on the presentation of such materials. Bystanding media therefore imply for the users a role of *pure enunciatees*. In the case of *bystanding* media, the users feel to belong to the presence field connected to the direct world, the one that actually surrounds them. This process happens when they realize that the images and sounds coming from the screen surface belong to a world perceived indirectly (indirect world[40]). According to Fontanille and Zilberberger (1998), we can speak of a mode of *Emptiness* (atonic orientation and atonic grasp).

Bystanding–immersive media such as multimedia hypertext, video games, or the different forms of augmented reality, maintain the perceptive alterity of the users, but introduce a practical aspect. The users continue to "attend" perceptive materials on a surface, but they can contribute to their determination by hand or arm prostheses e.g. touch patterns, mouses, joysticks or, in some cases, more complex motion detectors. In this case, the users remain enunciatees, but at the same time assume a role of *partial co–enunciators*[41].

39. It is important to specify that we should speak in this case of "technologically modified modes of presence", since they are not referred to ordinary Umwelte — as for instance in Fontanille and Zilberberg (1998) — but precisely to technologically modified self–centered worlds. For simplicity, however, we will continue to use the shortened expression "modes of presence". The idea of a modulation of different modes of presence and its analysis in semiotic terms also animates Nannipieri (2017, in particular pp. 167–176), although the categories he uses in the construction of the semiotic square (the opposition between presence in real environments and presence in virtual ones) are different from those we took from Fontanille and Zilberberg (1998).

40. We recover the terms "direct" and "indirect" from Eugeni (2010).

41. The term and the concept of co–enunciator derives from the linguistic theory of Antoine Culioli (1995: 91–93 and 114–130) then extended to sociolinguistics and to the sociosemiotic of interactions: cf. for example Landowski (2002), Chantraine (2019).

This co–enunciation is normally *haptic–perceptive* (the users determine and transform sensory materials by using hand gestures: think of mouse, joysticks, touch screens, etc.). In some cases (e.g. the video game), we can also assist to a *haptic–narrative co–enunciation*: the users here are enabled to transform certain states of things in the system so to make the narrative development proceed within the indirect world, e.g. by achieving a certain level in a game[42]. In *bystanding–immersive media*, then, the subjects is inserted in an enunciative configuration similar to the previous one; however, the possibility of co–enunciating the perceptive materials, both in haptic–perceptive terms (transformations of points of perception on the indirect world) and in haptic–narrative terms (transformations of states of things in the indirect world) introduce an effect of "almost–presence" with respect to to the fictitious world. In this case, we can speak of a mode of *Inanity* (atonic orientation and tonic grasp).

In the case of *moderate immersive* media, the headsets allow both high–resolution micro–screens and integrated sound delivery systems to occupy the users' perceptive field in a complete way. Therefore, they find themselves immersed in a coherent indirect world that they can explore perceptually, but whose narrative developments cannot change. This is the case of cinematic VR ranging from 360–degree movies to more complex examples such as *Carne y Arena*. Moderate immersive media introduce a new type of co–enunciation, the *sensorimotor–perceptive* one. The users help to determine the perceptive materials delivered by the device thanks to their movements on their own axis (3DOF) or within a three–dimensional space (6DOF). The sensorimotor–perceptive co–enunciation replaces or integrates in this case the haptic–perceptive one[43]; at the same time, the haptic–narrative co–enunciation is excluded: indeed, the subject perceives himself or herself only through their own sensorimotor sensations, since their body is not represented in the indirect world and cannot interact with its situations or change them. Therefore, in the case of *mod-*

42. Some authors have underlined from this point of view the somatic involvement of the gamer, such as to go beyond the terms "presence" and "immersion" towards an "incorporation / embodiment" regime: see Grodal (2009) and Calleja (2011). More generally, On the relationship between gestures, movements, and enunciation in the interaction with digital media and VR see Chatelet and Di Crosta, 2018; Basso–Fossali, Colas–Blais and Dondero, 2019.

43. Acquarelli and Treleani (2019), discussed this topic (with reference to the virtual reality cinema) by using the term of "re–enunciation".

erate immersive media, we will find a mode of *Lack* (tonic orientation and atonic grasp).

Finally, in the case of *radical immersive media*, mixed reality technologies come into play allowing a fictitious (disguising) or non–fictitious (blending) reproduction of the surrounding reality. In the first case, we find examples such The Void immersive movies, while in the second one we have Hololens or Magic Leap manipulated reality. In this case, the role of co–enunciators entrusted to the users increases thanks to the introduction of a sensorimotor–narrative co–enunciation: the users' movements, gestures and displacements produce not only the shifts of their points of perception (sensorimotor–perceptive co–enunciation) but also a transformation of the states–of–things within the indirect world and a consequent narrative progress. The result is a mode of *Fullness* (tonic orientation and tonic grasp).

We can therefore conclude by stating that different forms of extended reality actually constitute different modes of presence for the subjects with respect to technologically modified self–centered worlds. We also find confirmed our hypothesis that this happens through the construction of different enunciation situations, each of them implying a different role of co–enunciators for the users. In particular, these roles change according to the required means (hand–gestures or body movements), and to their enunciative scope (shifting of the point of perception or co–determination of narrative transformations). In summary, we propose the following table:

Type of media	User's enunciative configuration	Mode of technological modified presence
Bystanding media	Enunciatee (absence of co–enunciation)	Emptiness (atonic orientation + atonic grasp)
Bystanding–immersive media	Enunciatee + haptic–perceptive and/or haptic–narrative co–enunciator	Inanity (atonic orientation + tonic grasp)
Moderate immersive media	Enunciatee + sensorimotor–perceptive co–enunciator	Lack (tonic orientation + atonic grasp)
Radical immersive media	Enunciatee + sensorimotor–perceptive and sensorimotor– narrative co–enunciator	Fullness (tonic orientation + tonic grasp)

4. Conclusions

At the end of this analysis, it seems useful to recall a core concept from the work of Fontanille and Zilberberg (1998) that we had left aside, that is, the necessary shifting from modes of *presence* to modes of *existence*. In recent years, the theoretical and semiotic discussion on the modes of existence has followed a de–subjectivizing drift that, although keeping alive the term "enunciation", has radically changed its meaning with respect to what we have followed in this paper[44]. However, we can ask ourselves whether on the base of the analysis we have conducted, it is still possible to restore a connection between presence and existence; between ways of feeling present and ways of being; between enunciative situations and existential ones. Following this path, media — in particular the ones that technologically modify the experience of the self–centered worlds to which the subject is constantly exposed — should be radically re–thought as *devices that technologically constitute ways of existing*: ways of thinking, expressing, experimenting and confirm one's forms of being in the world[45].

Translation by Flaminia Munafò

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44. Latour (2013), Stengers and Latour (2015); some preliminary indications in Dondero (2017).

45. For an archeology of immersive media from this perspective see Chatelet (forthcoming). On the possibility that VR experience transforms the ordinary life of subjects see at least Gaggioli (2016) and Slater and Sanchez–Vives (2016).

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Towards a Semiotics of Augmented Reality

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Abstract: The contribute aims at proposing and describing the distinctive aspects which allows to define a certain mediatic configuration as *augmented reality*. Each of these will be taken in account, structured following the formal continuities of the user experience manifested in the occurrences and referred to the semantic contents that different interpretations (academic, artistic, journalistic, cinematographic ones) have associated to them. This paradigmatic understanding will propose the terms of interactivity, of pervasiveness and of geo–semantization for the evaluation of the single case. Furthermore, other levels of analysis will be given as the marketing discourses and the social rhetorics around the phenomena of augmented reality. The theorical concepts proposed will be associated to the dimension of the spatialized process implied in AR experience and described as a communicative and inter–subjective process, i.e. an unveiling and transparentizing one, modulated on the thymic category of euphoria and dysphoria, and referred to an actual materiality whose a virtual significate is attributed.

Keywords:

Augmented Reality and Augmentation

Rather than a technology, augmented reality (AR) represents an idea and a concept. It is a fashion idea circulating within the contemporary culture concerned by the ephemeral immateriality of the digital, a lucky idea in post–digital ideology describing the experience of the real within a techno-

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logically determined world. But it is also a concept used to describe and prefigure what digital technologies, in a broader sense, are going to represent in the present and in the future.

AR is not (yet?) a *domesticated* technology, that is, it still hasn't achieved the condition in which material supports become habitual and "invisible" to the users, by floating in a continue state of experimentation, driven by different social actors in several areas of culture. Nevertheless the growth of applications in several sector of societies is leading to an ever greater awareness of what the AR is.

From a technical standpoint, AR is a set of different technologies (computer vision, motion capture and computer graphics) which allows to display, by means of a geolocated device enabled with a camera, virtual elements overlapped directly above the perception of the real or on the image of it produced by the framing[1]. In particular, the device can be both a *hand–held* device (like a smartphone), or, by enabling completely different experience, a *wearable* gadget, like glasses or smart lenses, which are able to offer a pervasive experience to the user[2]. Moreover, the term AR can denote also the visualization of virtual contents directly on the environment through the use of projectors, flat displays and hologrammatic technologies, by removing the device from the users and let him interact freely in the space. This is the paradigm of *Spatial Augmented Reality* (SAR) (Raskar & Welch, 1998).

So, although by looking to the visual language AR owns a stable and increasingly recognizable configuration, it often became a concept circulating in cultural rhetorics to refer to a set of phenomena of digital culture that deal with computationalism and artificial intelligence. AR becomes "augmentation".

We deal with the concept of *augmentation* not only to refer to the merge of virtual and real elements in the same display, but also to denote, for instance, any forms of video and urban art, able to aesthetically *augment* the

1. As stated several times here, the differences between VR, AR and MR are detectable on the level of the visibility of the real world. While in the first one the real world is totally excluded by the perception, the second one builds an overlapping of virtual contents on a transparent screen which still allows to see the real world. Finally MR deal with a photographic representation of the real above which are posited virtual contents.

2. The expression was conceived by Thomas Caudell and David Mizell (1992), researchers of the aircraft manufacturer Boeing and authors of *Augmented Reality: an application of heads–up display technology to manual manufacturing*. Here they defined augmented reality as the superposition of computer generated material to the real world.

perception of an infrastructure, or to describe the computational process of intelligent buildings, to refer to the storage of digital documents in the immaterial space of cloud, to indicate the process of data–harvesting and data–visualization about an environment by means of a computational entity, to prefigure the promises of hologrammatic and wearable technologies, until to understand the idea of "collective intelligence" (Lévy, 1994) that, since Engelbart (1962) and cybernetics, leave for the reticular structure of the Web and the computational potentialities of the software as an "increaser" of human cognitive faculties.

Although these are not evidently occurrences of AR applications, at least as far as Western cultures thinks and describes it — influenced by the techno–utopian mythology and by the science–fiction genre — it would be wrong to reject first these interpretation, because when we think about *augmentation* we understand *also* that: the actualization of action programs, not only the isolated result of this process. As writes Anna Maria Lorusso (2018):

> Augmented reality not only offers us prostheses (of vision and more generally of perception: to be where we are not), but offers us a whole universe of relationships and knowledge that goes to constitute a system — a semiosphere, to put it à la Lotman — far more complex than a simple addition, a local extension of the given reality (functional to some specific need).

Thus the objective of this article will be that of examining the fundamental and paradigmatic aspects of AR possible occurrences by defining a *medium specificity* of it, and simultaneously, going to propose a definition of the paradigm of *augmentation*, in order to be able to provide a theoretical framework through which look at the different occurrences of AR cases, and also to give a definition to understand the semantic sphere around the concept of augmentation. Broadly, the paradigm of augmentation will be featured as a set of interactive practices contextually to a textual (numerical) space which led to an emersion of the physicality and materiality within the virtual. Something that inherits the studies on conceptualism for applying them to the next generation of digital media, that are locative (as smartphones and IoT) and wearable (as AR devices). The scientific context in which this research will be developed is thus a cross point between media and software studies on one hand and visual and

cultural semiotics on the other. The categorical intent of looking for a medium specificity of AR technology will pass through an analysis of heterogenous typologies of text that aren't necessary produced by an AR device by constituting the meaningful constellation within which is possible to insert the concept of *augmentation*.

For a Semiotics of Augmented Reality

Within the semiotics debate, it has been talked sometimes of AR[3]. Nevertheless it's still missing a conceptual framework able to describe the semantic mode of operation of this technology and of its components — difficulty added to the semantic confusion about the concept of *augmentation* drawn before.

I will propose a theoretical reflection starting from the definition of two level of analysis, within which to observe different aspects of AR particular *aspects* of the AR technology. Each of these aspects is stretch to bring out a taxonomic facet rather than others. The survey of these facets will lead to define a morphology of AR[4] — a paradigm — for which the single occurrence of AR will be represented as a certain configuration of some facets.

The first level will concern the fundamental aspects of every AR occurrences which locate a subject (user) and an object (device) in an textualized space, in order to recognize and to describe a certain mediatic configuration as "augmented reality". In this chapter, one of the most interesting aspects will be that of evaluating the semantic functioning implicit in its elements, that are able to intercept the dominant values in the

3. Pedersen (2005), Uricchio (2011), Pezzini I. and Spaziante L. (2014), Thibault M. eds (2016), Finocchi R. e Pezzini I. (2017), Del Marco V. e Pezzini I. (2017), Del Marco V. e Mazzucchelli F. eds (2018).

4. We talk about it in a broadly sense because we intend to deal with the theoretical complexity emerging from the research of a specificity of AR, that is trans–contextual and transversal to the single case study (research that would bring back instead, and inevitably, to the analysis of the semantic content of a text intended) in the traditional sense, in which the difficult applicability of the concept of "text" would be present in the definition of objects of analysis whose nature is digital, by definition hypertextual and open). The statements that follow must be understood exclusively contextual to this attempt at generalization which, in our opinion, is still missing in the semiotic analysis of digital media.

digital culture, to absorb them inside and to model, starting from them, the different expressive levels of its techniques and its contents.

The second level, instead, will be focused on the contingents aspects, related to the syntagmatic analysis of a specific occurrence. These aspects concern the enunciation and paratextual dimension of the occurrence. Anyhow, it's possible to think a paradigm also for this level that is constituted by a recurrences of the forms, of the social rhetoric's about AR, of the configurations of the enunciators.

Finally, the expansion of the precedent two levels will be take in action the processual steps that are implicit within the single occurrences. Indeed the conclusions will be dedicated to define a theoretical structure to think both to the paradigmatic dimension of AR and to other types of facts of digital culture, with which a "continuity of meaning", detectable in the configuration of semantic relations between social subjects and techno–cultural objects, in the dynamics processes that put them into action, in the cultural values that are associated with them, is shared with the AR model.

Therefore, it is possible to anticipate that these paradigmatic facets not only describe the virtual and possible forms of AR, but constitute, in their totality, a substantial configuration of objects, practices and linguistic expressions supported, from time to time, by different social subjects, which are located in the context of a culture characterized by values, ideologies and imaginaries.

In order to understand what we mean with "continuity of meaning", let's just think to the concept of "participatory culture" described by Jenkins (2006). It denotes completely different phenomena, from Wikipedia to YouTube, whose specificity does not lie so much in the deep internal structures of particularly significant texts (I am thinking of the case of memes or mash–ups), but rather in some recurring paradigmatic traits concerning the pragmatics of textual production, such as the social network structure based on peer–to–peer paradigm, the phenomenon of user generated content, the appropriation, manipulation and "parodization" of texts produced by the cultural industry.

In this perspective, the conceptualization of the AR could lead to overcome an exclusively paradigmatic consideration of the user experience, and to recognize in its configurations the figures of processualism that, in a transversal way, will determine the morphology of the elementary components of the paradigm of *augmentation*.

The Specificity of Augmented Reality

AR holds some distinctive aspects, detectable in each occurrence. Each of these can be isolated and observed from a semiotics standpoint. The set of the possible configurations of these aspects constitute an occurrence of AR. For instance, these are the virtual elements overlapped above the real world and the graphic user interface (GUI) which can constitute the *content* of an application; the gestures for human–computer interaction which constitute its proxemics and the positions (that are the movements of a user in the space) which constitute the topology of the experience; the device, more or less wearable, considered in its physicality and functionalities, and the visual texts which represent the augmentable surfaces.

Interface and Content

By interface and virtual elements is meant the set of signs and visual texts that appears overlapped above the real world by means of an occurrence of AR. These constitute, in the mediological meaning of the term, the *content* of an occurrence. These can be web–site pages, textual, graphics, hologrammatic (SAR), audiovisual texts, but also audio tracks, vibrations (synesthetic translations), digital smells and tastes and so on[5].

What research paths can semiotics open in this direction?

It's almost impossible to define an aesthetics and formal specificity of AR, because "the content of a medium is always another medium" (McLuhan, 1964). Like computers, smartphones and wearable devices, AR could be defined as a *meta–medium* (Manovich, 2013), that is a medium that *remediate* (Bolter Grusin, 1999), computerize, sample the contents, by making they modular, interactive and by allowing their playback in a digital visual environment, the device's display.

Thus, both GUI and virtual elements can't be considered as endowed of a proper semiotics autonomy except within their placement on the real world determined in turn by the occurrence.

This admit a first statement: the meaning of the contents in AR is given by the relationship between what is shown (and what it can potentially do with it) and by the meaningful content emerging from the augmentation

5. The contribution will focus on audiovisual content.

of a space or a surface, rather than from the inter–textual configuration of the content itself.

For instance, computer graphics technology represents, without doubts, one of the main techniques for the creation of content in AR[6]. It would be wrong think about it as a specificity of AR, from an aesthetics standpoint. Its main feature is the absence of an actual context that is given by the augmentation, when the content is added to the perception of the real. Here it emerges an ontologically difference, a co–presence of virtual and real, that is a necessary aspect of AR.

The same could be said about the interfaces, whose iconic and aesthetics systems are often inherited by those of main tech–companies. The specificity of the interfaces should be sought in the discrete pragmatics that they enable. The configuration of the action programs that a certain interface enables and that allow a subject to interact with the environment according to certain modalities is therefore semiotically decisive.

The inter–textual analysis that move from these premises can hold to study the semiotics facts and the relations of semantic pertinence between an object of the world and the virtual element associated to it.

In this direction, MacIntyre e Bolter (2004: 37) have proposed the term "aura" to denote "the combination of the cultural and personal significance of an object or place for a user or group of users". The content of an occurrence, therefore, is constituted by the shared meaning about a cultural text, its context and paratext. For the Mona Lisa painting, the aura (what Louvre's device displays when a QR code is framed) will include the set of historical, cultural and actual information that permits to the user a richer cognitive prehension of the artifact.

However, as we will see in the next chapters, it's not obvious that the contents are semiotically pertinent with those of augmented surfaces — we wish this can be stated with certainty. Several occurrences can be conceived as distortions and critique interpretations of the reality, in contrast with the shared meaning of the augmented surface.

Finally, we propose some examples of visual content (the list is clearly not exhaustive): the rich repertory of signs in Google Maps AR, that dwell

6. Not all the virtual elements of AR are in computer graphics: think of augmentation by QR code, whose content is a website, or diffused cinema, which is based on the overlapping of audiovisual texts.

a semantic relation with the augmented urban space; the simulacra of real objects or places and the configuration of aspectuality (of possibilities, of prefiguration) that is gained with the environment in which they are inserted; representation in computer graphics of scientific, plausible and modular objects that allow you to go below the visible surface, observe their components separately and study their singular specificities thanks to an abstraction; the enunciative function of text frames (dialogic and not) superimposed on the images of a user intent on "messaging", which are progressively affirming themselves also in the cinematographic language; the metatextual function of information and data referring to a specific cultural text (like auras); the concealment operations (for example of the face) in the digital production of images through the application of stickers or "smile".

Body and Spatial Enunciation

It can't exist a semiotics of AR that exclude from its corpus of texts the set of gestures (the movements of hands, arms and body), of poses[7] and positions (intended as geographic coordinates) actuated by the user in order to activate a content and broadly to communicate with the artificial device. These gestures are textual entity since they guarantee movement detection sensors and geolocation systems to translate body language into meaningful acts, and thus constitute a fundamental element of the AR paradigm. They are signs that operate interactively with the device, therefore they constitute a form of spatial enunciation, as regards the "dialog" with the technology, but also a cultural form of the proxemic to whom the social community can assign a meaning.

According to Pedersen (2005), the gestures are configurated as "symbolic action", since wearable devices are designed for being manipulative, discursive and transformative. In particular, referring to Burke's rhetorics based on the triad positive, dialectical and ultimate terms, "we move through the world (enabled with a computer that moves easily) [and this is a *positive* sign], we meet others and this interactive relationship causes

7. The pose is the result of a computational calculation based on the so called Six Degrees of Freedom, that is to the possible movements of a body in a three–dimensional space: forward / back, up / down, left / right, yaw, pitch, roll.

a *dialectical* of ideas and our movement and interaction causes us to act according to a seemingly supreme system of signs that govern our behavior" (Pedersen, 2005: 16).

By developing a paradigm of body language of the human–computer interaction, Nicholas Nova (2012) had talked of "curious rituals" to denote all these gestures, postures and rituals that are emerged and progressively became habitual with the everyday use of computer, smart media, wearable technology and game controllers. The curious ritual referred to AR, specifically, is included in the "gestures for presentation of self" category, that includes, for instance, the act of deploy the arms in order to take a selfie. Like with a "periscope" (Nova, 2012: 70) — that we could start to intend as a figure of the proxemic in AR — users stretch their arm when trying to focus on something not at eye level, by using the smartphone as a *prothesis* (for instance, to take a video during a concert in the crowd). This gesture is configured as a framing operation and, strictly to AR, as a space search operation of a virtual object not visible to the naked eye.

Anyhow, for the semiotic field, an analysis like that wouldn't figure out substantial conclusions (except for a definition of another paradigm). We must to look at the semantic contents and at the rhetoric discourse associated to these gestures from a cultural system[8].

The figure–gesture of the "periscope", for example, is detectable in the *Signal* shot by the photographer John Stanmeyer, winner of the World Press Photo in 2014; there a group of refugees is represented on the coast of an African city with the arm extended for the sky in an attempt to acquire a quantity of signal necessary to communicate by means of the smartphone. If we interpret this image culturally, we can observe clearly the ritual dimension of interactivity clearly, which in this case going to associates the figure–gesture of the "periscope" with the modality of *being able to do*, and specifically of *being able to communicate*, contextually to the artistic–documentary discourse of photographer.

From another standpoint, by looking strictly to the spatial enunciation in a urban context, in several studies (Geroimenko, 2014; Lughi, 2015) the form of the experience of the fruition act of some occurrences of AR, like

8. The analysis of the textual statements that follows must be understood as closely related to the meaning attributed to gestures and to the dynamics of user movement; it must be therefore distinguished from that which will follow in the next chapter, dedicated to the prescriptive enunciation by a specific social subjects of the experience in AR itself.

of Augmented Reality Games (ARG)[9], has been associated to the nomadic and psychogeographic experience of the diviner and the flâneur.

While the diviner — the mythological figure dating back to the most ancient civilizations of man — shares the formal traits of the interactive pragmatic (like the user in AR, enabled with a smartphone, who wander in the city looking for the place in which activate the contents, the diviner uses his wooden tool to locate water and metals under the ground), the parallelism with the flâneur figure is semantically more complex. The term, became famous in the context of the Parisian *Passages* described by Benjamin (2002: 446), denotes "those who walk for a long time in the streets aimlessly caught by a intoxication" in the hope of grasping the *genius loci*, the soul hidden of a city. Nonetheless, beyond these paradigmatic yet fundamental traits, the flâneur is (also and at first) the one defined by Baudelaire (1863), the artist *aware* of his own condition, worldly, lazy and loitering, which endows him with a sensitivity and insight uncommon.

By following this interpretation, the operations of hacking and urban art in which virtual contents are disseminated in the city and their catch is present as a sort of "treasure hunt". These are configured like prescriptions for the re–appropriation of urban space, for the epiphanic loss or for the enunciation of alternative paths (for example, towards peripheral spaces) in which the user becomes the recipient subject of an awareness–raising communication (which affects his condition of citizen, of digital user) and whose practice flânerie is understood in terms of "tactic" (De Certeau, 1980).

Finally, the enunciation process described here can be textualized — a posteriori — in a further form of spatial enunciation, when the traced and geo–localized paths and the descriptions of the experience (in the form of metadata) go to constitute the material for the production of new cultural texts. This is the case, for example, of dynamic maps created to study the trajectories of space travel in the context of urban studies, or geolocated representations of cultural texts produced by users in a specific place, which allow the semio–anthropological gaze to analyze the set of practices and the uses of a place.

In the course of the paper we will refer to these semiotic processes related to spatial enunciation with the expression "geo–semantization".

9. One of the most important ARG, just for being the first, is Ingress by Google (www.ingress.com accessed on 9 December 2019).

Device

The combination of technological components whose we refer with AR had been understood, first that as mediatic experience, as a device "to resolve operative problems of conveying wiring in aircraft manufacturing" (Caudell Mizell, 1992). That was proposed by two aircraft researchers is an "heads–up, see–through, head–mounted display", an helmet with a transparent display, combined with head position sensing and workplace registration systems, able to receive and execute instruction in real time in front of the gaze thanks to the freedom of hands.

We won't go too deep into the technical specifications, it's enough to draw out a broadly taxonomy. AR devices can be, as we saw before, wearable or not wearable, and both of them operate by means of two main technologies: a camera and a display. Each combination can be programmed to enable a vision *see–through* (it is the case of smart glass by operating through a transparent display), a vision *obstructed–view* (where virtual content is superimposed on an image of reality rather than on reality itself that remains obstructed to the viewer) and a vision *projection–based* (it is the case of SAR)[10].

In the previous chapters we have also seen how crucial GPS tracking systems, wireless communication technologies to server and audio systems (like microphones and speakers) are in the process of making sense[11]. But what is the meaning that our techno–culture involve to these components?

One of the most important issues related to the device — where the mediological studies and the phenomenological philosophy meet each other — consist in its being a "prothesis" or an "extension of a man" (McLuhan, 1964) or moreover a "prothesis of sensibility" (Montani, 2014). In this sense, the device is able to alter, or even to totally determinate the cognitive prehension of the real world by a subject, by addressing the gaze of him toward predefined point of interest:

10. Except for the hand–held device (as a smartphone) that always produces an obstructed view.

11. More possible semiotic researches based on the device can be identified in the analysis of the processes of vision through the technology of the eye tracking, in the software critique for object identification programs and categorization systems or in the linguistic search for the production of synesthetic contents (for blind people) through the bone conduction, for applications like orCam (www.orcam.com) and EyeMusic (http://brain.huji.ac.il/site/em.html).

> In AR […] is the *real world*, ontologically inclusive, to meet us by providing a series of information that can in various ways guide our actions. The real world with which GG makes us interact is therefore a "processed" environment, a real space further defined by the information that the GG prism overlaps at the request of the user — but also, at least in the design perspective, under stress of the network of sensors that the environment could be equipped and which can be assumed in continuous and perhaps exponential increase. (p. 83)

Thus the prothesis for AR would enable, according with Montani, an "interactive imagination". This is a human faculty very central in the discourse on AR. It is naturally designed for technical delegation and its operating lays in the vision of something that not is (not yet, no more) present in the field of view, as well as by enabling a sort of x–ray vision which gives to the user a more powerful view allowing him to see what is invisible to the naked eye. However for Montani, the interactive imagination enabled by AR, instead of exempting our senses from the exercise of perception, should lead to a political, creative and therefore unconventional use of these devices different from the action programs prescribed by them.

In this perspective, an interpretation of the device similar to the foucauldian concept of "dispositif" clearly emerges. It is not (only) the beholder of a pervasive and subjective experience in which he is undiscussed protagonist (as techno–utopian Silicon Valley communication state). Rather than giving to the user a super power, as Caudell and Mizell wanted, the user becomes an object of a strategy, of a priori pre–textualization. Although the AR device is composed by a *transparent* screen, able to achieve the perceptive continuity of real and virtual contents, the device is often collectively perceived as opacifying, responsible of an act of veiling. This interpretation finds ground by looking for instance to two of the main short films where the aesthetic forms of science fiction and cyberpunk aesthetics are associated to the articulation of the thymic category of euphoria and dysphoria, going to evaluate critically the promises of an augmented world by the big tech companies. *Hyper–reality*[12] (Matzuda, 2016) is totally filmed in subjective and the user's field of view is completely invaded by semi–transparent layers, which make the perception of the real world impossible by realizing, in fact, an individual reality in which

12. http://hyper-reality.co (accessed on 9 December 2019).

intersubjective communication in presence is abolished; *Sight*[13] (May–Raz Lazo, 2012), in which a courtship is complicated by the amount of notifications, also embarrassing, which appear directly on the retina of the two protagonists.

However it's clear that the dark side of the AR consist of being a tool for the immediate digitalization of the user experience, a tool for surveillance. In this regard, it's interesting to note the contrast between the foucauldian concept of "surveillance" and that of "sousveillance" proposed by Mann in 2002, which denote the reverse surveillance operation acted by users of wearable technologies, oriented to "surveil the surveillers". This practices could be understood as a form of politics creativity that can be referred to the geo–semantization strategies, especially that of detournement or cybersquatting, through which the installation of augmented contents means a re–appropriation of the public space.

An informative totem on the energy consumption installed in a square is, for example, the result of a detection of surveillance devices (sensors, meters, trackers) that leads to visualize, returning materiality, to data collected by them, and it is present as a self–surveillance; a dynamic map representing geo–localized processes, also can be described as a form of "reflectionism" (Mann *et al.,* 2002: 333), ie a technique for "Inquiry–in–performance" through which an individual, or a community, is reflected (and recognized) within a meta–experiential representation of its existence.

An informative totem like that installed in Piazza Risorgimento in Turin, displaying data about the energy consumption is, for example, the result of a detection of surveillance devices (sensors, meters, trackers) that leads to visualize, returning materiality, to data collected by them, and it is present as a self–surveillance; a dynamic map representing geolocalized processes, also can be described as a form of "reflectionism" (Mann *et al.,* 2002: 333), i.e. a technique for "inquiry–in–performance" through which an individual or a community is reflected (and recognized) within a meta–experiential representation of its existence.

Finally, a different path can be tracked toward a socio–semiotics perspective. Ferraro (2002) deals with the concept of "imaginary machines", by identifying the inter–objectivity and inter–operability of the technological objects, which are able to make available their own functions by

13. https://www.robotgeniusfilms.com (accessed on 9 December 2019).

means of the compatibility of the code sources and of data. These objects "behave like readers, tended to pick clues of the identity of the subject to whose service" (p. 109) and not only possess interconnected and embedded functionality (such as Google maps) but, on a deep level, share data and information that helps to make the boundaries between different applications increasingly blurred.

Understanding devices as relational and interpretative entities thus need to rethink their social operating, their capacity of being an extension among subjects, whose ability to act — their *can do* — is expression of a knowledge whose object is the user's will.

Flipping the theory on the model of the "sousveillance", the computational object (e.g. a computer and its software for data–scraping) is configured as inter–objective since it is able to communicate with a series of other objects (sensors, meters) and their actions are expressions of a desire to know that is expressed in a unveiling and revealing of the device's operation itself.

Augmentable Surfaces

In order to complete the theorical framework with the necessary facets that every occurrence of AR presents, this last section will be dedicated to the formal and semantic configurations that can assume the augmented surfaces to which a virtual content is associated. These aren't virtual texts (they represent the physical side of them) and remain visible in the presence of the augmented contents, going to determine that form of expression typical of AR.

Following a formal analysis, the simplest typology of surface is the QR Code (or *fiducial marker*), that is a square composed of black and white pattern, representing the 3D coordinates for positioning the virtual content above it. It could be seen as a series of instruction to establish a relationship of contiguity between the surface and the content; it is a marker, a piece of information which is relevant for solving the computational task related to a certain application, and thus it consists in a prescription for the computer vision software that deals with pattern recognition tasks.

A second type of augmentable surface is the *natural feature tracking* (NFT). It is used for virtual contents whose fiducial marker is invisible to the user since it lays in a meaningful object or scene (for instance, a mon-

ument). Since you can increase anything (just turn any physical entity into a biplanar image), the augmentable surface will consists of the shape that computer vision software detects within the frame.

A third and final type of surface is that known as *markerless*. Unlike NFT, here no form of the real is predisposed to be recognized and augmented, but it is the technology of the AR to process, in real time, the surrounding environment creating simultaneously, from it, a virtual map, and positioning the contents in the preset areas. This is the case of Blippar[14], an application that automatically recognizes objects in the user's field of view and identifies them by means of a labeling operation, or Google Lens[15], which compares, in real time, an object framed with an immense database of images, finding possible correlations. The surface, therefore, no longer has a functional value but only contextual. A content, for example, can simply be associated with GPS coordinates, and appear when they coincide with those of the user's device, or be a neutral space, like a white canvas inside a museum, a portal to another dimension (GPS tracking). This does not mean that the space–content relationship is insignificant since the activation space always has a meaning that precedes the AR experience and contextualizes the content; at most, preference may be given to the choice of an insignificant surface in order to highlight the content itself.

In this sense, AR establishes a "space of writing" (Bolter, 1991), in which the surfaces are enriched through an appropriation operation. In the case of urban surfaces, the act of writing — which develops at the level of the spatial enunciation, is identifiable at least in two operations: the pre–experience or paratextual one, that is the computer programming of the experience, the prescription of it through an interactive map, and that of the geolocalized paths of the user, actually realized and textualized a posteriori. These electronic writing operations are what Bolter calls "soft writing" (which calls for software–level operation rather than hardware) through which "connections are established between any unit of information (numerical, verbal, graphic)" and "text units [i.e. city sites] are designated as new elements of an expanding sign vocabulary" (Bolter, 1991). The different geolocalized poses or positions are, therefore, also a text,

14. https://www.blippar.com (accessed on 9 December 2019).
15. https://lens.google.com (accessed on 9 December 2019).

sets of alphanumeric coordinates capable of being interpreted by different programs. They are invisible writings at the user experience level, relegated to the GUI interface, to which the sousveillance operations described above give a materiality, a visibility.

Three Modalities: Interactivity, Pervasiveness, Geo–Semantization

The four facets analyzed before constitute a paradigm, that is a range of discrete possibilities that the occurrence of the individual case of AR actualize in turn. However, each combination appears as a manifestation of contingent aspects realized in the modes of *interactivity*, of *pervasiveness* and *geo–semantization*.

These modalities are necessary as well as the co–presence of virtual and real perceptions and can be described by taking in consideration the relationship between the subject of the medial experience, the artificial object (the device) and the augmented space within this relation is articulated[16].

In the first place, interactivity is the mode of the elements that describe the quantities and qualities of possible paths prepared for user manipulation: a QR code, for example, represents a sort of "zero degree" of AR, because it owns a very low interactivity and the only action it prescribes is the frame; an application like Pokémon Go, on the other hand, prescribes to the user several actions to be carried out with the virtual content shown (capture, reading information, training). The degree of interactivity of a content can also be an indication of its hypertextuality, that is the amount of internal or external references configured by the application. By means of these interactive tasks, the subject establishes a relationship with the hyperworld — that is the natural world augmented, its rational and mathematical representation — which of course is outside its sensitive reach. The elements of urban space are interactive when, framed, become clickable, and therefore, augmented, as well as the virtual elements of the interface shown in the application. More generally, interactivity is

16. Obviously, not only experiences in AR are interactive, pervasive and geo–semantized, but the arbitrary choice of these modes is dictated by the need to find criteria to observe the degree (of interactivity, pervasiveness, geo–semantization) with which to describe a certain occurrence.

a specific mode of the man–machine relationship (it denotes also a propriety of the device), since the human user is part of a communicative and computational situation with a *logical engine*, based on algorithms and programmed to behave differently depending on the input received.

Secondary, the modality of pervasiveness constitutes, more than interactivity, a basic feature of AR medium specificity. Moreover, it is at this level that it is possible to observe the main difference with virtual reality. Virtual reality is immersive but not pervasive. It enables a 360° viewing experience in which what is perceived by the user coincides with the plane of the digital text expression enjoyed. The concept of "immersiveness" denotes a unitary and limited space, within which the subject accesses through an intensive movement. On the contrary, the concept of "pervasiveness" is common to that of "emersion" and can be described in terms of an infiltration or diffusion (of a smell, for example) within an environment that is permeated by it. The movement is extensive and configured as an addition of an element that alter but never replaces it. According with Lughi (2015) we can associate VR with the creation of a simulated space, which include, in addition to the object of the vision, the environment in which it is inserted, so that the space can be both visible and passable, while AR with the creation of a represented space. The representation is the perceptive form typical of culture, characterized by a separation between physical space and virtual space. The frame represents the limit of the virtual space, that marks the difference with the real world. While in VR the frame coincides with the user's field of view, in AR applications the virtual content emerges as a frame within the field of view, being identified by the coordinates of the fiducial marker or by the optical sensors of the computer vision. Pervasiveness does not only concerns the ontology of the AR, but also its aesthetic dimension, whose aspects can be identified in the quality of the transparency of the contents and visibility of the interface, maximum in hand–held devices and minimum in wearables. Wearable technologies, for instance, enable the figure of the "first–person shot" (Eugeni, 2015), that consists in the subjective of an embodied vision, a figure detectable also at the level of the expression of the audiovisual texts cited describing, precisely, an AR experience from the perspective of the user. Nonetheless, AR might simultaneously configures itself at the same time as immersive and pervasive. This happens when

the virtual elements would merge, to the point of being indistinguishable, with the real world. This utopian prefiguration, one of the promises of the mixed Reality, would represent the maximum degree of pervasiveness possible for AR.

Finally, geo–semantization deals with the attribution of meaning to a pose (as spatial enunciation by a motion sensor) or to a place (as GPS coordinates) by means of the act of writing and reading of a virtual content located there (design of the experience). This is a featured modality of hypermedia and specifically of locative media. Here the attribution act doesn't concern only the posit of a content in the hyperworld within the real world (there can be contents which doesn't require the positioning of device on specific geographic coordinates) but the implicit processualism, the set of actions necessary for the design and the fruition of the mediatic experience. Broadly geo–semantization can be understood in the terms of the cognitive–enactive paradigm (Varela Rosh Thompson, 1991), which considers the cognitive process as a relationship between an embodied mind and the surrounding environment, and the perceptive one as an exploratory activity exercised by a moving body in space. Indeed in AR we are not only witness the attribution of meaning to a place by means of a design–fruition act of a content, but a process of attributing meaning to a dynamic act — that is relational, discursive — that must to be developed contextually to a textualized space, written to be activated.

It is clear, and it must be repeated, that the specificity of the AR resides both in the forms of the experience of positional and geo–semantized fruition (that is in the semiotic relationship between the environment and the contents that have been designed to increase it), and in the pragmatic forms of the processualism presupposed by every occurrence of AR, designed as well as the content.

Further Corpus' Elements

Previous paradigmatic facets are not enough to give an overall image of the AR phenomenon. Thought they constitute the contingent elements for a syntagmatic analysis based on a single case study, they rule out tangential

and paratextual elements which are fundamental to achieve the universe of meaning floating above the AR experience.

The paratext of an AR occurrence is, for instance, constituted by the application itself and the prescriptive statements in it. In an ARG, it is often a web site that the user must visit in order to acquire the necessary skills to enjoy some increased content, such as interactive maps and instructions. Moreover, it could be constituted by other multimedia content that, in a transmedia storytelling, represent the narrative substrate that contextualize the experience in AR. The application might possess a certain expressive configuration — its design and, broadly, its language — but it might also present itself as a narrative object in itself. One case that goes in this direction is *Proxy 5–WM2A*[17] (Pappenheimer, 2014), an application developed for the Whitney Museum of American Art Party in New York and presented to the public as a hallucinogenic substance to be taken in order to acquire visionary powers and to see of the artistic exhibition in AR.

A second search path could be instead identified at the level of the social discourses

to which the AR experience is related by attributing an intentionality to a social subject. This level is fundamental in the analysis of the single occurrence, and identifies the experience in AR as a requirement of a sender for a user.

In the case of *Occupy Wall Street AR*[18] — the protest at Zuccotti Park which he saw among his sit–in the superimposition of virtual content to significant areas of the city by the citizens — the sense of urban hacking contextually would be uncatchable without taking into account the dialectic between the artist Mark Skwarek, author of a real "call for action" and organizer of the protest remotely, and citizens. One of the most viral contents on Web was the photos of the augmented spaces: some areas of the city, inaccessible to demonstrators were augmented with the overlapping of contents representing the protesters themselves, who, once photographed, sent their own image to Skwarek, which transformed it into a virtual content.

However it's possible to think to a paradigmatic dimension also for this type of textuality. Several AR applications, for example, arise in the context

17. https://whitney.org/exhibitions/proxy (accessed on 9 December 2019).
18. https://aroccupywallstreet.wordpress.com/ (accessed on 9 December 2019).

of a digital marketing strategy. A company that chooses to adopt this technology for the communication of a product, is obviously a social subject that want to attribute itself the value of modern — today anything but banal and eagerly sought — and offers to its client an experience (sensorial, cognitive, purchasing) more pervasive, interactive and, therefore, avant–garde, able to associate the entertainment dimension to the commercial one. Nonetheless, the whole prototypes marketing campaigns shares a set of stylistic elements, often inherited from the science fiction genre.

This also applies to artistic practice, where the adoption of AR techniques coincides with an innovative research in the visual language developed through the production of empathy with the user.

We can understand this kind of occurrences as expressions of what Lughi calls a "technological re–enchantment" (2015: 143):

> An expression that indicates the need for a weld, a recovery through the technology of an enchanted dimension that seemed lost; an expression that allows us to glimpse the need to put together two apparently irreconcilable worlds, to exploit technological possibilities to satisfy emotional needs, sensitivity, desires, presence of the body.

This idea, which takes up Weber's concept of disenchantment, focuses on the recovery of an irrational dimension related to the use of digital and embodied technologies and is, evidently, correlated to the modulations around the category of euphoria, the rhetoric of innovation and the theme of digital creativity that these devices allow and prescribe. But even the structure of prescriptive textualities or the rhetoric of the occultism and secrecy of many ARG could suggest a paradigmatic dimension of the experience (or even a real genre). These would again be referred back to the concept of "return to the archaic and nostalgic dimension of a childhood life (Alice's gaze) that opens up to the world of collective dreams, myths, great configurations of the imaginary.

It is possible to detect in this conceptual proposal a formal continuity both with the typical procedural dimension of the rite — the prescriptive textualities are often configured as a succession of phases and actions to be performed in an order predetermined — and with the rhetoric of unveiling and revelation (of something that is hidden, imperceptible or hidden, as are the same virtual contents before being activated).

A third and final path of research which can be undertaken is that which posit as its object of study the social and institutional discourses that take the same form of awareness, in other words, or prohibition. From the dystopian rhetorical tones on the so–called "Smombie" phenomenon[19] — that is the excessive consumption of digital media in public places that leads to a perceptual detachment from the real world that metaphorically transforms users into zombies — to the ironic figure of the "Glasshole" (Greenfield, 2013) — people using Google Glass in somehow rude or creepy ways by showing social inaptitude and general clumsiness — to the journalistic communication focused on the risks associated with the use of Pokémon Go, as the crossing of areas of property or carelessness in urban traffic, you can get to the analysis of institutional discourse, which sees in this type of practice an incitement to mass disorder, or even religious (in Iran, in 2016, a religious ruling opposed the idea that it was possible to accelerate the transformations of Pokémon to make them stronger, as it was a reference to the theory of evolution).

Conclusion

The paradigmatic forms of AR described up to this point demonstrate a further assertion. One of the paths to analyze the AR from a semiotic perspective is to study the forms and the figures of experience by tracing backward references, looking for similarities with other media figures that, in AR, are remedied or adopted because significant.

Helena Papagiannis has spoken, in this regard, of "lean–back experience" (2014) referring to that repertoire of inherited forms — like those of the *phantasmagoria* shows made with the magic lantern during the cinema of the origins — that characterize as well as the user experience in AR in the emergence of surreal figures.

Following this idea would lead to deepening the concept of *augmentation*, going to consider phenomena that are neither digital nor virtual, that do not need any electronic device to manifest themselves, and that however are similarly able to increase (cognitively, aesthetically) the per-

19. https://en.wikipedia.org/wiki/Smartphone_zombie (accessed on 9 December 2019).

ception of a place or object. Spatial statements and urban space rewriting using practices of contemporary flânerie, gamification, cartography, graffiti and urban video art or "touristification" would be considered relevant. The same could be said about contents, whose formal similarities can be found, for example, in the overlapping of the text of a television comedy by adding recorded laughter, or descriptive graphics in a newscast.

However this type of path, oriented to finding the paradigmatic forms of the AR, functions in a good way concurrent with a syntagmatic analysis of the single occurrence, but is still insufficient to define a specificity of the augmentation paradigm.

In the introduction the "paradigm of augmentation" has been associated with a contextual process in a "textualized space" and with a "reinvention of the physicality of the virtual". The time has come to explain this.

The specific elements of the AR are always related to a procedural and spatial dimension implicit and necessary to the experience. Virtual contents make sense in relation to the place where it is activated, the interface in relation to the interactivity possibilities it configures, the device in relation to the delegation of the imaginative exercise and to the interoperability at the level of the software, the space–surface in relation to the act of writing and geo–semantizzazione of the same.

Therefore, the AR not only refers to "inherited forms", but represents a cognitive enactive model, characterized by a pragmatic crossing of a textualized space whose interaction with the environment is constituted by a set of mathematical computations operated by an artificial eye.

This reading–writing operation is central to the augmentation paradigm. It can be described in terms of a communicative act that leads to an emergence of information, content and meaning where there was none, through a discovery in the whole (modulated in the categories of euphoria and dysphoria) and of transparency (both aesthetic and cognitive) of the materials. Not by chance, in different occurrences of AR, the action of discovery of a virtual content is valued as awareness by a social subject that reports the information to a meaningful materiality.

The operation of making–transparent is therefore a let–know, an allowing to users to see unseen in the world. These actions can claim a transparency denied through practices of urban hacking, in the forms of phantasmagoria expression that envelop the process of technological innovation with an aura of mystery. But making transparent can also mean

seeing through the instance of mediation (the device), and seeing the instance itself, its way of operating, thus, its materiality.

This idea recalls both the model of the sousveillance described above, as well as the forms of expression of all those applications of AR in the specialist field that allow to operate below the visible (for example in surgery) that understand AR as an enabler of an x–ray vision.

The AR communicative act — dynamic, relational and discursive — is therefore an act of augmentation to the extent that it is always manifested in the presence of a material entity (the space of the increasing surface) without which it would not be possible to manifest itself. Its specificity consists in being able to restore materiality to the virtual dimension of the world and of contemporary dematerialized culture.

And this materiality, returning to the augmentation, can denote a physical space or place (as in the occurrences of AR), in a visual representation of data–visualization, in a form of air pollution caused by hardware and wireless systems (the so–called data–smog), in a street and its dangers, in data, understood as an asset of economic value, in the device itself, considered to be *opacifying*.

Contrasting the current with the virtual (rather than the possible), Lévy (1995) described virtualization as a "making himself another, a change of identity, a different way of being real, which problematizes the real". If virtuality, then, detaches from the "here and now" and "does something else" the reality that virtualizes, isn't it the AR that makes virtuality (again, differently) localizable, material, tangible? Is it not referable to a sort of *haptic turn* in the design of digital and wearable technologies?

This is a fundamental point because it leads to assume augmentation as a process that associates a virtuality to a materiality, not to cancel the ontological differences between the two, but to problematize the second through the first.

In this sense, going back to reading the individual occurrences of AR means looking within for the references to the communicative, affective and valuables processes deeply inscribed in the underlying cultural system, by opening perspectives that allow to describe heterogeneous phenomena in terms of an augmentation (and thus an understanding) of the reality.

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Deconstructing the Experience

Meaning–Making in Virtual Reality Between and Beyond Games and Films

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Abstract: In this paper we deconstruct the so–called experience of Virtual Reality by enriching the cognitive and phenomenological explanations of VR's renown "immersiveness" with a semiotic perspective and approach that highlight the quilting of the different dimensions of meaning–making involved in virtual reality. We do this first of all by highlighting how VR mixes key aspects from previous media and by looking at the socio–cultural aspects involved in the attribution of "realism" and "immersion". Then, in the second part, we focus on the uniqueness of VR's technology and highlight the consequent cognitive processing and the resulting phenomenological situation in which such experience occurs. In the third part, we underline the narrative essence of this experience as well as the birth of a new spectatorship allowing for VR to work as intended. In the fourth part, we look at the philosophical and anthropological background granting meaning to the experienced virtual utopic body and other space. Finally, we criticize the widespread conception of a non–mediated experience grounded on the embodiment and phenomenological conditions of the virtual worlds, and propose a different triadic explanatory model that helps to complexify our understanding of meaning–making in VR.

Keywords: Virtual Reality; Semiotics; Games; Meaning–Making; Media.

1. Introduction

This paper is the result of a 2018 research between the University of Turin, the New Bulgarian University, the VR Lab BG association and the

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VR Express business company. But more importantly it is the result of a chance meeting between two persons with different backgrounds but sharing similar doubts about Virtual Reality.

The first one is a film–director and artist that, inspired by Grotowski's definition of "Poor theatre" (Grotowski, 1975) and Roland Barthes's study of photography (1980), was wondering "Film and VR… Where does one start and the other end? What makes immersive experiences qualitatively different?"[1].

He was indeed wondering about a new kind of contract that was now needed with the birth of a new spectator and of new storytelling logics required by the Virtual Reality technology.

The second person is a semiotician that had very similar issues in defining the semiotic differences between classic and VR videogames. Indeed, digital games have always been defined as immersive virtual spaces, furthermore both classic and V.R games create meaning–making through audiovisual language and interactions. Nonetheless, VR games undoubtedly allow a different kind of experience and it was fundamental to understand the causes of this difference as well as the birth of new meaning–making and interpretative possibilities.

Moreover, for both of us the question of this threshold and semiotic difference was particularly relevant since it was directly connected to the widespread idea of VR as a different technology and medium capable of granting unique realism and immersiveness constituting "The Experience" of VR. Therefore, many questions arose about the VR being not only a communicative technology (Barricelli *et al.*, 2016) but perhaps a mix of semiotic languages creating, through still unknown processes, a distinctive impression of reality.

Yet, to answer to our questions we both understood that the first step was to dig into the vague concepts of "immersive" "realistic" and "experiential" that are often used to describe Virtual Reality. In fact, although it could be argued that these are nothing more than buzzwords not worthy of attention, truth is that these terms are still commonly used in different kinds of discourses, scientific and not. So, the starting point for us had to be both the obviousness and ambiguity of these words. Words so obvious that even the players are creating mods of games, such as Alien Isolation

1. http://blog.momchilalexiev.com/filmmaking-virtual-reality-different-similar/.

(2014), to play them in VR for an improved and different experience. But also so ambiguous that the concepts used to describe VR are almost the same that were used first for the cinema and later for digital games. Moreover, the ambiguity reaches its apex when we realize that VR versions of games often do not usually present new contents, mechanics, graphics, and can be played on the same platforms (Borderlands 2 VR, 2018). Despite the existence of a large literature inquiring on the sense of presence which is peculiar of the VR experience, we thus felt that a more general reflection was still needed to explain the shift happening in simulative experiences such as first person view scuba diving that moved from Treasures of the Deep (1997) to Subnautica (2018).

As a semiotician the first step to overcome this ambiguity would have logically been to start an inquiry on the semantic and definitions of such words, but since a similar work had already been done (Volli, 2007a; Heim, 2014) and given that this research had to be a joint effort, we opted for something different. Three months of participant observation followed, months during which we continually discussed the tens of VR products (both games and movies) that we experienced and during which we also listened to both creators and users of VR products. This paper is the final outcome of this discussion and uses the already existing literature to offer a hopefully new perspective on all the different aspects involved in VR's production of meaning.

2. VR *between* games and cinema

Starting from the myth of the painting competition between Parrasio and Zeusi, we can say that the human fascination for the ability to "trick the mind" through ultra–realistic representations has without doubt a very long history. This history shows us that realism is first of all an effect (Metz, 1968) that can be produced by different media in different ways and that strongly depends on the socio–cultural context: nobody escapes anymore from movie theaters when a train appear on the screen. Let's also think at the generations of film goers that found black and white movies "more realistic than color film" (Stam, 2000: 142). However, despite all these differences and without entering in the historical debate about the *mimesis*, we can affirm that each different medium is special for the way

in which it simulates and enacts aspects of our access to a reality: from the underlying logical structure of a succession of events regulated by a causality principle (what we could call the narration of our daily lives as in Ricoeur, 1983), to the visual perceptual aspects recreated by media such as photography and cinema, up to the agency on the world and mimetic sensory–motor skills required by games. Furthermore, as highlighted by Bolter & Grusin (1999: 3–10) each medium is in dialogue with its predecessor to be recognized as a more transparent and immediate mediation. Indeed:

> A painting by the seventeenth–century artist Pieter Saenredam, a photograph by Edward Weston, and a computer system for virtual reality are different in many important ways, but they are all attempts to achieve immediacy by ignoring or denying the presence of the medium and the act of mediation. All of them seek to put the viewer in the same space as the objects viewed. (*Ibidem*: 11)

Nowadays, VR seems to have made the dream come true, but we must not forget how previously "Bazin (1980) concluded that 'photography and the cinema are discoveries that satisfy, once and for all and in its very essence, our obsession with realism', yet he was certainly wrong" (*ibidem*: 26). In other words, we can say that each different medium offers the possibility of an "immersive experience" because it relies on some of our own capacities of grasping and acknowledging our "real word" or first order reality in an ontological view. Whereas the impression of being immersed in media has also an important literature (Lombard *et al.*, 2015), it is often overlooked that this immersion is semiotically granted in two opposite ways: through absence and presence. On one hand we feel immersed when we are mentally distant from our world and daily worries, an escape that Ortega y Gasset defined as the need of unreality (Roberts, 1998) implying our being so *distant* that we can feel our presence *there*: caring for fictional characters and sharing their emotions, easily following impossible logics of possible worlds by making inferential walks (Eco, 1979), experiencing fictional states of subjectivity (reminiscence, hallucination, fear) as if they were our owns, etc… On the other hand, however, we are also immersed because we are *here* and ourselves: through our own percepts, witnessing sometime the impossibility of sharing emotions, by applying our own cultural values and encyclopedia, by making inferences

based on our known narrative scripts, by evoking our memories, and even by making real efforts (Aarseth, 1997) as it occurs in games. Indeed, almost any media use interpellations (Casetti, 1986) of various kinds to play with this paradoxical situation of the audience that can reveal the act of enunciation itself: known references, *trompe l'oeil*, gazes into the camera, naming of characters in games, sutures (Oudart, 1977) *mise en abyme*, and so on. This is exactly why the notion of "level of immersion", that we can find in psychology (Herrera *et al.*, 2018) and often related to the idea of degree of interactivity (Cosenza, 2010; Hand & Varan, 2008) becomes weak when we look at the simple fact that literature, music, painting, theater and games can all be considered highly immersive because of being able to grant an experience of absence and presence through both cultural elements, linguistic mechanisms (such as what in structural semiotics is known as the theory of embrayage and débrayage) and psycho–sensorial means (such as movement as an effect of corporality, see Musatti, 1961).

In fact, it is precisely in two supposedly "non immersive" media, literature and theater, that the concept of a distancing effect was born. So, since history teaches us that a non–interactive and supposedly non–immersive book can cause a suicide contagion such as in the Werther Effect, relating immersiveness to new technologies is, to say the least, problematic. In fact, it is interesting to notice how in the field of psychology VR specifically raised the question of the relationship between technology and *sense* of presence (Riva & Waterworth, 2014). Indeed, if from a psychological point of view the presence can be defined as "a neuropsychological phenomenon, evolved from the interplay of our biological and cultural inheritance, the function of which is the enaction of the volition of the subject: the feeling of presence is the prereflexive perception that the agent's intentions are successfully enacted" (*ibidem*: 216) it is clear that this condition is not specifically granted by technology and even less specifically by VR. Without a doubt it could be (and have been) argued that immersion in VR is different because of both a physical and psychological fidelity (Alexander *et al.*, 2005) creating an illusion of non–mediation (Waterworth & Waterworth, 2014) thus leading to a superior sense of realism mainly rooted in the definition of presence in its multiple dimensions (Slater, 2003). Yet, once again, if we had to look at the concept of "psychological fidelity" we would find different elements that make the distinction problematic, especially in relation to the controversial claim of

a superior realism, as it has already been noted (Marini *et al.*, 2012). Here a concrete example will be helpful.

During the 2018 event "Future of Reality" in Sofia, Shauna Heller, an expert in applying VR technology in the field of Medical Care, explained how to improve the realism of the situation and engagement of the doctors they had to add an "NPC" of a mother worried about the children that the doctor were supposedly treating[2]. As it is clear, there are here numerous aspects of this "realism" and emotional presence that have more in common with narration and culture than with anything else. So, the first important acknowledgment to make is that Virtual Reality is not special in any way about this general possibility of immersiveness and experience, and neither when a superior effect of realism occurs it can be simply reduced to the technological specificities of VR.

Exactly as it happened in game studies, it is important to be aware of the possible "immersion fallacy" (Salen & Zimmerman, 2003; Calleja, 2014) caused by the vagueness of the language we use to describe our experiences. However, this does not mean at all that a book and VR games are equivalent. On the contrary it only highlights how words and concepts such as "immersive" and "experience" are in some cases not suitable to understand these undeniable differences.

Although this could seem in some way obvious, when we look at the most recent researches on VR it is clear that scholars are not seriously taking into considerations these aspects and thus are compromising their results and most importantly their interdisciplinary value. A good example is a recent and important empirical study (Herrera *et al.*, 2018) about empathy on "long term" (eight weeks) claiming that VR is somehow better than other media to produce this effect. When we closely look at the study we notice that reading is oddly defined as an activity involving our "visual system" since we use our eyes (Herrera *et al.,* 2018: 3) and that to obtain "objective results" the same amount of time was given to the participants experiencing texts on the issue of homelessness through "a fact–driven information intervention (Information), a traditional, narrative–based perspective–taking task (NPT), a VR perspective–taking task (VRPT), and a less immersive mediated perspective–taking task using a desktop computer (Desktop)" (*ibidem*: 21). Furthermore, the cultural

2. https://www.youtube.com/watch?v=Dvvc_cf1x4A.

background and personal beliefs of the participants were not considered as relevant and thus not taken into account. So, even putting aside both a priori (the idea that these different texts were equivalent on the content conveyed) and a posteriori (the results are based on a self–compiled questionnaire) methodological doubts, it is clear that such a research is somehow compromised by having ignored very relevant aspects of meaning–making that had without a doubt an important influence on the results.

What matters is then to understand how a specific form of immersivity and experience are both caused by the medium and acknowledged by the spectator in VR: to switch from a layered model and idea of levels of immersiveness to a conception of modes and forms of immersiveness. To do this the first step is to look at the two most recent so called "immersive media" invented before VR: Cinema and Digital Games.

Indeed, looking at the relationship between new and old technologies is fundamental from a semiotic perspective (Volli, 2007) and in Game Studies this modus operandi based also proved to be invaluable with works like *Cybertext* (Aarseth, 1997) *Hamlet on the holodeck* (Murray, 1998) and *Schermi interattivi. Il cinema nei videogiochi* (Bittanti, 2008). Besides, this is also true, and perhaps even more, when we look at the studies on films with the fundamental role of comparison with photography and literature.

On one hand, VR obviously takes on the main aesthetics of cinema:

— The phenomenological situation of a sense of solitude in the darkness to reach the utopic "solitary intimate deaf and dumb condition" desired by the cinema spectator (Eikhenbaum,1982 in Stam, 2000) resulting in an intense situation of witness and dream (Stam, 2000: 161).
— The possibility of different visual perspectives and thus to create the effect of a total access to a fictional reality's object.
— The combination of different heterogeneous semiotic systems resulting in synchretism and/or pluricodicity (Metz, 1973).
— The visual manipulation of pictures and the creation of meaning through these different shots and possible constructions (Metz, 1974).

— A spectator surrounded by sound and immersed through it.
— The experience of fulfilling the "desire for what Bazin (1967: 20) called a 'total and complete representation of reality', a 'perfect illusion of the outside world in sound, color [sic] and relief'". (Nash, 2018: 98).
— The audiovisual cognitive prothesis (Paolucci, 2017) allowing for a semiotic translation of experience to occur.

Moreover, from "gut–sensations" pictures (as in horror and splatter movies), to cognitive–embodied empathic response caused by faces (Plantinga, 1999) and immersive interpretative efforts (as in movies like Memento where we must patch the memories together with the protagonist) cinema is without any doubt an experiential medium. Indeed, the very same neurosciences and cognitive sciences inquiring on VR were also long before successfully applied to movies (Buckland, 2000; Gallese, 2015).

But on the other hand, VR also takes on the characteristics of games:

— The agency and intentionality (Vella & Gualeni, 2019) given to the player who becomes both actor and author of his story in *his* world.
— The non–linearity of the hypertextual structures (Landow, 2006) of combinatory (Bartezzaghi, 2016: 78) enunciates with the almost infinite possibilities of actualization of a same text through interactive montage (Nitsche, 2008).
— The semio–phenomenological illusion of witnessing a half– reality (Juul, 2005) made of almost infinite profiles (Petitot, 2008) that can be investigated through pragmatics and mathematics.
— The relevance of the virtual space in changing the meaningfulness of cultural practices belonging to the real world of the reader (Leone, 2011).
— The idea of "points of interest" and consequent possibility of "a 'subjective mode of wandering: observing detail, being open to what appears, being curious about what's up the hill, or around the corner'" (Whitelaw, 2002) while at the same time the meta experience of an artificial finiteness and oscillation between freedom and

limits (Fassone, 2017)
— The possibility for the player of creating another self and the related birth of an Ego deriving from psychological and tactile motor/kinesthetic link between player and avatar creating a new ludic subjectivity (Vella, 2016)
— A shared condition between player and avatar allowing for an experiential form of representation and rhetoric (Giuliana, 2018 & 2019) working through multimodality (Hawreliak, 2019)
— The requirement of an interactive and performative non–trivial effort (Aarseth, 1997) that involve specific sensory–motor functions (Gregersen & Grodal, 2008) with imitative possibilities (Jenson & de Castell, 2009) and that trigger emotional states and cognitions deriving from the game's system (Bogost, 2007) and which influence meaning (Meneghelli, 2011)
— The uses of our vision in such a way that, differently from cinema and as in real life, horizons of perception are enacted: (Merleau–Ponty, 1962: 78)
— The possible improvement of cognitive capacities through vision and interactions (Eichenbaum *et al.*, 2014).

It is indeed for some of these aspects that already the first *Super Mario* (1983) could make us experience a simulated reality without relying on photorealism, without relying on a strong plot or characters to identify with, without explicit references to reality and without relying neither on tears nor laughs. Moreover, it is also for all these aspects that digital games somehow reinvented the concept of "realistic history representation" by grounding the "realism" on many different levels, from the deep mathematical rules of the system to the visual and narrative aspects (Cassone & Thibault, 2016). Finally, it is by borrowing some fundamental aspects of films that games could make us experience conditions such as blindness (Dark Echo, 2015; Perception, 2017) or insanity (Eternal Darkness, 2002; Hellblade: Senua's Sacrifice, 2017).

So, it is first by mixing all these aspects and aesthetics that the VR is unique: "when interactivity is combined with automaticity and the five–hundred–year–old perspective method, the result is one account of mediation that millions of viewers today find compelling". (Bolter & Grustin,

1999, 14). Indeed, VR is the concrete conflagration of "opposed" media experiences such as the ones coming from cinema and games. Media that were historically defined on one side by photorealism and intimacy plus "passivity" (even though not in an interpretative sense, see Eco, 1979) and on the other one by "interactivity" and non–intimacy (let us think of the first arcades) plus non–photorealism. Additionally, VR also combines strong physical elements of the *ilinx* (Caillois, 2000) with behaviors typical of *paidia* (Idem): to the point where fiddling (Thibault, 2017) becomes one of the main activities involved in VR (where as kids we love to touch and break every object) and that VR successes such as Beat Saber (2018) and Robot Recall (2017) have a lot in common not only with games such as Dance Dance Revolution (1998) or Red Steel (2006), but first of all with the childish experience of playing with invisible swords and guns. Lastly, the historical occurrence of VR makes this fusion even more interesting as it takes on and mixes the more advanced features of both media: the digital reproduction through cap–motion of real actors in games (as in stereotypical cinema) and interactivity in movies (from 360 degrees music videos to *Bandersnatch*). VR is then the somehow final result of the dominating visual culture inside our societies (Pinotti & Somaini, 2016) and of its meeting with what is nowadays commonly defined, although not without controversy, as the digital culture.

3. VR *Beyond* Games and Cinema

Acknowledging these connections is important, but it would be a mistake to ignore the technological specificities of VR and their consequences. Although these specificities are nowadays well known, we will try here to highlight their role in the spatial presence, emotional involvement and embodiment of VR intended as a very specific technology allowing to experience a computer virtual environment in a unique way.

First of all, the headset recreates a 360 degrees visual immersion of the "spectator" in a virtual environment characterized by the six degrees of freedom (Bolter & Grustin, 1999: 243) and by isomorphic head tracking. From a cognitive point of view this perceptual–phenomenical situation allows the visuomotor congruity to define these spaces as plausible and persuasive (Murphy, 2017: 3). This seems interestingly enough also con-

firmed by empirical studies about the strong involvement of the hippocampus in VR (Hartley *et al.*, 2014) and can be related to the what–where cognitive binomial (also reflected in our languages: Lakoff, 1980), developed by humans as consequence of the growing centrality of the visual system (Pinker, 2009: 3917). Moreover, the headset is responsible for conveying also non–visual data that result when "Unconscious sensorimotor processes aggregate perceptual information from vision, audition, proprioception, and other forms of sensation in producing the incorrect 'knowledge', belief, or momentarily–insurmountable, sub–personal conviction that one is located within a virtual space". (Murphy, 2017: 4). Furthermore, from a semiotic point of view the headset involves the destruction of the proscenium and trigger the construction of a virtual space with redefined boundaries that we can explore through mainly indexical and iconic interactions. This spatial awareness and sense of presence also has an impact on psychological identification and emotional impact in two ways. First, it contributes to the possibility of a new kind of patiency and I emotions in VR that "effortlessly elicits authentic–feeling, self–directed, affective survival concerns" (Murphy, 2017: 6). Furthermore, it allows for proxemic impressions of closeness and distance that have a key role in feelings towards characters (Zibrek *et al.*, 2017) which can have empathic effect such as the one easily seen in products such as Dear Angelica (2017) or Reaping Rewards (2017).

So, if we go back to our example about VR immersion in medical care, we can see that the impression of the physical presence of the mother next to the doctor is actually one very specific and undoubtedly meaningful aspect of the augmented sense of presence and realism in VR; and this is also why in 2016 a woman could declare to have been sexually assaulted in VR[3].

Secondly, the specific VR controllers allows new sensory–motor interactions strongly based on our embodied knowledge and requires a physical involvement that is far superior than what we have seen in the past with digital games. At the same time, the superior involvement is based on an inferior *effort* to acts (Riva and Waterworth, 2014: 217), resulting in a superior sense of presence explainable not in generic terms of immersion but

3. https://nypost.com/2016/10/26/i-was-sexually-assaulted-in-virtual-reality/.

more precisely in semiotically accurate transduction of motor intentions and representations.

As for the head movements, here also actions are iconic: we grab items by moving hands and fingers and we have to put real arm strength into a movement to throw an item, which on a cognitive level imply a different activity (Varela *et al.*, 1993). It is true that many of these interactions existed prior to VR (Jenson & De Castell, 2009), as in the famous case of shooting in Duck Hunt with a gun–like controller or in the case of moving a Wii controller like a sword, but what until now have been the "exception" is now in VR the standard. As noted above, one of the most interesting consequences of this is the return of a strongly paidia–based game activity like children's play (Caillois, 2000). Besides, the felt realism of grasping of an object in VR does not depend anymore only on photogenic criteria or on the physics, but it relies on the embodied knowledge of a sensory–motor activity to grasp it and the possibility of looking and processing it as if he had new explorable phenomenological profiles. This is extremely interesting since the immersiveness of VR depends on the different kind of prediction process (Miller & Clark, 2017) it allows in a virtual environment by adding new associations between beliefs, intentions, actions, consequences and sensory evidences. Furthermore, VR games can now reproduce the fundamental aspect of gestures language (Campisi, 2018) together with the use of their body as signifier as in the act of extending arms to shoot in two different ways (as it has been represented in many movies).

All these points about the new VR interactions, seen both from inside (cognitive approach focusing on unconscious production of meaning) and outside (semiotic approach focusing on enunciative production based on signifiers) are extremely important because they highlight that, exactly as with games, what is happening outside of the screen is fundamental to the attribution of sense to the text. Thus, if Ibsister (2016) has shown us the relevance of the body postures of NPCs, with VR we have now the relevance of the player's postures.

Third, the constrained sensory and visual immersion have a relevant effect because of the consequent sensorial impact. This "sensational" focus, for which we can suffer from acrophobia in VR, has two fundamental consequences: the introduction of a strong ilinx dimension (Caillois, 2000) and a new kind of fictional truth. Indeed, it is actually far more than a "roller–coaster" fun effect as it allows for what we will call here an illusion of

immediacy based on our cognitive interpretative habits related to senses for which we associates sensorial feelings to one of the highest degree of truth criteria (Prinz, 2006) and our bodies become a site of feedback (Murphy, 2017: 13). Sensations are consequently working as signs interpreted by us in function of both a physical embodied knowledge and of a cultural schema related to the semantic representation on the screen triggering a ratio (Eco, 1975). Putting it simply, it's because we are used to associate percepts and sensations to the experiential domain of the intuition and of the immediacy, and thus of the non–mediated and necessary true, that VR "feels real". This critical feature, also relying on the first point about spatial presence, is the reason why already twenty years ago people could already be clinically treated for acrophobia through VR (Bolter & Grustin, 1999: 165) even though they would not recognize these virtual environments as realistic. Indeed, perceptions are one fundamental criteria of truth that our mind semiotically uses to prove to itself that something is real: VR is thus a real extension of reality in the Lacanian sense where "reality" is shown, while the "real" is proved (1973).

From these three main points we can see that VR can be considered a unique medium because of its augmented meaning–making possibilities for which there is a new "contact point between the medium and what it represents" (Bolter & Grustin, 1999: 30) that lies in the embodied access to a virtual world in which the player has agency. Moreover, it's interesting to see that these characteristics are the fulfillment of the original VR idea and project (*ibidem*: 22).

Thus, if we accept to define VR as a medium, we can see that semiotic translation of phenomenological experience is a key concept in understanding and analyzing its psychological effects. Yet, before facing such delicate matter we have first to look at VR as a both old and new form of narration.

4. The New Spectator: Narration *Beside* VR

It goes without saying that the mix of opposite media and these unique features also have an impact on the logics of the spectatorship and are the reason why both VR movies and games feel as something different. In this sense, the effects of VR cannot be reduced to the new technological possibilities of the medium (which is moreover a problematic term by itself

as explained in Volli, 2013), but must be understood together with its new narrative possibilities.

Indeed, on one hand there is an immersive medium which qualitatively changes the technological and cognitive frame we inhabit, and on the other hand, in the face of cinema and theatre, we have a well–established grammar for storytelling. Virtual reality combines modules we are very familiar with from film, theatre and games, like i.e. movement, light, special effects, active interaction etc. Those are elements we recognize and use but which in the same time do not automatically add up to a meaningful new direction. This coexistence, as per Jacque Ranciere's "Emancipated spectator" (2008), calls for an attempt to tackle the question of the state of spectatorship today. The way cinema and theatre work both as a cultural and social phenomenon is something one grows up with. We learn to understand linear editing, fast cuts, flashbacks etc. Storytelling is not intrinsically encoded in us as the study of Ed Tan "A psychology of the film" (2018) shows. There is an established grammar according to which we live ourselves through stories as a group. The outline according to which we communicate stories can be clearly traced back to the times of Greek tragedy, and whilst this "passive interactive optical relationship" (Ranciere, 2008) has established itself as the dominating agreement, alternative ideas have been present from the very beginning. In fact, through history we find numerous authors who have challenged the distinction between theatre and spectacle with the aim of empowering their spectators. One of the many examples from more recent times is Jerzy Grotowski's performance "Kordian"(1962) where actors and audience are present together on the stage by thus compiling physically the entirety of the piece. VR, however, is once again redefining new rules. Thus, on one hand, there is a clear change in our technological and cultural context, and on the other hand, a tradition of alternative ideas about the ways we can tell stories. It is a framework that constitutes a qualitatively different manner in which we relate to images and stories.

It is in this sense that VR is calling for a reexamination of our "unwritten agreement" (hopefully opening a door to a new room in the house of storytelling) and grant us a different access to fictional worlds because of the different narrative logic consequent to VR cognitive involvement. Concretely speaking, this can be easily seen in the fact that the old "plot vs interactivity" dilemma (Crawford, 2013: 50) is the main one that emerged during our expert interviews with both the VR companies (mainly working on advertis-

ing) and single creators of VR texts. Finally, this new spectatorship goes hand in hand with a crisis of our traditional models of narration. Indeed, already with digital games the Italian semiotic literature (Maietti, 2004; Meneghelli, 2007; D'Armenio, 2014) had in common the intent of adapting both Eco's and Greimas' narrative concepts and theories to videogames. Moreover, key terms of narratology had also to be in part redefined (Aarseth, 2012). And this occurred not only with games but more generally with interactive and hypertextual texts, such as interactive documentary that transferred the enunciative task and problem of "how to make something whole from smaller fragmentary parts where, in both cases, these fragments are already whole". (Miles, 2014: 69) to the reader. Yet these adaptations can be, to say the least, at times very problematic and, without entering in the debate, it is clear that uncommon uses of a particular medium or technology are always possible and emerge in relation with narrative and interpretative possibilities: such as with writing that, from Mallarme's disposition of words on the page to Cortàzar's antelitteram hypertextual structure, never ceased to re-invent both itself and the act of reading (Vandendorpe, 1999). In this sense, VR must also be considered a social and cultural product not reducible to what VR products currently are from a technical point of view but should also be considered the latest result of an ongoing narrative (r)evolution.

5. The Utopic Body: *Behind* VR

Exactly as with narration, the technological description of the physiological impact of VR on the body and perception (both in sense of requirements and effects) is also not enough to explain by itself the interpretative processes resulting from such an involvement of the body. In many ways, VR other and outer spaces and bodies have deep mythological origins (Bittarello, 2014) and could be considered as the phenomenological fulfillment of these narrations.

It is on this point that a philosophical and anthropological conception of the body is required to understand why the new virtual reality seems to achieve the utopic condition of a being a medium that grants us access to a reality apparently "without mediation" and seems to achieve the ultimate illusion of being there by turning upside–down the past problem of the "suspension of disbelief" and introducing the new problem of "improper

distance" (Nash, 2018: 99). From a certain point of view, the experience of VR can be so intense and physical that wondering about non physiological causes of immersiveness could seem unnecessary. Indeed, how could we not believe to have really been on the *Everest* (2016) if we have seen its snow with our own eyes, if we felt tired of climbing and we really hurt our shoulder, if we looked with caution where to put our feet, if we had all the symptoms of acrophobia and thought "do not look down!", if we were stunned by the beauty of the mountain and of the sky, if we planned and followed a path, if we reached the top with pride and satisfaction, and most of all if we can perfectly remember each moment of this experience?

The most intuitive answer to this question would be something like "because we didn't feel cold", which is of course a paradoxical one as cold could be simulated as well.

Both through direct sensorial effects and indirect interpellation, virtual reality seems then to be the concrete fulfillment of the utopia of the body. However, this embodiment occurs not only at a purely cognitive level, but also at a social, cultural and philosophical one. Indeed, in a wonderful speech of the sixties, the French philosopher Michel Foucault highlighted how, at a first impression, our body is always here and never there: a pitiless *topos*. This body is "ici irréparablement, jamais ailleurs. Mon corps, c'est le contraire d'une utopie, ce qui n'est jamais sous un autre ciel, il est le lieu absolu, le petit fragment d'espace avec lequel, au sens strict, je fais corps. Mon corps, topie impitoyable". Then, consequently, he continued saying that it's against the body that all utopic places are born:

> L'utopie, c'est un lieu hors de tous les lieux, mais c'est un lieu où j'aurai un corps sans corps, un corps qui sera beau, limpide, transparent, lumineux, véloce, colossal dans sa puissance, infini dans sa durée, délié, invisible, protégé, toujours transfiguré; et il se peut bien que l'utopie première, celle qui est la plus indéracinable dans le cœur des hommes, ce soit précisément l'utopie d'un corps incorporel. (Foucault, 1966)

Now, such a description seems to fit perfectly the embodied experience granted by the modern Virtual Reality games where we can, finally, go against any boundaries of our usual bodies: we are given the possibility to be lighter than air (Eagle Flight, 2016), to move faster than light (Robo Recall, 2017), to be strong enough to move with our arms the blades of a

windmill (Virtual Virtual Reality, 2017), to have a never decaying body and most of all to look at us in a mirror (to really look at us in it, to the point of playing with it) and stop seeing our "ugly body and face" (Foucault, Idem) acknowledging ourselves as someone else. Whereas other media allowed us for extraordinary absences, such as living other lives in other times, and while digital games allowed us to apply intentionality and efforts into artificial worlds, VR has enhanced our experience by giving us a prosthetic body to live and move in these artificial worlds. Once again, VR is not the first nor only cultural creation that aimed at this experience of artificial distance:

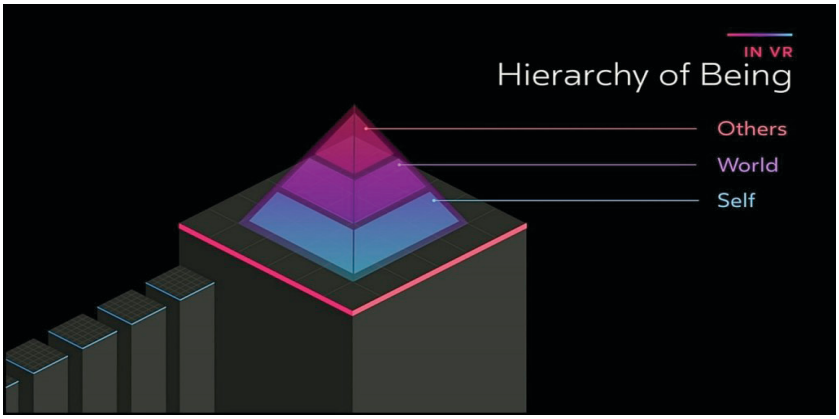
> Humans have always had the propensity to physically be in one place and to imagine being situated in another. Cinema, immersive theatre, puppetry, digital performance, religious ritual, and meditation practice are all examples of practices which create spaces and cultures of how virtuality can be imagined and represented, and which can transform or transport the bodies of participants or audiences. (Thomas & Glowacki, 2018)

VR can hence fulfill not only the dream of our absence, not only the utopia of occupying the position of the other by sharing a common body and point of view but can also physically prove and fake our own presence in these worlds. So, there are actually important philosophical reasons behind the success of the "new" virtual reality, and from these we can also see exactly what kind of different experience a VR game can give to a player by blending epistemological transparency with a psychological feeling of immediacy (Bolter & Grustin, 1999: 70).

Still, there is one last aspect that need reflection: the phenomenological illusion behind VR.

6. The Phenomenological Illusion: *Below* VR

By reading and listening to both VR designers and scholars, it is easy to find a common claim about the ability of virtual reality to create a kind of new self and new world by following a certain "hierarchy of being" (Rachitsky & Tewes, 2018).



This is created first of all through embodiment and determines both the effect of realism of VR and a new kind of immersive state that is presumed to not rely anymore on the representation–imagination mechanism. There is then a common belief about the fact that "Everything about you and your world can change' (2017: 55), so what is left? 'You are still there, at the center, experiencing whatever is present'" (2017: 55) (Thomas & Glowacki, 2018: 163).

Moreover, it is claimed that things in VR are different because "A participant who is transported to a virtual environment (VE) using virtual reality (VR) technologies is arguably not merely transformed, transported or extended but instead undergoes an intrinsic sensorial rewiring". (Idem). A rewiring that relies on a two–step layering of realities: "This layering seems to involve two processes: Firstly, perceptual mechanisms which inform bodily reactions to the visually perceived environment or virtual body (specifically the visual information received through the HMD) override the cognitive understanding or knowledge that the virtual world is not real (Slater, 2010).

Secondly, within the perceptual system itself, vision overrides other sensory input into the body. What is seen as virtual layers over what is known or felt as real or physical" (Idem). And it is for this reason that, following Baudrillard (1981) famous distinction, VR is supposed to be not a representation but a simulation. There is consequently this general idea of VR as something that needs no more interpretation and grant almost instantaneous understanding, a belief that have as a consequence a new kind of technological determinism discourse claiming that virtual reality

will change by itself our brain and vision of the world. Finally, since the 90's we can find the claim of VR being the ultimate empathy machine (Benedikt, 1991, in Bolter & Grustin, 1999) for its ability to allow us to change our "condition of being". And this claim is often supported by studies affirming that

> VR has been seen to occasion effects ranging from increased empathy following the illusion of inhabiting another person's body (Maister *et al.*, 2015), to the strong analgesic effect of distracting oneself from pain in one's own physical body during otherwise painful medical procedures (Li *et al.*, 2011). Moreover, just as VR experiences can relieve pain and encourage prosocial behavior, military–funded research has shown that so too can they be used to desensitize soldiers to potentially traumatic, violent situations (Rizzo *et al.*, 2012). (Murphy, 2017: 2)

All this has inevitably lead to what we will call here the phenomenological deception, which consist in conceiving VR environments as a true independent worlds to which we have direct access mainly through biological physical–sensorial involvement and universal cognitive tendencies (Murphy, 2017): as separate spaces of experiences that are so real that they can change ourselves in the "true world" and capable of almost neutralizing the first order reality. Once again, a very concrete example of this can be seen in the industry sector with Shelley Peterson's speech opposing traditional media requiring interpretation to visual technology such as VR and AR granting immediate understanding. In this last part we will argue against such idea, which is part of a broader contemporary come back to an old phenomenological conception (Paolucci, 2016: 30), but we will do this without going against the phenomenological–cognitive approach. Instead, we will follow the footsteps of previous semioticians interested in the relationship between Semiotics and Phenomenology (Eco, 1997) and try to enrich all these fundamental findings by putting them in a semiotic perspective of meaning–making creation and by focusing on three main problems: an upside–down conception of the brain, a simplistic idea of realism and an ingenuous idea of interpretation.

First, it is not VR that rewires our brain but other way around: it is the plasticity of our brain that allows for rewiring in different given situations (Costandi, 2016), including VR. This is significantly represented in the movie Perfect Sense (2011) that "shows" how we give meaning to the

world by interconnecting knowledge, memories and instantaneous sensorial inputs in many different possible combinations leading to different interpretation thanks to which we can both recreate a path and invent new unknown categories to grasp reality. Of course a movie cannot be used as a scientific proof, but the point is that discourses about VR are very often forgetting how complex is the mind's work to produce meaning even in "real life". So, for example, despite the "hot topic" of brain's visual system dominance as an explanation for immersiveness, a simple YouTube 3D audio experience with earphones and eyes closed can give us an incredible sense of presence and realism[4]. So, while it is certainly true that VR headset works in part as a blindfold, that both hide from us to allow us to see something more by extending our senses (Thomas & Glowacki, 2018: 146), in VR it is still because of the specific audiovisual contents that this "shift" can happen. Consequently, talking about senses being overridden is at least inexact: motion sickness is the proof that even on a physiological level the virtual reality is not so peacefully granted as a totally new reality. On the contrary the true content of VR experiences is precisely defined by combinations, translations and transductions from between the two worlds in which we simultaneously live in. For this reason, it is extremely interesting to notice how the studies on the first VR are of great importance today to remember how:

> The user of virtual reality is constantly aware of the discrepancies between the virtual scene and the real world, and that awareness is an important part of her experience. Because she is aware that her body is not adequately represented in the virtual environment, she begins to explore the limits of the embodiment that the environment does afford–to manipulate her point of view in order to test what "feels" right and what does not. (Bolter & Grustin, 1999: 253)

Secondly, it is fundamental to point out that realism is always the result of an interpretative process: many empirical experiments about photography have clearly shown that "neither the social nor the technical aspect of mediation should be reduced to the other" (Bolter & Grusin, 1999: 72) and we must resist to the temptation of explaining through sensorial immediacy and immersiveness the effects of VR.

4. https://www.youtube.com/watch?v=8IXm6SuUigI.

This is first of all true at a more superficial level of the interpretation and attribution of realism in relation to the expression level of the text. Indeed, the perfect simulator could trick all the senses of a spectator in VR game about going to the moon, to the point of making him suffocate if he leaves his spatial suit. However, if the player doesn't know about the lack of oxygen and gravity on the moon how could he ever think that this experience is realistic? Moreover, if he doesn't believe at all that mankind ever went to the moon, how could he think his experience as real? In other words, the "sensorial inputs" means almost nothing by themselves: your first jump in the water in *Subnautica* feels like being thrown into space in *Homebound*. Sensations works in VR exactly as any succession of signs that needs both a context and a dynamic process of semantic stabilization leading toward an interpretation (Eco, 1975; Eco, 1997; Eco, 2007; Paolucci, 2010). This is true for VR exactly as it is in games (Sicart, 2011) and so what we are feeling and witnessing in VR depends, once again, on our amazing semiotic capacity of translation that considers data from both inside and outside games to create the meaning we experience.

The success of VR games such as Job Simulator (2016) could not be otherwise explained and shows the deep significance of our embodied memory that is the result both of our cognitive evolution and of how things have shaped our mind (Malafouris, 2016). Furthermore, at a deeper and perhaps more philosophical level, the sensations felt are themselves a complex construction and the result of unconscious interpretative processes of the brain. This idea of the "feeling" (in its triple nature of the sensible, aesthesia and perception) being grounded on interpretation and in continuity with the domain of the logical is indeed at the heart of Semiotics and in accord with the most recent empirical data coming from disciplines such as cognitive sciences (Paolucci, 2016: 29–30); but more importantly is a fundamental perspective of great analytical importance against an ingenuous vision on the effects in VR that at the same time does not deny at all the specificity of the perceptive activity (Idem) and thus the relevance of the phenomenological conditions recreated by VR.

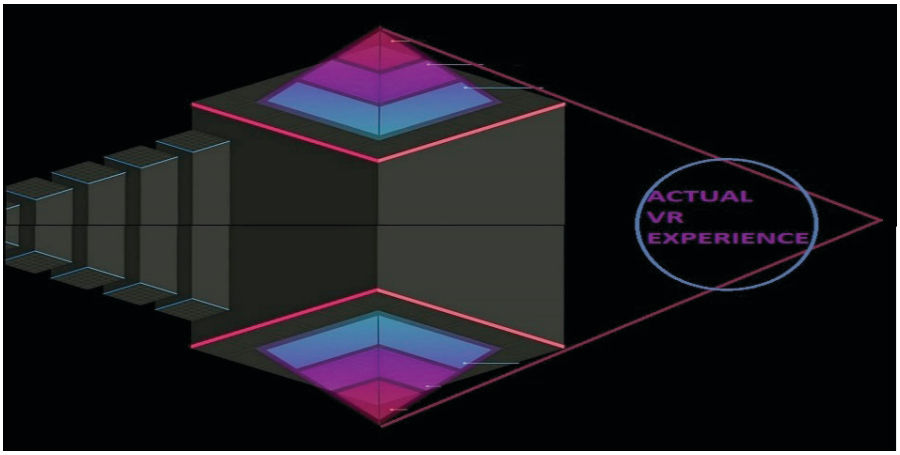
However, and this is our third point, a truly pure and perfect translation is almost impossible (Eco, 2003).

This is why it is so important to deny the idea of a "virgin embodiment" granted by VR for which the being of the player should depend on the choices of a designer and on the code that constitute the player's body and possible interactions (as in *Damaged Core* where we are told to be "a being of pure code"). Indeed, the "self" created in VR is always a prothesis of a first embodiment: the result of an imperfect translation, an imperfection demonstrated by the studies of the brain in VR activating the same zone but with different neural connections (Aghajan *et al.*, 2015).

In other words, it is only by taking modules of access and interpretation to reality that this "being" can exist as the result of a mediation: the new space is the result of the translation of an alterity through known models and the new subject is born from intersubjectivity. This means that there is no possibility of an effective cut between "real" and virtual body, that there is always a "continuous dialogue" (Thomas & Glowacki, 2018: 146): a claim easily demonstrable by the shift of feelings determined by the actual position of the physical body (as in Henry, 2016) and it is the reason why dancers experience VR differently than others (*ibidem*: 149). We can now see that Murphy (2017: 14) is both right and wrong when he doubts about the validity in VR of Vella's ludic subject (Vella, 2016): he is wrong because VR does not change the basic condition of this subjectivity, but he is right because the original "separation" is absolutely impossible even in non–VR games. This is indeed the final solution of Foucault's reflection about the utopia of the body by acknowledging it as a false utopia grounded on the common ignorance that any other body will always be nothing more than an extension of possibilities deriving from the first body which is not a *topos* but the exact opposite: a condition of infinite positions. This point is fundamental because it is the reason for which we bring in VR all our true and false beliefs about the world. Exactly as with optical illusion, it is not the "direct" sensorial access to an artificial reality that grant us the ability to interact and understand it, but the possible application of models and schemas learned in and through the beforehand ambient.

In conclusion, realism and immersion in VR are as much a phenomenological question of intuitive truth (*mimesis* of a model of experience processing and motor action volition) as much as a semiotic question of a lie (translation and cultural structures grounding our access to a semantized virtual reality and granting meaning to intentionality itself).

This blending of biological and cultural factors giving meaning to the player's presence and actions in virtual realities is actually the essential richness of today's VR experience and could be very well partially lost with the upcoming technologies of brain/mind–controlled VR games and interactive movies. In fact, whereas holding and drinking a cup of coffee only with thoughts could be defined as the "next best thing", several dimensions of meaning–making would be lost with the disappearance of a simple gesture that is part of our cultural memories and daily narration which, as we tried to explain in this paper, are part of the upside–down pyramid granting importance and meaning to the psychological and phenomenological situation created though virtual reality. That is why, in conclusion, the VR experience should be understood as a *third* experience in which the phenomenological intentionality with the virtual world (Zlatev, 2018) is semiotically grounded on an a priori encyclopedic world knowledge that is not only a technical question of explicit models and content's representation (Steed, 2014: 433) but which is already present in each prosthetically reproduced and consciously experienced sensorial stimuli and possibility of motor action that are meaningful precisely because they are subject to a user's interpretation through different forms of mediation depending both from the VR technology, the human embodied mind and the user's cultural belonging. Far from being an experience belonging to a substitutive first order reality, virtual reality is meaningful only because it is truly a *third* experience:



7. Conclusions

In this paper we suggested that different media can show us potentially infinite realities, but that each one can only grant us to have access and to experience these realities in a very specific way. We thus proposed to abandon a layered model of immersion and stressed out how this specific mode is the cultural result of mankind's continuous technical invention and evolution of media and cultural artifacts allowing for meanings experienced through different *forms* of mediated presence and absence. Then, we claimed that these differences on the level of meaning–making are what truly makes unique a certain experience. Consequently, we sustained our claims by highlighting the uniqueness of the VR experience from the point of view meaning–making connections between VR's technology, narrative logics, cognitive processes, philosophical and anthropological relevance, and finally semiotic translation. Lastly, we criticized an ingenuous vision of VR as a medium granting direct access to a virtual world and we proposed an alternative semiotic explanatory model capable of quilting the different dimensions of meaning–making involved in what can be defined as a VR "experience". We thus hope that our considerations will contribute to enrich the contemporary and future debate on VR, both for the scientific community and the creative community working on and with VR. Finally, we also wish to express gratitude once again to all those which helped and allowed our, perhaps methodologically unorthodox but nonetheless stirring, research.

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The Digital and the Spiritual

Validating Religious Experience Through Virtual Reality

Victoria Dos Santos*

Abstract: The fluid and flexible nature dynamic of computational media has facilitated a reconceptualization of the study of digital religion towards examining systems of believes, not only as they are performed and articulated in cyberspace, but also in the way how digital media and cyberspaces are being shaped by religious practice. This article aims at proposing Virtual Reality (VR) technologies, seen as modes to connect with spiritual objectives represented as valid instruments to perform acts of religion. Rather than a simple migration from offline to online contexts, they might also represent a different environment, with different conditions to allow and develop spiritual acts by themselves, with their own meaning making processes. Virtual worlds, and more specifically, spiritual virtual spaces are not less real than any other sacred space; and with this premise they are not less material. On the contrary, virtuality "is a fecund and powerful mode of being that expands the process of creation, opens up the future, injects a core of meaning beneath the platitude of immediate physical presence" (Levy 1998, p. 16).

Keywords: Virtual Reality; digital religion; digital rituals; digital materiality; avatar.

Foots naked upon a carpet, a chorus of voices singing loudly, the sound of a mp3 format music guiding the repetitive dance and gestures of a group: an ancient Sufi dancing ritual is being performed. However, all of the participants are wearing an Oculus Rift, as they move in a sort of common space that cannot be seen from outside. In another scenario a female avatar explain us how she often practices a techno–pagan ritual in

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a sacred space created by her, through some software, where the dispositions of magic tools and the representation of the four elements give her a deep sensation of connection with the deities. They are different situations, belonging to different religions and only one thing in common: Technological devices mediating the religious activity in order to connect with the sacred, as well as with other people and/or other environments: a sensorial experience of faith, happening in virtual worlds.

These activities, thought as an utopic science fiction film less than a decade ago, are a common practice nowadays in many religions, where the spiritual activities can go hand by hand with computational media. However, can we consider as natural these type of experiences, which are mediated by VR technologies and synthetically generated by a certain software? Is it necessary to interpret such experiences under the frames of real and unreal? How the process of development and propagation of cyberspace and virtual reality technologies create new strategies for diffusion of faith?

In contemporaneity, the conceptions of virtual and the real constitute the same environment or technological, social and semiotic ecosystem. Marshal McLuhan (1967) had already predicted how this 'electric era', dominated by new media, immediacy and globalization, would allow the development of what he called 'global village', where the revival of a tribal mentality would be the consequence of an electronic interdependence and the technological mediation.

If we consider that everything that extends a man is a medium, an object becomes a medium when it extends another object in some way or another. In the digital era, however, "we have extended our central nervous system itself in a global embrace, abolishing both space and time as far as our planet is concerned" (McLuhan, 1994: 3). This condition of hybridization between environments, produced by digital technology, generates new representations and new ways of interacting, moving and proceeding.

Computers are not innocent machines. Due to the growing evolution and success of internet, during the 90's, in fields such as entertainment, political and cultural communication, education, art, social networking and so on, digital computers evolved from "being a particular technology (a calculator, symbol processor, image manipulator, etc..) to a filter for all culture" (Manovich, 2002: 64). As a consequence, these devices are

mediating almost any social and cultural field with elements of their own nature. Computational media, as well as other technological digital devices, have become codified culture in digital form (Manovich, 2005): the interface modifies how we perceive and communicate when we are immersed in online territories. Moreover, their heterogenic use has created around them an almost mythical aura, in where the things mediated can no longer pretend to be unaffected.

Given their dynamism, simultaneity and immersive nature, online digital worlds are a highly attractive scene for practicing any intimal or personal activity, as in the case of spiritual traditions. VR platforms, as well as interactive worlds, have been spreading their applications to religious contexts, having a significant impact upon religious experience, formation and behavior. On one hand, we see a variety of traditional and nontraditional religions using VR as a tool to congregate and practice its own rituals. "On the other hand, we often find that VR platforms are perceived as a gateway to a different, often 'spiritual', reality" (Hornbeck & Barret, 2008).

1. Digital Religion, Some Notions

The use of computational media as a mediator of religious experience has become a common practice during the last decade. Both the migration "to the online" of traditional believes and the emerging of hybrid forms of spirituality are a clear consequence of how virtual worlds provide an exceptional territory to develop and basically practice any form of faith. Digital Religion (DR), as a category, answers to this phenomena of encounter between faith and technology. Heidy Campbell defines that intersection as "the technological and cultural space that is evoked when we discuss how online and offline religious spheres have increasingly become blended and/or integrated in our network society" (Campbell, 2004: 3). The term "sacramental space", contextualized in DR, refers to the adaptation of "symbols, rituals and practices" into the virtual and how technology is used for spiritual pursuits. "Contemporary society often feels isolated and disconnected", and therefore "…the Internet has come to represent another–worldly space allowing people to re–engage with issues of spirituality" (Campbell, 2006: 3). In synthesis, the practices

of believes in a virtual space creates new dialogues between technology and spirituality, with its own aesthetics formation, considering technology itself as a point of encounter, or even a medium, to connect with the divine. This represents the merging of all the collective and cultural texts we associate with religion and of all the elements we relate with a digital mediated society.

The field of DR has been understood in many different ways, as the influence of communicational media and information technologies increase. Hojsgaard and Warbung (2005) describe three different phases that marked the approach in both exploration and analysis of DG. In early nineties, by the novelty condition of religion mediated by internet, cyberspace was considered as a universe completely apart. The second wave came with a more contextualized and trustful perspective about the incidence of the digital context in daily life, as well as the migration of many aspects of society into the virtual spaces. In the third wave, corresponding to the actual and ongoing situation, religion traditions mediated by the digital media is considered to be another of the many existent practices, representing another aspect of religiosity where the division between offline/online, virtual/real, are no longer relevant. This article aims at proposing a possible forth wave: an exponential step in the level of hybridation between religious believes and digital media, where the emerging spiritual digital practices are the result of the intrinsic conditions of the virtual universe, understanding them as summarized by: "[…]A hybridized and fluid context requiring new logics and evoking unique forms of meaning–making" (Campbell, 2012: 4).

Folk culture and tradition are more latent in the world of contemporary technologies, so they are "busily recruiting and adapting new technologies to old purposes" (Bausinger, 1990). This is close to McLuhan's conception of how tribalized cultures, for being more sensorial with a pre–alphabetized structure, are more able to find themselves comfortable and in consonance with electric technologies, such as, for instance, computational media.

By those means, when mediation is considered as an inherent function of religion and digital media technologies are intended not only as technical innovations but, mainly, as cultural and social territories, the issue about digital religions is exactly the ways of practicing, understanding and considering religion in conjunction with emerging spaces. That is to

say, the territory where religious practices live and digital culture meet. Hoover and Echchaibi (2014) focused on the many relationships between digital media and the sense of religiosity in contemporary society. Actually, the concept of 'The Third Space of Digital Religion[1]' suggested that digital media has practically moved on from merely exploring the 'digitalization of religion' to a deeper level of analyzing how religion is actually constituted through digital media.

In other words, the particular conditions of the virtual space (considering it as a fragmented, interconnected and decentralized space) have determined the spiritual experience itself, contributing to processes which affect the traditional religions and that could have allow the manifestation of new religious experiences. According to this, Stewart Hoover assures that recent media have gone from limiting to explore the digitalization of information (Hoover, 2015) to a deeper level: to examine how religion is constituted through digital media.

2. The Spiritual Dimension: Virtual Reality as a Religious Tool

VR is a technological reproduction of the perception of the real. Nevertheless it corresponds to a pragmatic process, conditioned by the social realities: A constant interplay between culture, social relations and technology. VR, evolving into the field of New Media, refers to any audiovisual technology —more like a set of tools — allowing the interaction with a computer–simulated environment, representing a sensory and psychological experience of immersion through animated representations called avatars[2]. In Godwired, Rachel Wagner considers VR as "any form of digital technology that involves user engagement with software via

1. In his article, Stewart Hoover express how important it is for scholarship to move forward and study how religious tradition, authority and authenticity is changed through the process of digitalization.

2. In online digital worlds, people experience their presence through animated representations, called avatars. Human–controlled avatars engage in a variety of social practices. Oftentimes, avatars communicate in a chat–like manner, using voice or text–based instant messengers for private discussions. "However, the word 'avatar' is originally a Sanskrit word to literally referring to 'descent', referring to a voluntary descent from higher to lower spiritual ranks. In religious studies, it is often translated into English as 'incarnation'". For a deeper lecture about avatars in virtual communities, see Leone 2010, p. 8).

a screen interface" (Wagner, 2012: 1) so the conception of "virtuality", in this context, describes an experience enabled by digital mediation. VR can be considered as an alternative to reality or an alternative online reality, determined by the type of computer software defining the interface capable of conditioning the level of immersion a person can feel within the virtual world. In contraposition to other types of medium, virtual reality operates most often under the logic of transparency. For example, a three–dimensional–space flight simulator is a VR experience offering a natural sensation of driving a plane, even if the user is not inside a plane in the middle of the sky. The experience itself is generated by a software, creating a synthetic copy of the real world. The screen disappears due to the head–mounted display, portraying images which encompass the viewer visual field. The immediacy of virtual reality derives from that 3D immersion and from the capacity of interaction it allows.

In contemporary human–computer interfaces there are many different, and often radical, possibilities to improve, evolve and experiment social and cultural activities. According to Lev Manovich, VR not only gives us the possibility to travel to geographically distant and to nonexistent three dimensional spaces (Manovich, 2013) but as well, through the relationship with computational media we can engage into a dialogue with the system. The term interface describes the way in which the user interacts and communicates with the technological device and how integrates the metaphors to contextualized and understand the pragmatic and syntagmatic organization of computer data

The interface, according to Manovich, has become a key semiotic code of the contemporary society of information as a compendium of signs and visual texts to be decodified by the user. Independently of the kind, the interface specifies the interaction between two entities by translating into a recognizable code the actions to be taken so that the user can access and interact with the system. These systems restrict the user's view to what is displayed on a monitor, or in what the subject can perceive within the headset. A defined interface represents the key element to the level of immersion these other realities can transmit, that's to say, "the degree to which a person can feel wrapped in the virtual world" (Rojas & Rebolledo, 2014: 888) by means of the level of transparency. "In this sense, a transparent interface would erase itself, so that the user is no longer aware of confronting a medium, but instead is deeply inside it; encountering, in

an immediate relationship, with the contents of that medium" (Bolter & Grusin, 2000: 23–24).

Continuing with that perspective, a religious performance in the virtual world can be easily enhanced thanks to the qualities of interaction and immersion that these environments proposed, as well as other disruptive characteristics proper of digital media related to time/space conception, a subject that will be later deepened in this article. Virtual Reality is often described as a medium which allow us to see and hear things in ways we haven't experienced before. Furthermore, VR technologies also generate the 'real' sense of being present in a 'virtual' scenario, as well as natural responses to the experiences which are being produced. Experiences that can be lived are genuine and real.

These media are 'granting' us a new kind of increasingly ubiquitous access to reality, by filtering it and changing the related things. In these technological media the 'reality' becomes multiple and the experiences offered become commonplace. Non–existing scenarios in the offline world can be simulated, co–created or even proposed. Human experience consists of "many worlds" (James, 1983) or "multiple realities" (Schutz 1973), "countless, separate social worlds, each of them with its own internal logic and principles of organization"(Chayko, 1993: 172). Indeed, as an experiential medium, it revolutionize the logics of storytelling and the rules of meaning–making, optimizing the systems surrounding us.

Considering the characteristics above cited, it is not a surprise that VR works as a coherent and powerful tool to perform, organize, expose and guide religious activities. Independently on the type of faith or its exclusivity, the exponential presence of digital context in social areas has encompassed and merged with a wide variety of traditions of faith: from Catholic Eucharistic and Buddhist meditations chambers to Muslims prayers and Wiccan rituals recreated in a sort of virtual magic forest. Other practices related to spirituality, like meditation, have also been proposed and carried out through digital discourses, indeed in the form of video games. VR medium technologies allow the possibility to follow and practice almost any religion tradition in virtual worlds in a multiplicity of ways, also considering that the more a religion is wired the more it incorporates the values of the software it embraces (Wagner, 2012).

In the early use of computational media for religious pursuits, as for example cyber–churches, the mere copy of the offline activity using digital technologies could basically be found. Typical examples were audios to spread ceremonies, podcasts or videos to offer sermons to members of a given congregation. However with the boom of internet "religious groups are now embracing and shaping a variety of technologies, such as Second Life or its VR equivalent Samsar, "to create an online worship experience that offers interactive worship via avatars (Campbell, 2013: 1).

3. The Semiotic Perspective of Intertextuality

"There is only software" (Manovich, 2013: 152). This supposes a new paradigm in the context of convergence of media with cultural life and in the perspective of technological integration. According to Manovich, it is not about inserting a new software into an old technology, but to separate them from their physical supports and turn them into software, so they can interact and produce hybrids that would allow to combine media's properties and techniques, generating new representations and ways of interacting.

For Manovich, this hybridation is due to the patchwork of techniques, methods and ways of representation of old and new media into the software context. This would conduct the idea of thinking the human–technological integration from a semiotic of intertextuality as Roland Barthes understood: "The intertextual in which every text is held, it itself being the text–between of another text," (Barthes, 1977: 160).

According to the reflections of Barthes, the text could be considered a network of liberating possibilities, so more and more the conception of religious traditions as closed entity fades (Barthes, 1994). The Barthesian text is a productive practice in which the reader acts as an author: all writing continues to build indefinitely, and it is for these reasons that the text is a liberating practice: It does not stop, but continues to be fertile, and at the same time allows the reader to open new chains of meaning. Heidy Campbell (Campbell, 2004) considers that:

> The attention is on the message over the producer, the textual creation instead of the text creator. These texts focus individuals on representations of reality. Im-

> portance is placed on conceptions of what they are interacting with on–line, over what is behind the words. […] The focus becomes gathering data. (pp. 213–214)

Semiotics, seen from a textual perspective, allows to work with digital religion as a text, intended as a continuous process of meaning construction that does not close and is not defined, in order to explore how new relationships are taking place in a textual space, and not as a sociological problem of culture. Similar to a reader, the practitioner produces meaning in his performance or contact with religious material, but the meanings are not fixed, since the work is not a product but a significant practice, as Roland Barthes rightly states. The text is no longer about static, taxonomic and formal systems; but of systems of production and writing.

Understanding the world as an infinite network of linked phenomena, digital space embodies these characteristics by being a network of connections, a collective territory. Julia Kristeva, describes it with her notion of intertextuality, by ensuring that each text is composed of multiple writings that, when coming into contact, form a dialogue, generating other discourses and entities: "[…] Any text is constructed as a mosaic of quotations; any text is the absorption and transformation of another. The notion of intertextuality replaces that of intersubjectivity, and poetic language is read as at least doubled" (Kristeva, 1978: 190).

Under this perspective, the individual, and the religious practice, is built and transmutes incessantly in the virtual sphere, expressing what it means to be textual: a multidimensional space, where a variety of speeches collapse and mix together.

According to Nunes, in the virtual world of the Internet:

> Our words are our bodies, an aporetic copula that forces a reexamination of 'the body' as both physiological (noumenal) entity and phenomenological experience. In each instance, Internet provides the medium for disrupting models rather than confirming them. […] Internet might present a seduction rather than a subduction: a challenge to modernity's assumptions of self and body, of individual and community. (1995: 326)

The texts presented become the defining factor of who the user is in cyberspace. Through text, readers construct mental images, not only of the otherness, but also a reconstruction about traditional practices now in-

habiting virtual worlds. In the case of faiths and systems of believes, the intertextuality between religion and digital media technologies can provide new conception about both of them. In other words, this pragmatic level is based on the human–computer interaction that changes not only the user's roles and perspective, but also the computer functions and the perception of the religious.

4. Enhancing Religion in Digital Worlds

If the spiritual realm has meant a medium to connect people with metaphysical spheres, what it has in common with digital technologies is that both of them share that characteristic of mediators, "uniting the visible world of human interaction with the invisible world of spirits" (Witte, 2017: 1), between the real and the ethereal, the terrene and the spiritual.

Many of the characteristics of virtual territories can have an allegory with religious elements and narratives. Margaret Wertheim summarizes that "nothing epitomizes the cybernautic desire to transcend the body's limitations more than the fantasy of abandoning the flesh completely by downloading oneself to cyber–immortality" (Wertheim, 1999: para. 10). This association with religious phenomena makes even more sense when we consider that the user in cyberspace can have access to strategic information by acquiring certain powers only enjoyable by deities. Without physical limits, avatars can move freely into any location. The fact of going beyond the limits of time and space through communications between digital media could be compared to some religious ideas where only divine beings can exceed the limits of body and mind.

On the other hand, the ability of cyberspace and digital technologies like VR to generate religious meaning does not specifically derive from the relationship it has with its 'offline' objects but from the creation of other signs, from other forms of symbolic representation which interprets it[3]. This also considers the capacity of computational media to not only adapt but also create objects and practices through processes of textual production. Therefore it results important to consider how in the area of spirituality and sacred believes, into the digital context, it is possible to

3. Something that can be adjusted to the triadic dynamics of Pierce, according to Zecchetto.

find popular culture narratives and practices working as religion, due to the interactivity between digital media and social/cultural expressions. William Gibson's Neuromancer (1984), regularly associates VR's immaterial properties to concepts of heaven and transcendence. Researchers working with immersive VR platforms have described them as a "mythological space" (Pesce, 1997). Julian Dibbell, creator of Second Life, assures that VR can be a sort of spiritual experience.

At the exact moment a religious practice takes place into the digital context, new chains of meaning will start emerging, even if the object was a traditional ritual belonging to the offline world. The digital realm and VR technologies possess on their own different conditions and ways of perceiving time and space, 'contaminating' the discourses they mediate. The texts being produced in a virtual world cannot be completely judged by an approach not contemplating the advances and importance of digital technologies in contemporary cultural and social movements.

Signs and discourses cannot pretend to be understood out of the context where they are produced, as well as they do not only depend on their basic semantic meaning.

> Meaning emerges by the interaction of values and signifies in relation to the cultural interpretations that comes out from the contextual elements where the communication is verified. They are understood as the relations of meaning, because potentially all meanings are affected by their location in a semiotic network. (Zecchetto, 2002: 179)[4]

Markus Davidsen (2013), in his work about the conceptualization and validation of Tolkien's emerging religion communities, criticizes Adam Possamai when he referred to distinctively religious movements and milieus as 'hyper–real religions'[5], similar to Carole Cusack's term of 'invented religions'[6]. Davidsen, on the contrary, used the term 'fiction–based reli-

4. Original text, in Spanish: "El sentido se descubre mediante la interaccion de los valores y significados de los signos en relacion con las interpretaciones culturales que brotal de los elementos contextuales donde se verifica la comunicación. Estas son las relaciones de sentido, ya que potencialmente todos los sentidos son afectados por su ubicación en una red semiotica".

5. Adam Possamai assumption of Hyper–Real Religion (2005, 2009, Ch. 6, 2012).

6. To read more about Cusack's term of 'invented religions' see Cusack, 2010a.

gions'[7] considering that even if they are not conventional, that doesn't make them less real or 'hyper', since they possess rites and communities practicing them. Besides for Jean Baudrillard all religions where hyper real[8]. He draw up, as well, an analytical distinction between religion and play, "which makes it possible to distinguish between religious use of fiction (fiction–based religion) and playful engagement with fiction (fandom)" (Davidsen, 2013: 380). This assumption can also help us to infer that even if the uses of VR can be more related to 'the fictional', it is not less efficient or serious when it comes to the use of technology focused into religious aspects: to perform a ritual, to open or enter into virtual religious spaces, to connect with other members of the community, to meditate, and so on.

Nevertheless, not every use of VR, working with some religion narrative as in video games, represents a religious performance on virtual spaces, though many of the ways religious activities, especially rituals, are performed through VR technologies, is by using narratives similar to Role playing Video Games[9], like Second Life and Sansar, where virtual communities can interact.

Under that conception, Ritual[10] performance into the digital indeed applies a lot to video games idiocrasy, which are interactive and have so much more to do with activities changing our behavior, particularly for games involving ritual practices. Similarities between the behavioral structures in ritual and video games lies mainly in things the believer/gamer can and cannot modify. In the ritualistic act of entering into a magic circle, for example, the practitioner/believer is also entering into a dif-

7. To read more, see M. Davidsen, The Spiritual Tolkien Milieu: A Study of Fiction-based Religion, Leiden University 378 (2014).

8. Even if Baudrillard never applied his sign theory to contemporary religion, he actually develops his key concepts of simulacrum, simulation and hyper–reality contextualized in the discussion of the Christian concept of God (1994: 1–7). Baudrillard's theory points out how, in postmodern times, media is not a simply mechanism for the transmission of information, but instead, actively construct knowledge and affect social behaviors and normativity, so the conception of reality is, in fact a media–constructed 'reality'.

9. By the means of this article, there will not be an extension into this subject. To read more about the similitudes and structure of video games and religions see Rachel Wagner Wagner R (2012) Godwired: Religion, Ritual and Virtual Reality. London: Routledge.

10. Ritual, according to Roy Rappaport, it is the ground where religion is made. As well as: "the performance of more or less invariant sequences of formal acts and utterances not entirely encoded by the performers" (Rappaport, 1999: 24). Wagner (2012), on the other hand, consider ritual as a doing and as an activity. To read more, see Rappaport R. (1999) Ritual and Religion in the Making of Humanity. Cambridge University Press.

ferent space/time, following certain instructions and/or assuming a certain archetype which will leave some kind of experience even if it doesn't change the actual reality of the subject. In online virtual worlds, solitary practitioners or religious communities can reunite as avatars, entering in that space through a ritualized process of logging in (Wagner, 2012). The sacred, then, is believed to be manifested in those territories during the ritual, following Mircea Eliade's concept of Hierophany[11], which denotes the presence of the sacred in any object — it could be a physical stone or even a digital three, for instance — as a "wholly other", differentiating from other objects of the same categories.

Religious social behaviors could be learned or modified in virtual environments, as the avatar immersion contributes positively or negatively to users' attempts to meditate or pray. When people interact with others for significant periods of time, using avatars in virtual world's dynamics, new forms of social interaction will emerge; however what that means for the human perception and cognition will only be understood many years from now. However, the effect of avatar on social interactions and dynamics in VR enters in consonance with what is knows as digital embodiment, a concept that Katherine Hayles had investigated deeply and can be described as an experience of embodiment which grants a state of individuality, without considering to possess a central or universal code which determines all the experiences. According to her there is no body, there are only bodies. The body functions as a series of couplings with other elements and it is defined by how it is attached to other entities or discourses.

By establishing cyberspace as the scenario where these practices of encounter between religion and digital media are manifested, their 'immaterial' representation seems to be minimized by the impossibility, or non–presence, of a body as well of a sacred physical space. Different points of view might however be encountered in the academical debates.

5. Materiality And Validity Of Virtual Spiritual Territories

In a contemporary society integrated through networks and phenomena such as Artificial Intelligence (AI) and the internet of everything, the

11. M. Eliade's concept of Hierophanies refers to the 'Showing of the Sacred'.

human being is, then, an integrated being between two environments, the offline and the online. The environments, instead of differentiating, complement each other. In such instances, we have become experts at entering and exiting frames, but at the same time we have a lot of difficulties to understand the diverse natures in all the different "realities" we are participating. Frames are, nowadays, much more permeable than ever before.

Classic conceptualization are insufficient to understand the variety of experiences which are possible nowadays, that is to say that the conception of unreal, hyperreal, immaterial or simulacra result limitative at the moment of evaluating these spaces, not measurable or categorized with modern procedures. Contemporary digital technologies transcend the classic schemas and produce other ways of symbolic production. Following that logic, the Internet is neither a good nor a bad medium, considering that the interaction between people and in the virtual world:

> Both strengths and weakness manifest in the technology, here the Internet blurs the boundaries of what is real and virtual, as technology which both unifies and alienates. Therefore, a different and more balanced approach is necessary to understanding the complexity of the Internet. (Campbell, 2004: 210)

For Pierre Levy, the digital context could be seen as the technical foundation of virtuality, and the latter as the distinguishing feature of information technology. The translation to digits, that is, to digital codes is what characterizes the virtual world in which we are immersed. The popularization of digital technological artifacts has absorbed other media and disrupted social functioning. In turn, they accompany and accelerate a general virtualization of objects, experiences and relationships.

For Levy, internet has not changed the concept of space and time, but properly space and time, since if an information system modifies our environment of proximity, things that seemed distant before now approach and enter into our space of experience (Levy, 2007). In addition, it has allowed people to become aware of the existence of a time and a space not confused with human events. Despite its characteristic of intangibility, the virtual has always been another dimension of reality, therefore it is not the opposite of the real, but rather the opposite of the actual. Virtual entities are de–territorialized, they can be in different times and places without

being definitely present in any of them, so, like words, the virtual exists without necessarily being in a specific place.

That is why the virtual can be described as an infinite chain of possible updates. In the technological context, it is a condition of the digital and in these terms it occupies, in a multiple and simultaneous way, a space and a time. However, when talking about digital texts, it is difficult to locate and delimit them on maps: fix them inside as stable points or reference centers. This happens because the virtual worlds we access from digital media are not anchored under a dominant system code. The digital space, conceived as a semiotic system, is a network formed by icons, indexes and symbols not having a hierarchical or integrated organization, but on the contrary it is a "fragmented and interconnected macrosystem" representing "thousands of information systems" (Hernández *et al.,* 2012: 99) generating communicative processes, led by features such as connectivity and ubiquity.

Many of the activities having place in virtual worlds have reached a high level of immersion and transparency, thanks to interactive features as haptic feedback, lifelike graphics and surround sound, so Virtual Reality nowadays can take the user to simulate online scenarios or it can create new ones with 3D objects and other virtual elements. Nevertheless the assumption about virtual objects and places to be immaterial remains open, and lots of academics debate about it.

Richard Kedzior, in his article How Digital Worlds Become Material, uses the perspective on materiality from scholars such as Appadurai (1986), Kopytoff (1986), and Miller (1987, 2005), since for them, "the materiality of consumption is not just a projection of socio–cultural conditions, but also an active agent of change able to structure action, create new meanings, and enable social connections" (Kedzior, 2014: 15).

In the case of Miller (2005), he states that "different understandings of immateriality become expressed through material forms" and religion is a powerful example of this when in many traditions the approach and understanding of god is mediated through temples, sacred objects, or rituals. From this perspective, "the material is not only what is tangible or physical, but also what is culturally significant, meaningful, or consequential" (Kedzior, 2014: 15). As Miller argues, the definition of materiality needs to consider "the large compass of materiality, the ephemeral, the imaginary, the biological, and the theoretical; all that which would have been external to the simple definition of an artifact" (2005: 4).

Digital materiality emerges, then, "as a set of arrangements between intangible graphical representations, digital artifacts, or simulations, experienced by consumers through the mediation of computer screens (Kedzior, 2014: 15). Even if they lack of physical material properties, digital elements can be considered material when we approach them through the prism of practical instantiation and significance (Leonardi, 2010). Thus, in the process of digital consumption "what matters most about an artifact is not what it's made out of, but what it allows people to do" (Leonardi, 2010).

6. Conclusion

Social actions, interactions and institutions are continuously transformed by technologies. In contemporary times digital devices and its virtual spaces are increasingly present in daily and common life. The influence of the digital in contemporary societies has affected even the way religiosity is understood, and for that reason the study of the scope of faith cannot be thought outside the technological sphere. The intertextual dynamics between offline and online categories implies new ways of symbolic production and new ways of understanding them, allowing the development of emerging ways of practicing and understanding religion. Virtual Reality is one of those technologies, which is framing reality in still ambiguous processes, changing the way spiritual traditions and systems of faith are lived into the digital context.

When it comes to religious performance through VR technologies, it is necessary to consider the effect of the application of VR on religion as a cultural or a semiotic process. The point is to consider the experiences it allows rather than limiting to think about the validity of the real/unreal. As Mann (2019) indicates:

> Thus, while the experience of a physical pilgrimage to Mecca may not be easily replaced by joining that of another in VR, it is apparent that VR experiences offer something of the 'real thing'. Nevertheless, how religious communities will value these immersive virtual experiences relative to the 'real thing' remains to be seen. (p. 199)

The development of VR applications has increased exponentially since less than a decade and the availability of software for the creation of immersive apps are more simple and affordable. However, given that the use of VR for social and cultural pursuits is still quite young, it is not clear the long term consequences which will occur for the contemporary religious scenario. Nevertheless, since the mediation of computational media is growing exponentially, a reasonable thought would be that the use of VR in religious rituals or activities will grow, considering that, there is a continuously significant growing interest in developing apps relevant to religious purposes.

Another important aspect is the opposition between the virtual and the material world, which has been the center of discussion in many of the studies about cultural practices in digital media. The assumption of a certain materiality of virtual technologies, by viewing digital media as material objects in their own right, considers virtuality as the foundation of any digital environment. This is not meant to be opposite to reality, but to what we consider to be 'actual' and how, under this perspective in all these multiplicities of possible actualizations, the virtual occupies not only an space but also a time to be performed.

A key point for future investigations, under the semiotic point of view, would be to analyze how do digital worlds become material and, from it, to consider the level of materiality close to the level of significance this digital worlds acquire for users. Natural experiences, synthetically generated, can also be determined under the frames of real and unreal and how do they define and interpret such experiences. As assured by Heidi Campbell, when technology is understood as a social process "it is possible for different social groups of users to shape technologies towards their own ends by the ways they use or modify a given technology" (Campbell, 2005: 3).

This stress originated by digital media technology is clearly seen when exploring the idea of cyberspace and its roots in science fiction. Cyberspace is a metaphoric image of an imaginary world existing beyond the computer screen. In science fiction, cyberspace —especially in the work of William Gibson carried out nearly 30 years ago — was, or could be, a realm of total–immersion. Virtual Reality, in fact, epitomizes a human desire to merge together with technology and transcends the limitations of the physical/offline word.

In a world increasingly mediated by technology and machines, the words of the Japanese academic and robotics expert, Masahiro Mori, resonate, referring to the Buddhist implications on the robot and its metaphysics (Mori, 1985): "we need to learn religion". It is precisely in digital religion that the same evolutionary process of software can be observed, which was described by Lev Manovich through two biological words: hybridization and evolution.

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Tecnica, virtualità e paura

Su una versione dell'angoscia contemporanea

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English title: Technology, Virtuality, and Fear. On a Version of Contemporary Anxiety

Abstract: Fear is the common denominator of a vast battery of contemporary phenomena, which in other respects would seem unrelated and, in some cases, even baffling. The version of fear that interests us has to do with the contemporary digital revolution. Here, fear is not necessarily related to some punctual facts, but is nevertheless at work in the production of protected spaces: within these spaces, shielded from interference, the subject strives for a homeostatic enjoyment, a condition secured against the irruption of unexpected events. In this light, virtual reality tells us something about the deep nature of technology.

Keywords: Fear; Technology; Virtual reality; Technophobia; Society.

1. Nel tempo della paura

La paura è il minimo comun denominatore di un'ampia batteria di fenomeni contemporanei, che sotto altri profili parrebbero irrelati e in taluni casi perfino inspiegabili. Ortoressia e salutismo, xenofobia e chiusura in safe space reali o virtuali, congiure di élite e pulsioni di masse imbarbarite, cospirazioni di multinazionali, pericolo nelle strade da parte di estranei o nell'intimità delle case da parte di familiari, rischi ancora nascosti in mezzi di trasporto in realtà sempre più sicuri o in elettrodomestici di uso quotidiano, ~~epidemie incombenti e~~ catastrofi naturali, egemonie ne-

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oliberiste e sviluppi della globalizzazione, relazioni tra sessi, tecnofobia, apocalissi climatica, ~~acuta nostalgia di un passato mitizzato~~: in queste e altre varianti, ognuna delle quali meriterebbe un'analisi a se stante, la paura è onnipresente (sia pure con ruoli architettonicamente differenti: ovvero come ingrediente diretto o come motivo di una reazione). Essa, per così dire, attende solo di manifestarsi, in qualità di sentimento primario e dominante che in realtà non bada troppo al contenuto specifico di ciò che viene temuto, tantomeno è disponibile a un'analisi "fredda", di tipo statistico e comparativo. D'altronde, in questo caso non sarebbe davvero paura.

Due precisazioni. La paura è davvero un sentimento necessario e utilissimo. È davvero opportuno guardare a destra e sinistra prima di attraversare la strada o fare caso ~~all'odore del cibo che stiamo per portare alla bocca~~. Più in generale la paura, per noi non meno e forse più ancora che per gli altri animali, è una dotazione istintiva essenziale, che riduce grandemente la complessità delle decisioni e ci permette di attivare in tempi più brevi strategie di evitamento o, più raramente, di attacco. Ad essa, detto altrimenti, dobbiamo la nostra sopravvivenza come specie oltre che come individui. Il problema nasce, come sempre, quando un sentimento diventa esclusivo o almeno dominante, ovvero se esso diventa la regola del nostro stare al mondo. In un certo senso, le paure che diventano regola tendono a occupare tutto lo spazio della conoscenza ovvero prevaricano su di essa. Qui potremmo riconoscere delle responsabilità alla classica analisi di Jonas; o più esattamente all'uso che ne è stato fatto. Ad alcuni essa è sembrata suggerire che essendo la paura precisamente una forma di conoscenza, alla fin fine ne fosse l'epitome più efficace anziché una forma parziale e *pro tempore*, da integrare e superare[1]. Detto altrimenti, si è scivolati dalla sacrosanta rivendicazione dei limiti che ci impediscono di *determinare* le conseguenze future, da una filosofia antiutopica della responsabilità e dell'incertezza, antidogmatica e fallibilista, che insegna a mettere nel conto anche la vulnerabilità, ad una

1. Jonas (1990). Puntualizzo: ritengo che la dinamica che riconduco a Jonas non sia il fattore decisivo. Le motivazioni fondamentali sono da riconoscere, ritengo, in svolgimenti sociologici e psicologici che l'autore di origine tedesca non poteva presentire. Potremmo sostenere che la temperie culturale successiva abbia parassitato le sue idee, di solito senza riconoscerle direttamente eppure in qualche misura usandole come fattore di legittimazione. (Tra le altre poche analisi degne di nota della paura e dei suoi effetti, cfr. i saggi di Furedi, 2006[4] e 2018, e Svendsen, 2007).

scorciatoia di semplificazione che rinuncia a con[illegible]re e comprendere, e che proprio laddove la sicurezza è più garantita ne coglie con sempre maggiore spavento le inevitabili lacune.

Seconda precisazione. Naturalmente, è difficile, se non impossibile, nutrire tutte le paure *insieme*, a[illegible]e se combinazioni di due o tre, in proporzioni diverse, sono la regola. ~~Il~~ sentimento ~~di p~~[illegible]~~s~~ fluttuante si orienta verso un'espressione oppure un'altra a seconda di fattori psicologici e ideologici variabili e spesso incompatibili[2]. Ne deriva che chi è in balia di una paura è certo in grado di riconoscere esagerazioni ed esasperazioni *altrui*, ma è selettivamente cieco rispetto al *proprio* timore (che in un certo senso dovrebbe al contrario essere proprio ciò che andrebbe analizzato e controllato con maggiore urgenza), il quale gli sembra incontrovertibilmente giustificato anzi autoevidente. *Demitizzare*, così, è principio sacrosanto, ma che riguarda sempre gli altri; mentre invece, a rigore, esso è qualcosa che dovrebbe riguardare anzitutto se stessi e i propri miti. Al contrario, la propria paura è la scoperta di un fatto assai grave, non l'invenzione di uno spauracchio segretamente autoconsolatorio, perché giustificatorio, come quelle degli altri. Ciò tra l'altro rende quasi impossibile l'ascolto reciproco delle paure, che forse potrebbe essere una buona terapia per provare a controllarle.

In questo modo la paura si autoavvera: come è noto, più coltiviamo una bolla più questa coincide con il (nostro) mondo; e dunque, detto dal lato delle conseguenze, più temiamo disgregazioni più ne aumenta il tasso. La paura in effetti, come vedremo anche in seguito, ha la conseguenza di definire potentemente un'identità attraverso un sentimento condiviso e totalizzante, diverso e talvolta contrapposto a quello altrui. Le gated community dei credenti nel complotto o dei fanatici della forma fisica, possono non avere niente in comune — eccetto precisamente di essere una gated community che si definisce per la paura che condivide[3]. Si noti: essere definiti da un sentimento del genere significa venire tendenzialmente espropriati della propria agency in favore di uno s[illegible]s decisivo e "oggettivo", una definizione ineluttabile di ciò che siamo.

2. Come si sarà compreso, l'elenco precedente cercava volutamente esempi da uno spettro il più possibile ampio in termini sociopolitici.

3. Ho già detto che le paure sono presenti con due ruoli architettonici diversi. In questi due casi, nel primo la paura del complotto, in una sua versione o un'altra, genera direttamente la propria comunità, mentre nel secondo la paura del decadimento fisico la genera indirettamente e per reazione.

Individuare le cause di questa situazione e le sue ricadute, e analizzare man mano alcune di queste istanze riconoscendone le affinità, tanto più forti quanto più tipicamente inavvertite, è compito rilevante, direi anzi urgente. In questa occasione però mi limiterò a descriverne una variante. La versione che ci interessa ha a che fare con il mondo della rivoluzione informatico–digitale. Nell'ultimo paragrafo seguirà infine un'ipotesi, derivata dall'analisi svolta, relativa al significato generale della tecnologia.

2. Il nuovo mondo

Le coordinate di un nuovo mondo sono sempre a rischio di suscitare una certa inquietudine mista a speranza. Il nuovo mondo digitale non fa eccezione. Che esso generi, e soprattutto abbia generato, una consistente batteria di speranze, è certamente evidente. Tutti ricordiamo il momento aurorale in cui la promessa di internet era conoscenza, democrazia, condivisione. La grande scommessa era che proprio la nuova architettura sarebbe stata foriera della rivoluzione. Dal basso e orizzontale anziché dall'alto e gerarchica: non solo, per definizione, una forma maggiormente democratica, ma anche, grazie ad essa, non semplicemente una conoscenza più ampia ma di tipo qualitativamente diverso. Preparato da una batteria diversificata di riflessioni "alte", dal rizoma di Deleuze–Guattari alla nozione di intelligenza collettiva nella ricerca entomologica (con significative applicazioni informatiche, come la *swarm intelligence*: intelligenza senza controllo centralizzato e gerarchico), e da una temperie culturale diffusa, il progetto era dunque di fare della diffusione orizzontale anziché della propagazione verticale una struttura cognitiva alternativa. Dal punto di vista della garanzia epistemologica, la stessa forza bruta dell'accumulo dei dati avrebbe svolto una funzione egregia. Cosa importa il parere degli esperti e dei competenti quando la massa degli utenti si esprime e irresistibilmente individua la gelateria migliore della zona, ovvero partorisce una verità su una spinosa questione storica grazie all'integrale di centinaia di pareri parziali in una voce di Wikipedia? Cosa mai può andar storto[4]?

4. Per alcune espressioni classiche di queste tesi cfr. ad es. Kelly (1995); Shirky (2008, 2011). In generale la cybercultura che ha come epicentro la Silicon Valley ha nutrito e nutre idee di questo genere (anche con funzione di autolegittimazione).

Ma la domanda prevalente oggi sembrerebbe: cosa è *andato* storto? Si potrebbe notare, ad esempio, che Wikipedia è stata investita da una crisi di aggiornamenti e certamente anche di credibilità (almeno per coloro che sono abbastanza esperti da sapere valutare la qualità di una voce: col che si ritorna alla dialettica tra numero "democratico" ed élite "aristocratica", evidentemente non così decisa); ma forse la difficoltà è più generale. Da un lato i big data hanno evidenziato in pieno i lati di rischio per gli spazi di autonomia del soggetto. Come tutti ormai abbiamo imparato, mentre produciamo tendenze, orientamenti, sapere gli algoritmi estraggono conoscenza su cosa cerchiamo, pensiamo o acquistiamo, alla fin fine su chi siamo. Inoltre gli stessi algoritmi orientano e censurano, e mostrano quanto la promessa democratica ricada in capo alla responsabilità di decisori occulti o in alternativa, e forse ancora peggio, anonimi. Tutto ciò non ha mancato di suscitare legittime inquietudini[5].

Dall'altro lato, e in maniera più centrale per il nostro tema, la sovrabbondanza incontrollabile delle informazioni produce effetti di chiusura e autosegregazione che sono l'analogo perfetto di alcuni dei fenomeni cui abbiamo accennato nel primo paragrafo. Il fatto è che questa realtà imponente e intimidatoria di informazioni, dati, notizie, interpretazioni, ecc., non è padroneggiabile dall'apparato cognitivo del soggetto (con i big data, occorrono appunto estrazioni algoritmiche per individuarne sensi e risultati). È necessaria una drastica semplificazione, che è precisamente quanto si incarica di fare la logica dicotomica delle bolle. All'interno del catalogo delle paure, tutte fondate e tutte fasulle, nell'epoca in cui ci è stato insegnato che una volta abolito il principio di autorità non dobbiamo più credere agli esperti, nessuno di noi è in grado di orientarsi con sicurezza, salvo fare ricorso a un fiat che da quel momento in poi tende ad escludere, per semplificazione cognitiva, la voce dissonante del dubbio; identifica il sé in termini oggettivi, più semplici e rassicuranti; e chiude fuori il mondo minaccioso di coloro che non vedono o non riconoscono la verità — coloro, più precisamente, che vedono e riconoscono un'altra verità.

Ebbene, questi processi di autosegregazione sono al centro anche dei fenomeni di virtualizzazione: la dinamica della chiusura emerge nel sentimento di chi si accomoda in una "realtà" ad hoc man mano più ricca di

5. Espressioni dello scetticismo digitale, profondamente diverse per premesse e metodi di indagine, sono ad es. Carr (2010), Lanier (2010); Morozov (2011, 2013).

dettagli e relativamente credibile. La virtualizzazione[6], detto altrimenti, contiene in se stessa delle autentiche istanze di paura. Il bisogno di protezione la caratterizza in profondità. Essa disegna cornici di esperienza e almeno potenzialmente interi universi vitali programmaticamente separati dalla realtà esterna — la realtà effettiva ovvero il mondo così come lo conosciamo; in una sorta di immortalità *via* avatar[7].

A me pare che sia qui in atto uno svolgimento molto rappresentativo delle dinamiche generali della paura, quasi una maniera di coglierla in purezza. ~~Non~~ si tratta necessariamente di individuare dei fatti puntuali che suscitano timori; ma di determinare, più in generale, uno *spazio protetto*: entro tale spazio, schermato da interferenze, il soggetto desidera un godimento di tipo *omeostatico*, una condizione inscalfibile dall'irruzione di eventi imprevisti. La realtà virtuale ambisce ad una gigantesca progettazione di esperienze man mano più ricche e complesse, e coincidenti in prospettiva con l'intero spettro dell'esistenza e con il mondo come tale; ma esperienze appunto progettate dunque preventivate, rassicuranti, protette, incapaci di mettere in discussione l'assetto della soggettività[8]. Niente dovrebbe essere in grado di turbare l'omeostasi, nessun cigno nero dovrebbe poter irrompere e spezzare l'equilibrio~~, rigenerandolo magari ad un differente livello~~.

Da questo punto di vista, il fatto che la realtà virtuale venga talvolta utilizzata, in ambito terapeutico, come strumento per *combattere* alcune

6. Parlo di virtualizzazione intendendo tutti i processi di *immersione* in spazi vitali generati per via tecnica. Gli esempi più evidenti sono i social e i videogames (e la gamification, che funge da colonizzazione della realtà per conto della game culture), ma il binge watching, l'accesso immediato a repository testuali, il cinema immersivo in 3D e computer graphics, o il commercio elettronico, descrivono altri modi, molto vari e più sottili, di esautorazione del mondo così come lo abbiamo conosciuto.

7. Blascovich, Bailenson, (2011); Bailenson (2018). A margine, un'osservazione sulla letteratura su tali temi: il rischio di una certa obsolescenza di informazioni e riferimenti tecnici è costante, già a distanza di pochi anni da una prima edizione. Ciò non toglie che intuizioni e osservazioni pertinenti possano essere presenti anche in testi invecchiati (d'altra parte, limitarsi a una letteratura "aggiornata" significherebbe condannarsi a dovere sempre rincorrere un'innovazione che continua ad accelerare).

8. Che esperienze siffatte tendenzialmente mirino ad una sorta di abolizione della corporeità non può essere ritenuto irrilevante. Il corpo è l'interfaccia tradizionale tra mente e mondo, e, in quanto interfaccia, è il luogo in cui l'esterno irrompe, rompendo e rigenerando gli equilibri; contestualmente esso incide sempre più con zone d'ombra, disagi, malattie, degenerazioni progressive, che interferiscano, guastano e infine abbattono l'omeostasi.

paure, non è affatto in contrasto con l'analisi condotta[9]. Il meccanismo consiste infatti nella chiusura in un ambito protetto che permette di reiterare e progressivamente controllare l'esperienza insopportabile, fino a risanare un equilibrio compromesso. Non si tratta di mettere in discussione, in questa sede, l'efficacia terapeutica del metodo: ma di vedere confermato il meccanismo dell'esclusione come approccio di default alla realtà. E dunque, se questo atteggiamento può localmente essere utile (d'altronde non è una novità: camere iperbariche o celle monastiche si basano sullo stesso principio. Come vedremo tra poco, che la tecnica tenda da sempre a produrre spazi protetti può essere considerato un modo di descrivere la sua natura), ciò non toglie che la sua adozione indiscriminata abbia precisi prezzi da pagare.

Per dirla con una formula sintetica, si tratta dunque, in generale, di essere *altrove*. Tutto ciò che si trova effettivamente al di fuori di noi, nelle adiacenze del corpo, non può non impattare più o meno gravemente su di esso. Un'esperienza puramente virtuale ha invece l'ambizione di eludere le condizioni al contorno entro le quali ci troviamo. Evidentemente, questa operazione può essere solo una tendenza, quasi un'idea regolativa, e (quasi) mai una realizzazione piena. In effetti, per funzionare la realtà virtuale ha bisogno ancora dei nostri sensi o dei meccanismi di propriocezione innestati entro il corpo. Tuttavia la simulazione in atto è immensamente più libera rispetto alle costrizioni del qui ed ora. Possiamo, detto altrimenti, vivere entro un'ambiente progettabile anziché drammaticamente refrattario quale è invece il mondo che ci tocca in sorte. Non è il caso di negare la profonda utilità di simulatori di volo o di chirurgia (sempre allo scopo di minimizzare il *rischio* di interventi o atterraggi reali), o il piacere che deriverebbe da visite turistiche virtuali altrimenti impossibili[10]. Però oltre la funzione addestrativa, sta la fascinazione di potere escludere le miserie dell'imprevedibile, che è il grande fattore attivo, come minaccia, nell'angoscia contemporanea. In qualche misura si vorrebbe l'assimilazione della vita quotidiana ad un certo modello di *tempo libero* vissuto in un contesto ordinato e preservato, come un villaggio vacanze ideale dove è impensabile che qualcosa non funzioni.

9. Paura di volare o di parlare in pubblico, a titolo di mero esempio. Cfr. sul tema Blascovich–Bailenson (2011: 218–221).

10. Per un percorso affascinante che integra anche gli usi produttivi della realtà virtuale cfr. Lanier (2017). Il suo libro forse rappresenta il tentativo di assumere una posizione equilibrata nei confronti della tecnologia, come cercherò di suggerire nelle conclusioni del saggio.

Ma il fatto è che la chirurgia (potenzialmente) perfetta, così come l'atterraggio perfetto, è *solo* quella virtuale.

È dunque all'opera una potente spinta a contrastare il significato dell'esistenza come apertura sull'imprevisto, come successione di fatti e vicende sulle quali il nostro controllo è sempre ipotetico, eventuale e comunque parziale; ovvero semplicemente l'esistenza come inquietante serie di contingenze e biforcazioni imprevedibili che disegnano infine biografie individuali ed irripetibili. In questo senso l'esistenza è stata sempre, e forse più radicalmente di ogni altra cosa, ~~totalmente~~ esterna al controllo della tecnica.

Che la contingenza e l'imprevisto siano la sua cifra profonda [illegible]mente vero e inevitabile da non potere essere preso in considerazione, diventando un po' come l'aria che respiriamo e dunque di solito non percepiamo; tantomeno affrontato. Detto in maniera diversa, si tratta propriamente dello spazio del futuro, così come l'abbiamo conosciuto finora. Il futuro non coincide con l'area, d'altronde molto ridotta e quasi sempre limitata a ciò che sta per accadere tra pochi minuti, che siamo in grado di calcolare. In un certo senso, tale futuro, se effettivamente prevedibile, non è futuro ma *presente differito*. Mi comporto già alla luce di ciò che so che sta per succedere. Con l'eccezione di eventi prevedibili perché in capo a me stesso (sto per alzare il braccio: in questo senso lo prevedo), o eventi già iniziati (una persona cammina nell'altra stanza: so che sta per entrare nella mia), o di eventi abituali (sono le 7: tra poco mia moglie arriverà in cucina per fare colazione), gli esempi più cospicui di questo futuro presente sono di tipo tecnico. Si pensi per esempio ad una grande stazione. Sul tabellone, e sull'orario programmato per ogni giorno dell'anno, si trovano indicati gli eventi futuri di arrivi e partenze. Da questo punto di vista un orario è un artefatto per prevedere il futuro. È rassicurante sapere che tra 6 ore e 40 minuti, esattamente alle 13.30, partirà il treno per Roma che arriverà alle 15.25 a Termini. Ma come l'esperienza effettiva delle stazioni insegna, la realtà non coincide con la progettazione: con tutto il carico disturbante dell'imprevisto di ritardi, scioperi, guasti, incidenti, ecc., che contribuiscono a deviare o annullare i nostri piani (la nostra agenda per la giornata). In un certo senso allora, una parte consistente, probabilmente dominante, dell'apparato tecnico che abbiamo messo in campo nel corso dei secoli, deve servire a controllare il futuro. Al di là della maggiore o minore efficienza e affidabilità dei sistemi ferroviari in differenti nazioni, è chiaro

però che neanche in Giappone è intaccato il senso dominante del futuro come una terra straniera, esplorata man mano senza sapere cosa si trova dietro l'angolo.

Ebbene, questa esistenza che si sposta passo passo entro un futuro che non conosce, senza vedere, nella nebbia, in sostanza nulla più di pochi istanti avanti a sé, può e deve finalmente essere oggetto per la prima volta di una sorta di riprogettazione. La tecnica deve essere in grado di prendere in carico anche questa contraddizione. Gli spazi virtuali disegnano così una nuova antropologia, dalle caratteristiche inedite. L'estromissione del mondo "reale", dell'"esterno" minaccioso, implica una bolla man mano in espansione e che tenta di abbracciare ogni sfera della vita. Generalmente in questa sfera posso nutrire la mia paura tenendola a distanza, poiché la condivido con coloro che la frequentano assieme a me. Le comunità dei fanatici di una qualsiasi delle apocalissi a disposizione, delle vittime di una qualsiasi forma di violenza o malattia, dei seguaci di una certa verità alternativa, si caratterizzano per nutrire religiosamente la loro ossessione, la loro verità o la loro sofferenza; nel frattempo l'imprevisto fuori controllo viene accuratamente tenuto al di fuori del safe space, che ovviamente non è davvero sicuro se si lascia contaminare dall'incidente, dall'incontro con ciò che mi turba ed è difforme, con ciò che pensa o vive diversamente da me. ~~Ma la segmentazione epistemica e poi sociale è un'inevitabile conseguenza di questa dinamica~~.

3. Sulla tecnica

Tutto ciò, ritengo, non è affatto episodico, anzi contiene numerose indicazioni di carattere generale. Forse la prima considerazione da svolgere può tra l'altro servire ad evitare che quanto esposto ricada a sua volta, e non a caso, nella reincarnazione di una paura ricorrente e abituale, che è la tecnofobia[11]. Come ho già accennato, la crisi degli ottimismi tecnofili di qualche tempo fa ha comportato una diffusa diffidenza nei confronti della tecnologia. Ma in realtà, che la definizione dell'uomo non possa ignorare la sua capacità di *ricostruzione* del mondo, ciò che almeno sotto certe for-

11. Non a caso la letteratura discordante che ho citato nelle note 4 e 5, nutre, ovviamente con toni e radicalità differenti, i due sentimenti contrapposti della tecnoutopia o tecnofobia.

me viene chiamato tecnologia e che in ogni caso ne è la radice, è piuttosto evidente pur se sempre da ribadire. La tecnologia è anzi all'origine del processo di ominazione: le prime tecnologie, prima ancora di fuoco o ruota, sono il linguaggio e dunque la cultura, che rappresentano l'inizio del distacco parziale dell'uomo dalla natura e l'inizio del controllo (beninteso anch'esso parziale e imperfetto) nei suoi confronti. Da questo punto di vista, ciò che è umano è sempre *tecnologico*[12]. Le nostalgie di un "passato" (assiologico più che cronologico) valorizzato come "natura" sono istanze ricorrenti, da almeno un paio di secoli, ma non sono solo illusorie, ma anche inganne se riflettiamo su quanto i pericoli pretecnologici fossero mediamente più gravi di quelli tecnologici contemporanei; o quanto possa eventualmente essere dannoso *non* introdurre una tecnologia.

In realtà, in generale la storia della tecnologia può essere letta come la progressiva, gigantesca espansione di una bolla protettiva. Che la condizione naturale dell'uomo abbia sempre avuto *bisogno* di una buona dose di artificio, anzitutto a partire da un'infanzia anormalmente lunga e bisognosa di cure (uno dei fatti più rilevanti e relativamente misconosciuti per comprendere la natura umana), è tesi ben nota[13]. La spinta per l'omeostasi in questo senso appartiene alla storia profonda e dunque alla natura intima di ciò che stiamo analizzando. Non è possibile liberarsene in nome di un rimpianto malriposto nei confronti di ciò che è "naturale". La tecnologia è così importante perché *non* è una sovrastruttura dalla quale potremmo liberarci con uno stravolgimento dei modi di produzione o con una rigenerazione di un senso morale ambientale. Ma proprio per questo essa merita uno sguardo che non faccia sconti e ne colga le criticità.

3.1. *Funzioni e varianti della paura*

Di più: se è fondata questa analisi, ne segue che è difficile pensare un'antropologia senza operazioni elementari di separazione–protezione rispetto ad un "altro" comunque inteso. La paura, in effetti, ha un duplice verso di applicazione, per così dire. In generale essa identifica un

12. Svendsen (2007: 63).

13. Oltre alle tesi dell'antropologia classica tedesca, mi riferisco all'autore che ha significativamente imposto l'analisi delle "bolle" come spazi antropologici protetti, indispensabili per l'ominazione: cfr. Sloterdjik (2014–2015).

punto reattivo messo a rischio. Così facendo contribuisce al sospetto nei confronti di ciò che si trova oltre tale punto sensibile: estranei, batteri, catastrofi, ~~tossine~~, ecc., sono questi fattori più o meno chiaramente identificati che esercitano una pressione minacciosa. Ma pressione, nei confronti di *cosa*? Il fatto è che mentre identifica ciò da cui dobbiamo difenderci, la paura non può fare a meno di generare un noi, un senso acuto di condivisione: noi membri di un ceto, noi connazionali, noi vittime, noi che abbiamo bisogno di difesa. La paura, detto altrimenti, come aveva perfettamente inteso Hobbes, è anche un potente fattore adesivo oltre che disgiuntivo.

Si tratta in realtà, come è facile capire, dello stesso processo visto da due lati opposti. Ciò che è unione per "noi" è separazione per gli "altri". Ovvero: il perno di questo movimento è la paura che "noi" condividiamo nei confronti degli "altri". Tuttavia, anche se il movimento è unico ciò non significa che esso sia sempre neutrale nei suoi effetti, generando una costante somma zero. Il ritmo di aggregazione–disgregazione contemporaneo rischia di suscitare esso stesso angoscia. La contrapposizione in nome di una paura è inevitabile, e per certi versi indispensabile, verso l' "esterno": ma se si applica all'interno di un corpo sociale, oltre un certo limite avvia il processo della sua disgregazione.

Ebbene, la politica contemporanea della paura mette a rischio libertà e fiducia (trust) come fattori necessari della convivenza. La sfiducia, in effetti, è forse la cifra che definisce meglio la natura profonda della paura contemporanea. Alcune sue forme sono evidenti, altre meno, ma forse per questo ancora più incisive. Si pensi, a questo proposito, al fatto che anche la malattia contemporanea è assai più una degenerazione dall'interno anziché un'aggressione dell'esterno~~, come all'epoca delle grandi infezioni. Non è rilevante che statisticamente ancora infezioni o parassiti facciano numerose vittime: nella~~ sensibilità che condividiamo la tonalità fondamentale è quella dei nostri corpi che segretamente, inavvertitamente, senza segnalarlo con dolori o febbri, si trasformano nei nostri nemici. Cosa potrebbe suscitare più *sfiducia* di un simile tradimento?

Se questa analisi è corretta essa suggerisce un cambiamento, sia pure da intendere soprattutto come variazione sul tema, nella natura stessa della paura che stiamo analizzando. Gli altri "minacciosi" sono scivolati oggi all'interno del corpo sociale (come nel caso del cancro o delle malattie autoimmuni). La risposta, perfettamente naturale, è come

abbiamo visto la costruzione di uno spazio protetto e autoprogettato, ove potremmo celebrare il festino dell'identità che ci definisce. Ma così facendo il ritmo di disgregazione del corpo sociale accelera.

3.2. *Per una gestione della paura*

Torniamo al punto precedente. La tecnofobia in nome dell'umanesimo è una tentazione anch'essa malriposta — che produce anch'essa, un po' paradossalmente, una bolla: quella dei nostalgici di un mondo che non è mai stato. Naturalmente, la gestione della tecnologia è affare tutt'altro che semplice, e si può ammettere che la sua complessità o almeno la portata delle sue ricadute sia esponenzialmente cresciuta, con ciò giustificando almeno in parte le ansie ricorrenti. Il punto è, ritengo, che viviamo un costante ritardo cognitivo rispetto a una tecnologia man mano accelerata. Non è solo che non riusciamo a tenere il passo, ossia che il suo passo è ritmato in maniera diversa rispetto all'assimilazione cognitiva che siamo in grado di tenere; ma che questa accelerazione comporta un regolare differimento rispetto alle conseguenze, che sono sempre proiettate in un futuro fatto di linee intersecate in maniera esponenziale: è per questo che ogni innovazione diventa imprevedibile in maniera crescente, ossia "rischiosa". Dato che il controllo sembra il rimedio naturale del rischio, la perdita di controllo presente nella successione, reale o percepita, delle *disruptive changes* contemporanee, implica l'accrescimento del rischio. In tutto questo, il fatto che possa esistere il caso sfortunato, l'incidente, l'evento imprevisto (ciò che è poi l'essenza vera del "rischio": il fatto che qualcosa sfuggirà sempre alla presa della nostra capacità di previsione), in sostanza qualcosa come la *sorte* (buona o cattiva), è tendenzialmente denegato o programmaticamente rifiutato[14]. Occorre individuare una responsabilità,

14. Con un certo sprezzo del ridicolo. Altre epoche non si vergognavano ad ammettere il ruolo preponderante della fortuna. Ma l'ossessione del controllo sfocia in una caratteristica cecità selettiva nei confronti di ciò che non si fa controllare. In realtà il bug del sistema (che dal punto di vista umano si chiama distrazione, svista, effetti di retroazione) resiste ad ogni pulsione di ottimizzazione e ad ogni tentativo di riscrittura del codice attraverso tecniche ridondanti. Un esempio abbastanza interessante è la gestione dei dispositivi di sicurezza in auto: essi sono man mano più evoluti e potrebbero garantire, come da programma, una sicurezza quasi assoluta. In realtà al crescere della loro efficienza cresce anche la potenziale distrazione del guidatore umano, che si affida a tali sistemi e dunque si dedica ad altro. Sarà interessante assistere all'avvento della guida autonoma per verificare a che livello si installerà il bug, e come la paura dell'incidente troverà modo di riprodursi.

meglio ancora una colpevolezza, fittiziamente dissipando ogni opacità e ambiguità presente nella serie degli eventi. Così la sensibilità contemporanea esprime una visione della catena delle cause non dissimile da quella arcaica, dove ogni evento possiede un autore che occorre individuare e placare (oggi l'autore fa piuttosto da capro espiatorio, svolgendo però la stessa funzione esorcistica[15]).

In questo senso, dunque, la tecnologia è un capro espiatorio ideale e rientra a pieno titolo nel grande catalogo delle paure. La realtà virtuale non fa eccezione: utilissima, o almeno piacevole, essa significa anche l'esautorazione della Realtà con la maiuscola. È quasi inevitabile che nei suoi confronti ci si orienti secondo una doppia polarità di entusiasmo o rigetto. Nel presente saggio ho cercato di mostrare in che senso essa rappresenti un'istanza perfino paradigmatica della spinta contemporanea alla protezione e fuga nei confronti di una Realtà percepita come ostile e minacciosa: però, al tempo stesso, ho cercato di suggerire che tale funzione della tecnica non è affatto un fenomeno solo contemporaneo, nel qual caso sarebbe relativamente semplice proporre una palingenesi naturalistica e regressiva, bensì un lascito molto antico dovuto ad una fondamentale caratteristica della condizione umana.

Ancora una volta, la difficoltà è di trovare una misura saggia, dove, come era nelle intenzioni di Jonas, le paure fungano da segnalazione di una difficoltà ma non esautorino la ragione dal suo compito. Compito faticoso per più di un motivo, ma indispensabile se vogliamo mantenere uno sguardo critico ma equilibrato, anziché scivolare in opposizioni dogmatiche quale quella tra tecnoutopia e tecnofobia.

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Part II

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VRBAN

Strategies of Representation and Degrees of Freedom in Virtual Cities

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Abstract: Smart Cities and Virtual Reality technologies are at the centre of many scientific and political discourses and are generally presented as among the major technological innovations of our time. This chapter aims to investigate the relationship between cities and VR and, in particular, how urban spaces are represented through VR technologies. This chapter, hence, presents an overview of the VR representations of urban spaces, both providing an overview of the current state of urban representation in virtual reality contexts and identifying the untapped semiotic and technological potential in building urban VR experiences. To do so, we utilized a scoping method in order to collect a representative depiction of the entire field. A total of 37 applications containing both games and non–game apps were documented and analysed, yielding classification of both the cities therein and the users' roles relative to them. An interdisciplinary methodology focusing on the semiotics and affordances of the titles analysed, allowed us to create several concepts and typologies to engage VR spaces. Clear trends emerged from the analyses, indicating patterns in the interconnection of the purpose of the application, the presented city, and the presented user or citizen. However, considering the vast potential of digital environments, and immersive virtual reality in particular, it is dejecting to see that these applications are mostly simplistic and are far from utilizing all of the potential affordances of (digital) cities and of the ever–improving technology. With this potential in mind, we present this study as a starting point for enriching similar applications and several points for consideration depending on its type and purpose. Finally, possible future research directions that would delve deeper in different segments of the field are briefly noted.

Keywords: Cities; Virtual Reality; Urban Representation; Avatar; Interactive Media; Human–Technology Interaction; Games.

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1. Introduction

"Virtual reality is here" has been used almost as a slogan in the past few years. In reality, although the technology is getting more sophisticated and more affordable, somehow VR still does not seem to be quite "here". Firstly, the majority of VR users still only own or use *mobile* VR headsets. While these undoubtedly provide immersing virtual reality experiences, they are full of limitations in their technological advancement and in the affordances, they provide for designing experiences, applications, and enjoyable and memorable user experiences. Additionally, the medium is still in an early stage of maturity: good quality VR apps are still in thin numbers, and none of them has yet become mainstream. Finally, the very discourses that surround virtual reality are discourses around *novelty:* VR is often deemed interesting and worth investing not for its media affordances or for the quality of the experience design but as a symbol of innovation.

Nevertheless, virtual reality does show much potential in creating, for example, strong cultural experiences (Jung *et al.*, 2016), attitudinal change (e.g. Herrera *et al.*, 2018) and feelings of empathy through immersion the illusion of body–ownership, or placing one in another's shoes (de la Peña *et al.*, 2010; Herrera *et al.*, 2018; Peck *et al.,* 2013). In this paper we wish to overview and explore the potentials of this technology in particular in the representations of urban environments.

Cities are the quintessential anthropic space, entirely shaped by culture and technology, social and economic hub of most nations. However, while VR applications represent a wide range of human activities (from cooking to fishing) as well as environments (indoor and outdoor spaces alike, but realistic and imaginary), cities, seems to be generally under–represented or used in quite simplistic and shallow ways.

This is particularly surprising if we think that the city it is at the centre of the technocentric discourse of "smart cities", which proposes the implementation of monitoring, geo–tracking, ubiquitous computing and Internet of Things (IoT) technologies as ways of making cities better at catering their citizen's needs (Bowerman *et al.,* 2000) or more sustainable (Phillis & Kouikooglou, 2017). This idea is still pervasive despite the criticism received throughout the years concerning privacy, technological lock in and (Greenfield, 2013; van Zoonen, 2016). At the same time, cities are

also the setting of fervid activities of digitisation and digital representation ranging from widely used apps such as Google maps, to the detailed and engaging cities of digital games, to "digital twins" at the service of urban planners and policymakers (Mohammadi & Taylor, 2017).

This paper, then, aims to contribute to our understanding of the semiotic features of VR representations by scoping, systematizing and problematising the existing approaches to urban representations in virtual reality. This will allow us, on the one hand, to draw an overview of the current state of such representations and, on the other hand, to identify some possible areas of intervention that could lead to more engaging representations by exploiting the technological affordances of VR and the semiotic properties of the cities.

2. Background – Urban Representations and VR Technologies

2.1. *Few Notes on Representing Cities*

Representing cities is a complex endeavour. From a semiotic standpoint, cities can be understood as polyphonic texts, perceived as organic wholes, but also characterised by structural heterogeneity (Volli, 2005). Urban representations, in order to be effective, have to simplify or to mimicry this polyphony. While the representation of part of a city — e.g. by *iconic* means such as through a painting, or a photograph — do not necessarily raise these issues, any attempt to reproduce, is some measure, the complicated totality of the city has to face and model the semiotic complexity of the urban spaces.

Urban spaces, moreover, are not simply built spaces organised accordingly functional needs. While these are obviously of central importance, the relations between citizens and cities (Lynch, 1960; Lefebvre, 1968) and between city and culture (Lotman, 1987 & 1990) go beyond the socio–economical uses of the space and the necessity of the circulation of people and resources: they also involve issues of cultural identity, communication and (self)representation.

Cities are rich *semiotic devices* that work as *models* of the cultures they host. They are what Lotman (1977) calls "modelling systems" and therefore have, at the same time, a descriptive and a prescriptive nature. On the one

hand, they are a mirror of a culture and of a symbolic universe: their spatial organisation is homomorphic with that of the semiosphere, allocating spaces of centrality and periphery according to the current cultural values (e.g. churches being in the central squares, while factories are relegated in the outskirts of the city, as described in Lotman, 1990). On the other hand, cities are producers of culture: they communicate instructions to the citizens (with traffic lights, street signs, panels helping *wayfinding* cf. Lynch, 1960), but they also "make" the citizens — they make them "polite", "urban" and "civilised" (all words from Latin and Greek roots for "city").

Every attempt to represent cities has to deal in some way with this double nature of cultural model. We can see it even in the most utilitarian way of representing cities: mapping. City maps are *diagrams* of the city: iconic representations that simplify extremely the semiotic overabundance of urban spaces in order to create easy–to–use artefacts that allow operations on the representamen that are still valid for the representatum (Stjernfelt, 2007). Nevertheless, if we look at the history of maps it easy to notice how what is represented is rarely the simple material reality of the city: recognisable monuments, expressions of political power and even fantastic elements find their place in the maps. The mapmakers are not simply representing the physical materiality of the city, then, but also, in part, its history and folklore, its cultural meanings and its values — an entire symbolic universe (Berger & Luckmann, 1966).

Maps answer to the desire of making the urban space understandable, to reduce its complexity to a manageable simplicity so to be able to navigate it, administer it and organise it. At the same time, maps are also tools to manipulate the city: simulations, blueprint, projects, all use maps of the city–to–be as a basis for decision–making. While these maps attempt to represent the urban spaces in an objective way, they cannot escape their socio–cultural context and the ideologies that motivate and guide their creations — as, for example, the Victorian era values enshrined in Charles Booth's maps of London poverty (1889–1902) (Kimbal, 2006). In all these cases there is an effort to keep out of the map everything that is not relevant for the purpose of the mapping either for practical matters, either for ideological ones (for example, excluding the not–so–temporary settlements of homeless people or other marginalised groups). It is not rare, in these cases, to try to make use of

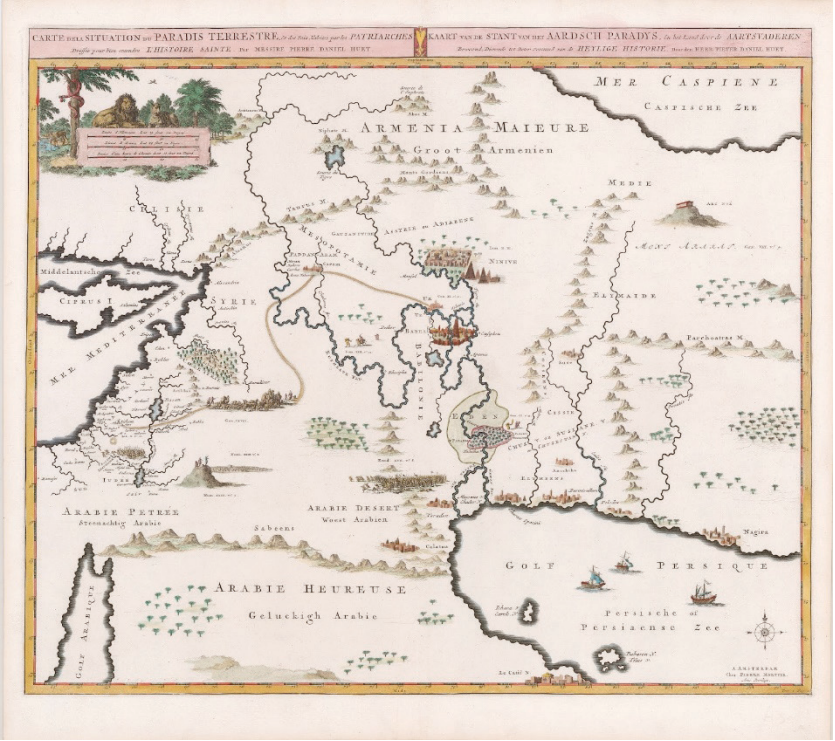

Figure 1. Situation du Paradise Terrestre by Pierre Mortier (1700) representing several cities and the supposed location of the Eden, the earthly paradise, Cornell University Library.

pictures — aerial photography first and then satellite images — in order to give an aura of indexicality to the map and to try to adhere, as much as possible, to its physical morphology.

Notable urban representations can be also found, very easily, in fiction. Throughout history, cities have been often the backgrounds of stories and narratives, from Ilios to Gotham City. Novels, in particular, were so keen to adopt urban settings that Rousseau famously claimed (in an appendix to *Julie ou la nouvelle Héloïse* published in 1761) that thousands of people were leaving the French countryside and moving to the cities because they wanted to live where the stories happened. Regardless of the real causes behind urbanisation in the 18th Century — and the eventual role of literature among them — this is symptomatic of a common perception. Cities

are *interesting*, they are the setting for countless narratives be it the Paris of Arsene Lupin, Dickens' London or the New York of so many Hollywood films and TV series.

Fictional cities, however, are not necessarily invented and represented only as flavour–giving inert backgrounds. The city can be at the forefront, its organisation and appearance be the very engine used for world building (it is not the case that Eco explains his theory of narrative *possible worlds* using as starting point literary representations of Paris and London, Eco, 1979 & 1994). Much of cyberpunk science fiction, for example, features highly hierarchic cities, clear representation of a society imbued of degenerated capitalism (see *Gunnm* aka *Battle Angel Alita* manga by Yukito Kishiro, among many others). The city, again, is used to represent a culture, its values, structures and ideologies.

It is for this reason that cities have been so often used to imagine utopian societies (and while Utopia herself was an island, we can think of Plato's "Ancient Athens" in the *Republic* or Saint Augustine of Hippo's *civitate dei* and *civitate terrena* or Tommaso Campanella's *City of the Sun*) or to explore the human spirit (for examples Gabriel García Márquez with the fictional city of Macondo which appears in many of his novels, or Italo Calvino in *Le città invisibili*).

When we come to digital representations of the urban spaces, the most common and successful ones are related to digital mapping. There are a lot of efforts to digitise urban spaces to transform them into responsive and interconnected maps that place the city and the economic activities it hosts firmly in the Web, or to create complex simulacra of them, composed by countless photographs of public spaces. The possibility of creating adaptive and reactive sophisticated digital representation of cities has led to the emergence of the idea of Urban Digital Twins (Mohammadi & Taylor, 2017). The latter would be digital *copies* of the urban spaces that can be manipulated, reshaped, transformed and modified at will so to explore the possibilities of the city *before* implementing any actual change.

Nevertheless, many of the most skilfully realised digital representations cities are fictional ones, and in particular those created for digital games. Several important titles use complex and aesthetically enticing urban scenarios as setting. The representations of cities in games can vary a lot.

Some are little more than simple symbols indicating a city as one ele-

ment in the game that the players can interact with (e.g. in strategic games such as those of the *Civilisations* or *Total War* series).

In other games the players have created and/or organise metropolitan areas and structures that, if mismanaged, will end to collapse. In these games the degree of complexity of the representation can vary greatly, from basic representations of a metro network (e.g. *Minimetro*) to complex urban simulations that take into account many elements related to logistics, traffic, well–being, presence of basic services etc. (e.g. the *Sim City* series or *Cities Skylines*).

Finally, digital games also feature sophisticated urban environments to explore and interact with via some sort of avatars. These complex city representations encompass existing cities, both present (e.g. Chicago in *Watch Dogs*), past (e.g. the many cities depicted in the *Assassin's Creed* series) and future (e.g. the sci–fi Paris in *Remember Me*) as well as purely fictional ones (e.g. the megalopolis appearing in the *GTA* series or the fantasy cities in *The Witcher*).

The richness of urban representations, across history and across media, and the different affordances that each medium provides to relate and eventually interact with these representations are one of the reasons that induced us to wonder about cities in VR.

Figure 2. The city of Neo–Paris in 2084, screenshot from Remember Me (2013) Dontnod entertainment.

2.2. *Virtual Reality*

Virtual reality (VR) technology has been around for several decades, after Sutherland and colleagues built the first headset in 1968. For a long time, it has mostly been unaffordable and unattractive to the general public while often used for industry and military purposes (Bailenson, 2018; Koźlak, 2013). However, with the release of Oculus Rift (2012) and later HTC Vive (2015) its popularity has been on the rise with ever richer content being put out on the market[1]. In recent years, the technology has rapidly grown more sophisticated and a wide assortment of headsets has become available. These all, at least to some extent, differ in their specifications and sometimes offer very distinct features for the users and their experiences.

The two largest groups of virtual reality technologies, in this sense, are mobile and room–scale headsets. The first one is very crude, but allows for public familiarization with the technology due to its very affordable price range and a variety of applications accessible in mobile app stores. The greatest difference between the two is their capability of tracking users' movements in space which would then accordingly affect the world(view) in VR. These categories are referred to as 3 and 6–DOF (degrees of freedom). Mobile VR only allows only for 3–DOF, or in other words, the headset and the controller track only the rotations of the head (the roll, yaw and pitch), while 6–DOF technology is capable of tracking also the movements of the body in space (moving back and forward, left or right, up and down). These properties refer both to the headset and controllers (i.e. their respective tracking of user's head and hands). Due to these substantial differences, 6–DOF VR is usually referred to as *immersive* VR, emphasizing its technical immersive capabilities compared to 3–DOF, or mobile, VR (e.g. Bailenson, 2018).

In this study we will take into consideration both these technologies. If 6–DOF is more sophisticated and offers more to the experience of urban representations, mobile VR is still very much in use, as it is more affordable for the users and requires less resources for its production. Consequently, this is the VR content that can largely be seen on the market and it spans from simplistic or intricate 360–degree videos to interactive games.

1. https://www.statista.com/statistics/426469/active-virtual-reality-users-worldwide/ (Retrieved on 30.12.2019).

2.3. *Representations of Self*

Every representation of an urban space, be it a photography, a novel or an immersive digital environment, also entails some degree of representation of the *actant observer* that experiences such representation. Visual representations of cities, in particular, always create a system of gaze that draws the observer into the picture, assigning them a point of view, and therefore a spatial position in the city (or above the city). The morphological complexity of a city can only be experienced in visual fragments, in *perspectives* and *scenes*, hence the position of the observer and the ability to move through such spaces is a salient feature of each urban representation. VR representations, furthermore, creating a dynamic effect of trompe–l'oeil (cf. Calabrese, 2010), allows various forms of representation of the observer while proposing a strong identification between the user and the observer themselves. In such cases, therefore, the representation of the observer is perceived and interpreted as a representation of a "self" — that is a subjectivity built by the use of the technology and the experience of the representation. In order to analyse urban representations in VR, then, we also need to approach the representations of their observers. In order to do so, we will build on the affordances that are offered by the medium itself.

2.3.1. Interactivity, Agency, and Embodiment

As mentioned, technological immersiveness of virtual reality relies on the hardware specifications. These are primarily: positional or motion tracking, field of view enabled by the headset, and resolution. However, not all applications utilize all of the possibilities of the technology and we ought to specify what types of affordances users can expect to encounter.

One of the main concepts in studies on virtual environments (VE) is presence, or the subjective experience of non–mediation (Lombard & Ditton, 1997; Lombard *et al.*, 2000). Virtual reality has been particularly praised for inducing presence, for the most part through visuals by sensorimotor contingencies and immersing the user in the digitally projected world (Slater, 2009). *Place illusion* refers to the phenomenon which plays an important role for the sense of presence as it situates the individual via cues such as seeing one's body when looking down (Slater, 2009).

We can already see that some kind of interaction is desirable for giving an illusion of presence, but it is mostly limited to interacting with the system, not the environment as such. For example, in 360–degree videos it is impossible to interact with the content or influence it (i.e. have agency over it), but only to change the direction of one's view. However, the interaction with the content is closely interconnected with user's experience of agency and autonomy in the virtual environment (Witmer & Singer, 1998). Some interaction forms of interest for the context are moving through the VE and manipulating virtual objects (Preece *et al.,* 2015). User's own sense of presence along with agency in the VE contributes to the plausibility illusion (Slater, 2009), or the believability of the virtual world. This illusion in turn contributes to users' processing, acting, and reacting as if the virtual world and the events therein were real.

Finally, in connection to place illusion, virtual environments in general enable embodiment of visual representations, or avatars, through which one acts in the VE (in connection to motion gaming see Gregersen, 2011). In the context of video games in particular, the relationships between the user and their avatar as inhabitable protagonists (Isbister, 2016), as well as the accompanying affective, cognitive, and behavioural effects are being studied at length (e.g. Banks, 2015; Hudson & Hurter, 2016; Isbister, 2016). Immersive virtual reality, however, enables for the illusion of ownership of a virtual body by, in a way, transporting the user in it. For example, seeing avatar's movements congruent and synchronous with one's own via motion controls enables an effect of meaning, a powerful trick on their perception and cognitive processing (Maister *et al.,* 2015; Maselli & Slater, 2013; Peck *et al.,* 2013), where again agency over one's virtual body plays a crucial role in inducing the illusion (Tsakiris *et al.*, 2006).

All of these points need to be taken into consideration when investigating VR. It is worth noting that further advances, such as biofeedback (e.g. Salminen *et al.,* 2019; Yang *et al.,* 2019) and wearables and haptic interfaces (e.g. Kim *et al.,* 2019) render the described phenomena only rudimental in virtual reality and greatly build on them. However, interactivity, agency, and embodiment in somewhat simple forms likely still make up for the majority of current virtual reality applications and therefore shape the VR experiences.

3. Methodology

In order to explore the current situation on VR representations of urban environments and due to the relatively small numbers of such representations we decided to scope the existing titles and to try to systematize them in order to analyse their possible articulations. Our methodology, therefore, is divided in three parts:

— the scoping of VR titles in which urban spaces are predominantly represented and their organization in "naïve" categories based on their content or purposes;
— an analysis of the aspects of the city included in the representation and the competences such representations confer to the users, based on semiotics of culture and urban semiotics (Volli, 2008; Marrone, 2009);
— an analysis of the representations of users (avatars), or lack thereof, and the afforded interactions and experiences.

3.1. *Scoping*

Virtual reality content today is available on a number of platforms, applications, and Internet websites. For example, the most simplistic ones such as 360–degree videos for mobile VR can be found on YouTube as well as on numerous websites with different themes, from presentations on cultural heritage, through immersive journalism, to advertisements. Somewhat more complex and usually interactive examples such as games, gamified, and game–like content can mostly be found on mobile app stores and common game stores (e.g. Steam, PlayStation Store). However, there is no positive way of encompassing all sources and noting all existing VR content.

Therefore, the scoping of the sample content used in this study was conducted through extensive manual search and examination of all known sources and depositories of VR content, as well as through Google searches comprised of a combination of two sets of search terms: the first relating to the content theme, containing terms such as *urban*, and *city*; the other relating to the type of content with terms such as *virtual reality*, *VR*, and *360–degree video*.

While it is possible that VR titles that feature urban representations might not be tagged either as "urban" or "city", this search ensured that the titles included in the research focused with particular attention on the representation of urban environments.

The inclusion criteria consisted of two parts coinciding with the two sets of search terms: first, the content would have to be available for VR, either mobile or room–scale; second, it had to be set entirely or for a significant part in a digital reproduction of an urban environment that the users can move through or explore. The final sample consisted of 37 VR titles (cf. Appendix 1).

The collected examples were assessed using the content that was available online with no cost, either at the source or on platforms as *YouTube*. When there was no demo available, YouTube was searched for a gameplay or preview video that would be used for the analysis. These consisted mostly of preview and gameplay videos and were representative of the aim, the surroundings, and the environment's affordances, including for example interactivity and 3D movement through the virtual environment.

3.2. *Limitations*

Our methodology suffers from some limitations. First of all, due to the diversity of platforms and variety of independent projects there was no practical way to scope a complete sample. While we devoted a significant effort in discovering and including as many titles as possible, we could not ensure to include all examples of urban representation in VR. While this should not affect the soundness of the categories and typologies that we draw from the semiotic analysis of urban representation and the analysis of user representations and affordances of the system, we recognise that a larger sample could allow more general considerations on the current situation in VR representation of cities. We believe, nevertheless, that the titles that we were able to collect and analyse, especially because of the homogeneity of the characteristics features by titles in the same categories, constitute a sample sufficient to outline some meaningful general trends.

Secondly, in our analysis the concept of "interaction" is used both to indicate the degrees of authorship/readership representations of VR cities and to define different types of avatars. Some of the overlapping that

emerge from our analysis could be symptomatic of this fact. However, it should be noted as well that these *interactions* we refer to are not identical but rather looked at from the two different perspectives utilized throughout the study. When analysing cities, interaction refers to the responsiveness of the representation of the urban spice; when analysing the system affordances and consequently user avatars, interaction is viewed in the lens of users as controllers (e.g. Roth *et al.,* 2017) and their agency in the virtual environment.

Finally, as this study was meant as a scoping one, all VR content was included regardless of the specifics of the technology. The biggest differences stem from whether the content was produced for mobile or immersive room–scale VR. However, including this additional layer of analysis would overcomplicate and cloud the results without any guarantee that it would be thorough enough and yield a meaningful addition to the results. Namely because users can opt out, for example, to view 360–degree videos on screen instead of mobile VR or use non–gesture–based controllers with an immersive VR headset.

4. Analysis

4.1. *General Categories*

As a precursor to the analysis, we attempted to group our titles in a few categories, in order to be able to handle the sample in an easy and clear way and to devise a meaningful overview of the content.

First of all, we separated the titles between games and non–games. These were identified based on official descriptions and distribution channels. We have, therefore, 12 non–game titles (numbered 1–12 in the appendix list) and 25 games (# 13–37). We then proceeded to articulate them in the several "naive" categories according to their purpose, features or game mechanics.

In particular we divided non–game titles in: Design and Management (applications meant to be used by architects and urbanists dealing with city policies, design and planning), Cultural Heritage and Tourism (apps allowing to enjoy digital reconstructions of culturally relevant cities, often in the past) and Experience / Art (one application allowing to navigate

through a city made of real–life tweets and intended to evoke a poetic feeling of connectedness with other citizens).

The games were instead divided in: Racing and Free Movement (games in which cities are used as tracks to race or as paths to cross with parkour/jumps/acrobatics), Fighting (games in which players shoot at enemies or targets), Construction (games in which players build and/or modify the buildings and other objects in the urban spaces), Simulation (driving and traffic simulation games, where players cannot act on the city, but only on its viability), Eroticism (games in which players explore Red Lights districts and whose game mechanics are built around erotic displays), Puzzle (one puzzle game in an urban setting) and Social (games whose main mechanic is that of allowing free and playful interaction between players).

4.2. *Representation and Authorship*

In our first analysis, based on semiotics, we will focus especially on two features of urban representations in VR: the *modelling strategy* — that is, the rationale behind what aspects of the city are selected to be represented — and the *degrees of interaction* — in what measure the represented urban spaces are reactive to the users' actions.

Urban spaces are extremely complex and rich semiotic objects. Every attempt of representing them requires, then, an act of selection: which characteristics of the city do we want to include in the representation? This question goes beyond choosing which buildings or streets or neighbourhoods to depict and includes the meaning of the urban in a representation. What *is* the city that we represent?

As we have seen while approaching several kinds of urban representations, we can choose, for example, to map the city, and therefore to select a few relevant information about the urban space and to represent then in a schematic way. On the other hand, we can also represent the cities in order to represent (or invent!) entire cultures — as done by Plato, Saint Augustine etc. Any urban representation, then is an act of modelling that follows some strategies, both related to the aspect of the city selected for representation and the specificities of the medium used for the representation.

The sample we have collected features three of these strategies:

— the city as a wallpaper. In these titles the city is a mere background. A purely aesthetic element that can be admired or ignored, but whose main feature resides in its aspect. The representations aim to create an effect of meaning related to the presence in an urban space but is not interested in the complexities that urban spaces generally connote;
— the city as a system. These modelling strategies represent the city as a net of relations, values and resources. The circulation, logistics, dynamics and other systemic factors are represented in more or less sophisticated way. The urban environment, then, is used as a sort of metaphor for this complexity, while the meaning of the system is all within the representation itself;
— the city as a culture. Both real cities and fictional ones, as we have mentioned, can cast a semiosphere around it — or the illusion of one. This modelling strategy aims to use the representation of the city to refer to something else: shared cultural values, heritage, new possible social spaces and so on.

While they all rely on visual 3D representations of urban environments — quite obviously seen their mediatic statute — the titles in our sample also vary considerably according to the degrees of interaction they allow. We can group this continuum around three polarities:

— interacting *in* the city. It is possible to move within the city and to look around. Buildings and other objects mostly work as obstacles stopping the movement. The city may host other elements (characters, vehicles, creatures…) that the users can interact with. In other words, the city can be a space in which to interact, but it is not possible to interact with it. The users are essentially "readers";
— interacting *with* the city. The city responds to the users' actions. It can allow complex paths on its buildings (that are not anymore simply "off–limits" but acquire plastic characteristics and functions) or provide new information about its elements when the users engage them. The city itself is immutable, but it is reactive. The representation provides a sort of "augmented readership";
— acting *on* the city. The city is created, modified or reshaped by the users. Its elements may be destroyed coloured or replaced, new elements may be added. In this case, the users can be "co–authors".

The modelling strategies and degrees of interaction that we have outlined can be crossed in order to identify nines types of urban representation. In them we can fit the titles from our sample and their categories (Table 1).

	City as wallpaper (17/36)	City as system (6/36)	City as culture (13/36)
Interacting in (22/36)	Racing / free movement (15, 17, 18, 19) Fighting (20, 21, 22, 23) Eroticism (33, 34)	Simulation (31, 32)	Cultural heritage and tourism (2, 3, 4 5, 6, 7, 8, 9, 10, 11)
Interacting with (7/36)	Racing / free movement (13, 14, 16) Fighting (24) Puzzle (35)	Design and management (1)	Experience/Art (12)
Acting on (7/36)	Construction (27, 30)	Construction (26, 28, 29)	Social (36, 37)

Table 1. Types of urban representations.

Interestingly, some clustering appears to emerge when we look at how categories fit in our model. Seven of them (Eroticism, Simulation, Cultural heritage and tourism, Puzzle, Design and management, Experience / Art and Social) fit in one single slot of our table. While in some cases it is unsurprising (as some of these categories only feature few, or even one single title) this trend also involves one of the largest categories: that of Cultural heritage and tourism. On the other hand, the three categories left (Racing / free movement, Fighting and Construction), which include many of the most numerous ones, fit in maximum two adjacent slots. This suggests a convergence in the ways the titles pertaining to certain categories deal with interactivity and aim to represent cities. If some of these correlations are quite obvious (e.g. the fact that titles related to cultural heritage represent cities as culture) they do not explain the whole picture (why these do not allow more complex forms of interaction, for example). We can try to make some informed hypothesis on why.

First of all, it is easy to notice that the titles are distributed in a very uneven way in our model. First of all, the majority of the titles adopts forms of interaction *in* the city, appointing to their users the role of mere readers of the urban spaces. While this might reflect the dominant urban

ideology of cities as objects that the common citizen can't or shouldn't modify (unauthorised urban writing is often considered "vandalism"), it is also probably a consequence of budget limitations and of a rhetoric that sees VR experiences as innovative *per se* and therefore is reluctant to invest to allow more complex forms of interaction.

At the same time, we can notice that there is a high number of titles (almost the half) that represents the city as a wallpaper. In many of them, the urban setting is a scenario to host other meaningful activities, such as fighting or racing. Some of these representations can be very simple, only offering an arena, while others can be more aesthetically sophisticated and participate in the pleasure offered by the activity. In some other cases, like in the erotic games, the city offers a glittering context to the core activity which attempts to offer an aura of good taste and luxury. It can also be seen as a device for procrastination (the pleasurable *indugio* described in Eco 1994) that builds the expectations and possibly the enjoyment of the users. Finally, some gameful urban representations of the city as a wallpaper acknowledge the heterogeneity of the urban spaces, transforming the objects of the city in single elements in the game that might have to be interacted with in order to proceed successfully with the game or that can be modified or positioned for aesthetic purposes (the construction games 28 and 31).

The representation of the city as a system, while adopted by few titles, is generally implemented in quite a curated way. In includes simulations of the traffic and viability in urban spaces, tools for urban planning that allow professionals to retrieve data about buildings and neighbourhoods while immersed in VR and construction games in which the players have to create or manage different kinds of urban infrastructures (regarding energy, transportation, nature etc.). The very complexity of this form of representation, even in the titles with the lowest interaction strategies, probably explains the low number of titles.

The representation of the city as culture is the second most used and includes the vast majority of the non–game titles we have scoped. Most of these representations limit their users to interactions *in* the city and belong to the category of cultural heritage and tourism. In all these examples the city is quite clearly represented as a *museum*, to wander in, but semi–deserted and where we are not allowed to touch anything. Again, to the ideological aspect of the representation we can easily join some practi-

cal concerns regarding the budgets of these projects and a lack of literacy in VR that seems to characterise the institutions that commissioned them. The more interactive forms of city representations (Experience/Art and Social), while featuring few titles, are also among the most interesting, combining the complexity of the urban spaces with the possibility of the users to navigate, reshape and write on them. They often feature a high level of carnivalesque and free playfulness and aim to facilitate creativity and self–expression.

4.3. *Who Am I in a VR City?*

In the second step of the analysis, we coded user representations in each of the examples in the sample. The coding was conducted using three binaries which were constructed according to the possibilities of representations — agent/observer, embodied/disembodied, and diegetic/extradiegetic. These are based on the possibilities of the technology or content itself in presenting the users: interactivity and agency, embodiment, and congruency of the representation with the virtual world, respectively. They are of course not completely independent considering that disembodiment, or lack of presentation, cannot be neither diegetic nor extradiegetic.

From these binaries five categories of user representation emerged in the collected sample:

— *witness* (disembodied observer): particularly in 360–degree videos. Users are only allowed to change their view by rotating their head;
— *god* (disembodied agent): users can interact with the world but with no corporeal presentation of themselves in it;
— *spatial manipulator* (extradiegetic partially embodied agent): in the world, user is limited to simplistic presentation, such as crude representations of hands or even only controllers, incongruent with the virtual environment. These presentations seem to mostly serve usability purposes for easier interactions as they situate the user in the 3D world;
— *storified manipulator* (diegetic partially embodied agent): different from the spatial manipulator by its consistency with the virtual world. The hands or some other extension of self is presented in a

visually congruent manner with the surroundings. For example, in shooting games a firearm can be visible instead of the hands;

— *character* (diegetic embodied agent): user's corporeal presentation is fully incorporated in an interactive virtual world.

	Witness	God	Spatial manipulator	Storified manipulator	Character
Design and Management		[1]			
Cultural Heritage and Tourism	[5][6][7] [8] + only moving: [3] [4] [9] [10] [11]			[2]	
Experience/Art		[12]			
Racing and free movement			[19]	[13] [15] [16] [17] [18]	[14]
Fighting				[20] [21] [22] [23] [25]	[24]
Construction			[26] [27] [28] [29]	[30]	
Simulation		[31] [32]			
Eroticism		[33]		[34]	
Puzzle					[35]
Social				[36] [37]	

Table 2. Occurrences of avatar types across categories.

The suggested categories were cross referenced with content types as shown in Table 2. Overall, we can again see some trends emerging as the five avatar categories mostly tend to cluster in specific content types. There is a certain emerging gradation visible in the avatars' complexity which allows that each type contains and builds on the affordances of the previous one. For example, *God* has all the affordances as a *Witness* does, but with the added agency in the environment.

Witnesses are placed in an environment relating to cultural heritage and tourism with no self or agency in the environment. They are silent watchers immersed in a 3D digital space and are either guided through it or enabled to roam it freely. Apart from possible free movement, the particular difference between viewing the same content on a screen or in VR is the technological immersiveness. The panoramic representation in VR completely occupies the field of view blocking all external stimuli, to an extent placing the user amidst a city instead of in front of it. This is true for all VR applications but is the essential advantage of mobile VR, however simplistic the technology may be, over 2D screens.

Gods are found in more diverse types of environments, such as design and management, artistic pieces, simulations and erotic games. They are invisible to self but sometimes the environment eerily notices them regardless of that [33]. They can interact with, and in some way at least influence the environment. It could be driving a car with no hands on the wheel [32] or controlling city objects from a bird view hovering position [1].

Spatial manipulators can see either their cartoonish or abstract hands, or controllers. These serve solely as a tool for managing the digital environment. These users are usually builders, managing the cities from high above. The parts of them that are presented are there only for usability purposes — to provide for an overall sense of one's source of agency in space, and usually to enable smooth interactions with the city.

Storified manipulators are possibly appearing in the most diverse applications. Like the previous one, these representations are there to orientate the user, but are also the first ones that include them in the virtual environment. The little that is one's self in the virtual does belong there instead of appearing as an incongruent intrusion. Again, the parts that contribute to usability are presented, but with some consistency.

Characters are users that are fully visually presented in the VR. They are fully fledged inhabitants of the virtual cities. However, they are scarcely found and limited to games, but not tied to any particular genre.

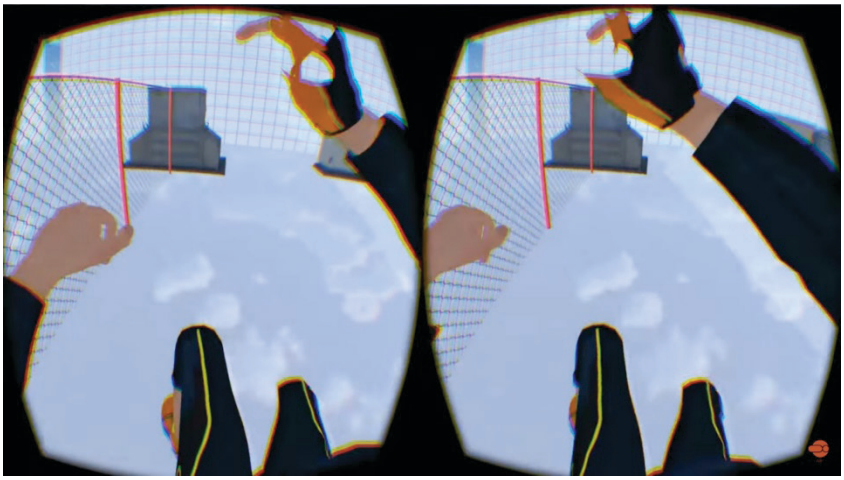

Figure 3. The Character avatar of *Parkour VR* [14].

4.4. *Current State of Urban Representations in VR*

In the following table are synthesised the occurrences of specific types of avatars in particular urban representations, with the (few) exceptions listed where appropriate.

	City as wallpaper		City as system	City as culture
Interacting in	Storified manipulator (exceptions: 19, 33)		God	Witness
Interacting with	Storified manipulator	Character	God	God
Acting on	Spatial manipulator	Storified manipulator	Spatial manipulator	Storified manipulator

The table outlines some clear correlations between the types of avatar implemented and how cities are represented. In most cases (seven out of

nine), to each specific representation corresponds only one type of avatar used in all the titles. In the other cases, the avatars implemented are two and rather similar to each other. Some types of urban representation include only few titles — or even only one — and in those cases the lack of variety in types of avatars is not surprising. Nevertheless, the types that encompass the highest number of titles (interacting in the city as a wallpaper and interacting in the city as culture) also feature one single type of avatar, with minor exceptions.

In general, we can see some general trends. First of all, the titles that offer the most elaborate experiences, that is, those which provide higher levels of authorship over the city, tend to give more importance to the representation of the subject. The titles allowing to *act on* the city all feature a Spatial or Storified manipulators. Authorship, therefore, is supported with a representation of a *model author* (Eco, 1979) that is clearly present in the representation, while never completely *actorialized* (in our sample Characters never occur in titles featuring the possibility to *act on* the city). In other words, the users are offered the representation of *agency*, of some digital prostheses (Lahti, 2003) that allow them to act in the virtual environment but are not invested with any character identity.

Secondly, all non–game titles make use of disembodied agents (Witnesses in most cases, or Gods), while all the games, with the exception of the Simulation ones, use embodied agents, often anchored to the diegesis. This is probably due to a different importance that the two elements have across genres: games put the players at the centre of attention, while non–games focus on the urban environments themselves.

5. Discussion and Conclusions

We investigated representations of urban environments in virtual reality from two perspectives — that of cities and that of technology and users. We have outlined several types of urban representations as well as several types of avatars, and we investigated the relationships between these two dimensions.

Our scoping of the current situation on urban representations in VR returned a quite shallow use of the technology and of the semiotic potentials of the objects represented. On the one hand, while VR technol-

ogies are still relatively young and expensive for wide commercial use, and production is somewhat resource–heavy, these applications have been developed over a course of several years and we expected to find more nuanced, rich, and engaging interactive experiences. That does not seem to be the case. Looking at the currently available applications there are very clear patterns of how these two perspectives — of the city and the user — are used depending on the type and/or purpose of the application itself. In other words, we found that the vast majority of urban representations in VR seems to follow some unwritten patterns in design, usually following a principle of economy. They attempt to simply convey the mere idea of a VR representation through the minimum viable product or even a proof of concept. For example, if it is a construction game (acting on the city type), based on the results we can assume that the user will only play a functional role, with their "tools" — hands or controllers — visible in the environment[2].

These patterns are also quite similar to the ones used in other platforms and media, such as digital games. VR therefore is rarely addressed as a distinct media technology with its own particular affordances found in no other one, its strengths and weaknesses in regard of possibilities of representation and of creating experiences, but most of the design principles implemented in VR are simply ported, imitating older and well–established media.

On the other hand, the flatness of many urban representations in VR seems to reflect the structures of power and authorship that are embedded in real cities. VR cities are often "untouchable": spaces to cross and to look at, but not to modify and transform. As we have mentioned, this is particularly true if we approach titles that deal with tourism and cultural heritage, that while they present to the users a digital replica of the buildings and objects, they still require them to be engaged while keeping a respectful distance. The "do not touch" rule is here enforced by the very

2. These patterns are visible in all types of content in virtual environments and are not necessarily detrimental to the experiences. We can see how in video games, as very rich interactive media experiences, there are similar patterns as found here. Strategy games, and in general those that primarily focus on the system rather than the affective experience, rarely employ the representation of the user, it is simply unnecessary, and the user might not even exist as a recognized entity in the game. They are rather treated simply as if they were moving chess pieces on the board. On the other hand, role–playing games (or RPGs) are defined by the user controlling and leading, or "being", one character.

choice of the avatar, which is always a Witness. While a lack of resources for more elaborate experiences can partially motivate this choice, these representations also evidently suffer from a lack of imagination. VR technology is not seen as an opportunity to create something new, but just as a mean to recreate what is already existing, be it city spaces or digital games.

The novelty effect that VR still exercises on many users — and possibly on many of the people that commissioned such works — even in its most simple, 3–DOF forms has probably balanced out the shallow nature of such representations. VR has been used as a form of valorisation in itself, regardless of the quality of its implementation, that overshadowed other concerns. However, as the technology becomes more widespread among the general public, the "bare minimum" will not be able to offer a satisfactory effect on users for long. Bolder and more imaginative implementations will be needed to keep urban VR representations meaningful and attractive. VR, in fact, would have much to offer in this sense. There are several kinds of implementations that could positively use the affordances of technology to present something in a way otherwise impossible or to stimulate users' memory. Indeed, there are various examples of testing virtual reality for learning (e.g. Parong & Mayong, 2018; Markowitz *et al.,* 2018), including Google Earth VR, which proved to be more effective over more traditional paper–based methods (Gorham *et al.,* 2019). It is worth noting that the Google Earth is only utilizing the technological immersiveness of the system in terms of presence or place illusion (Slater, 2009). However, there is also a drawback that warrants caution when using embodied applications. Creating avatars that are *not quite* human might instead impede the suspension of disbelief necessary for the psychological immersion to occur. The uncanny valley (Lugrin *et al.,* 2015; Mori *et al.,* 2012) describes the phenomenon originally from the field of robotics where the likeness with humans will have a positive effect, unless the representation looks too much like a human but *not quite*, causing the observer to feel uneasy. The slight nuances of human (nonverbal) behaviour are still impossible to perfectly replicate to make sure to surpass this critical point of likeness and release users' attention. Therefore, embodiment should not necessarily strive for a photorealistic presentation, but instead simply giving the user a skin to wear and act through while inhabiting a virtual world.

Some of the titles we have examined, in fact, go in these directions, allowing complex forms of action and interaction with the VR urban spaces.

Figure 4. Players painting the urban spaces in *Hypatia* [36].

Nevertheless, diversifying the avatars used in different types of urban representations and moving beyond simplistic approaches to city representation would make it possible to tap on the potential of the medium. For example, touristic applications affording some degrees of authorship to their users through Storified manipulators would allow new way of negotiating the experience of cultural heritage. Similarly, construction games engaging the complexity of the city as culture and their nature as a complex, polyphonic meaning–making devices would add a new layer to the existing possible relationships between individuals and the urban. In other words, the "gaps" that emerged from our analysis offer, at the same time, opportunities for the creation more meaningful and innovative VR cities.

On the theoretical side, our study also underlines the importance of updating analytical tools and epistemological strategies to adapt to new media and texts. On the one hand, it is important to avoid being blinded by the novelty effect that VR technology can have, and look beyond the simple use of the technology to analyse *how* the technology is used and implemented, what effects of meaning rise from it, what languages and modelling systems are shaped by it and what are its semiotic features. On

the other hand, we also must avoid looking only for old languages when dealing with new media. While confronting them can indeed be productive, and while many of the early implementations are attempt of transposition from the ole media to the new, a thorough understanding of VR can only come from focusing on what makes it unique.

This research, that has been based on an interdisciplinary collaboration, also aims to propose a possible approach to the semiotic study of Virtual Reality, that integrates the analytic toolbox of the discipline with concepts derived by media–specific studies and theories.

5.1. *Future directions*

While our study had a rather narrow focus — urban representations in VR — many of the concepts that we have outlined in these pages can indeed be applied to other objects of study.

First of all, the types of avatars in VR, while built around our sample, can be generalized and systematized in order to be adapted to a variety of VR applications. The titles in our sample did not cover all the possibilities of avatar implementation in VR and, as such, we were able to outline a small number of types. Future works might include specific work on VR avatars and their implications on users' affect, cognition, and behaviour. This typology could go beyond the need of a sharp typology and allows for a deeper look at the variety of possible implementations.

Secondly, while here we focused on cities, our approach can be adapted to other forms of special representation in VR. It would be possible, for example, to analyse the representation of nature and natural spaces. Some of the categories would need to be adapted (nature generally doesn't represent culture, but its ideological opposite — sometimes with euphoric, sometimes with dysphoric charges — and can be seen as a space outside the semiosphere) but the general approach would be the same.

Finally, some of these categories, such as cultural heritage and tourism, deserve more systematic and focused reviews due to their relevance and a wide array of intended uses and effects. This chapter, then, is also an exploration of the possibilities and an invitation for further analyses of subjectivity and spatiality in different VR contexts.

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ANNEX 1 – The Sample

All hyperlinks have been accessed for the last time the 30th January 2019.

1. *Non–game applications*

1.1. Design management

Connected cities VR, https://www.youtube.com/watch?time_continue=62&v=aCj_jChhXRg.

1.2. Tourism and cultural heritage

Chernobyl VR Project, http://www.chernobylvrproject.com/en/.

The VR City Experience, https://cityvr.com/.

Google Earth VR 8+ Streetview.

Curio–cité, https://artsandculture.google.com/project/curiocite.

Virtual Tour – Città Proibita VR, https://www.maotorino.it/it/education/progetti-speciali/virtual-tour-citt%C3%A0-proibita-vr.

Katara Cultural Village, http://www.katara.net/en.

Timescope, https://timescope.com/.

VR Rome, https://store.steampowered.com/app/964460/VR_Rome/.

Gèneve 1850, http://institutions.ville-geneve.ch/fr/mah/expositions-evenements/expositions/geneve-1850/.

Rome Reborn, https://www.romereborn.org.

1.3. Experience/Art

City of Sparkles, https://cityofsparkles.art/.

2. *Game applications*

2.1. Racing/Free movement

To the Top, https://www.youtube.com/watch?v=DljCutE9uDI.

Parkour VR, https://www.youtube.com/watch?v=rLsHrSA87Yg.

Sprint Vector, https://store.steampowered.com/app/590690/Sprint_Vector/.

Doll City Prologue, https://store.steampowered.com/app/468170/Doll_City__Prologue.

Hover Boots VR, https://store.steampowered.com/app/672670/Hover_Bots_VR/.

Vertigo, https://www.oculus.com/experiences/rift/203721827632946/.

City Scape VR, https://www.oculus.com/experiences/rift/1855910274463487/.

2.2. Fighting

City Balls VR, https://store.steampowered.com/app/757400/CITY_BALLS_VR/.

Dawn City, https://store.steampowered.com/app/768110/Dawn_City/.

MSI Electric City: Core Assault, https://store.steampowered.com/app/691930/MSI_Electric_City_Core_Assault/.

ZombiesTown VR, https://store.steampowered.com/app/562740/ZombiesTown_VR/.

City Avenger, https://www.oculus.com/experiences/rift/1423819361003940/.

Outrageous Grounds: The Maze, https://store.steampowered.com/app/513050/Outrageous_Grounds_The_Maze/.

2.3. Construction

Cloud City VR, https://store.steampowered.com/app/662950/CloudCity_VR/.

Tiny Town VR, https://store.steampowered.com/app/653930/Tiny_Town_VR/.

Skytropolis, https://store.steampowered.com/app/629040/Skytropolis/.

Block'hood VR, https://store.steampowered.com/app/787720/Blockhood_VR/.

Strongbow Nature Remix, https://www.unit9.com/project/strongbow-nature-remix/.

2.4. Simulation

City Traffic Control, https://www.oculus.com/experiences/rift/1556750707686722/.

City Car Driving, https://store.steampowered.com/app/493490/City_Car_Driving/.

2.5. Eroticism

Night City 2177, https://store.steampowered.com/app/994320/Night_City_2177/.

Paradise City VR, https://store.steampowered.com/app/989780/Paradise_City_VR/.

2.6. Puzzle

Cityscape Repairman 2.0, https://www.oculus.com/experiences/rift/875702375875548/.

2.7. Social

Hypatia, https://www.wearvr.com/apps/hypatia.

VR Chat, https://www.vrchat.com/.

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Virtual Wearables

Envisioning Future Scenarios for Wearables in Extended Reality Environments

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Abstract: Extended reality systems are among the most prominent environments of today's entertainment. They are wearable systems and there are many other supportive wearables that are designed to go together with XR devices such as haptic gloves or full–body suits. However, applications are usually limited to tactile feedback and the collection of the body data and other strong parts of wearables are neglected. These strong parts, according to previous studies, are the performative, social and interactive features of wearables. In this chapter, we will introduce those in detail and envision future uses for XR wearables drawing on this knowledge.

Keywords:

Extended reality (XR) (virtual reality, augmented reality or mixed reality) is one of the most trending concepts in entertainment today. As a basic explanation, the aim of XR is to provide more immersive media experiences by putting the user into the virtual world of the related media. From social media environments to creative production tools, XR applications are quite varied, and compared with desktop applications, they provide unique experiences because the user is in the centre of a different reality. In 2018, the virtual reality hardware market has been around 4 billion US dollars (KZero, 2016; SuperData Research Holdings, 2018) and this number is expected to increase to 9.7 billion US dollars by 2021 (SuperData Research Holdings, 2018) if the high–adoption scenario is realised. Industry leaders, such as Facebook and Google, are investing in XR systems to realise this scenario by making XR more affordable, lightweight, usable and integrated into daily life and entertainment.

However, most of the current widespread extended reality glasses only stimulate the visual perceptions of users, which creates the need for companion devices such as 360° treadmills for incorporating other senses into the XR experience. This is where wearables come in because they can facilitate different kinds of senses and introduce various interaction styles to a XR environments.

An example of such concept is the recently released movie Ready Player One (Spielberg, 2018), which envisions a future where the utilisation of virtual reality is a common daily activity and where the virtual reality equipment is complete only with the support of whole–body wearable kits. Although this is a fictional scenario, research on XR wearables corroborates with this vision because there are many studies relying on wearables for introducing senses that cannot be provided by XR glasses. There are examples of wearables providing haptic feedback and gestural controls that are already on sale (Labs®, 2018) or in the commercialisation phase (Corp, 2018; Inc, 2018). However, wearables promise much more than just haptic feedback or gestural controls, and are postulated to make XR experiences more immersive by (1) being a tool for reflecting augmented body expressions, (2) transforming the body in versatile ways to enhance the embodiment feeling and (3) introducing new ways of interacting with the virtual layer through tangible and embedded modalities (Tanenbaum & Tanenbaum, 2015) by augmenting the physical properties of wearables in the virtual environment and expanding their capabilities of representing information.

Considering these, research on wearables for XR still does not answer the following questions: What for wearables can be used in XR, except for providing haptic feedback and gestural control? What is missing in terms of design philosophy in the XR field when it comes to interfaces that can be attached to our body? What areas are still underexplored and how do these areas can help us to reach an ideal state where we have a seamless interaction between the physicality of real life and the digital layers of virtual reality? In this paper, I will present a critical reflection on the current state of wearables for XR to answer these questions and point out a future that might allow us to create new bodily experiences in the virtual world through wearables.

Current state

Most of the work done on *XR* consider *wearables* to be mediator devices for *getting body data* and giving *bodily feedback*. Therefore, except for several specific cases, wearables have been used for providing tactile and kinaesthetic feedback to users and transferring biodata such as motion or EMG into a VR environment to better manipulate the content within. For instance, when it comes to output devices, Wolverine (Choi & Follmer, 2016) is a knuckle–type example of a wearable that is worn on the fingers; it provides tactility with force feedback. A similar study made virtual objects "feelable" to hands by incorporating a glove with haptic actuators (Israr *et al.*, 2015). Haptic Serpent (Al–Sada *et al.*, 2018) and the Force Jacket (Delazio, Nakagaki, Hudson, Lehman & Sample, 2018) are other projects that provide tactile feedback but with a focus on the full upper body. In addition, there are also released and future commercial products. such as HaptX (Inc, 2018), VMG (Labs®, 2018) gloves and Plexus (Corp, 2018) for adorning the virtual environment with physical feedback. In terms of input, WatchVR (Hirzle, Rixen, Gugenheimer & Rukzio, 2018) is a recent example that investigates smart watches as a control device for VR systems. In this project, the authors compared the different modalities of smart watches, such as gestural and touch interaction, by testing them in different positions, such as worn or handheld. Another example is Flex (Eckhardt, Sullivan & Pietroszek, 2017), a low–cost wearable device that can recognise hand gestures from EMG data for integrating body into XR. As shown by these examples, w*earables have been a part of many XR projects; however, they mostly focus on haptic feedback and gestural interaction, leaving space for the* exploration of other modalities, such as tangible or embedded.

Other than the above examples that focus on body input and output, several projects have explored novel interaction modalities that wearables could introduce into VR environments. FaceTouch (Gugenheimer, Dobbelstein, Winkler, Haas & Rukzio, 2016) — one of these examples — modifies head–mounted displays (HMDs), an essential part of XR systems; this project exploits the wide back surface of the virtual reality display as a touch area that can be used for inputs in nomadic XR systems. Similarly, FaceDisplay (Gugenheimer, Stemasov, Sareen & Rukzio, 2018) adorns the back and sides of VR glasses with displays to allow co–located social in-

teractions between users who do and do not wear HMDs. CHILDHOOD (Nishida, Takatori, Sato & Suzuki, 2015) aims to allow its users to experience the environment from a child's point of view by incorporating a waist–worn camera, a hand exoskeleton for simulating a child's touch and grasp and a non–functional hood to increase the transformativity (transforming into a child). *As seen here, there are several projects that modify VR glasses, using unconventional modalities and focusing on wearables' contribution to topics such as transformativity. However, these projects only address* specific use cases and do not produce generalisable design knowledge by adopting user–oriented design research.

Potential of wearables were investigated in a deeper level in non–XR entertainment projects. Hotaru (Abe & Isbister, 2016) and Magia Transformo (Jing, Nygaard & Tanenbaum, 2017) are two game projects using wearables because of wearables' affordances towards enhancing social interaction facilitation and performativity; these projects use wearables as an integral part of the gameplay and look into their design–related qualities, such as their visualities, interface properties and affordances. In addition to embodied modalities, wearables have also been envisioned as being able to adopt tangible and embedded interface modalities that are attached to body (Tanenbaum & Tanenbaum, 2015). Parallel with this theory, my previous project — WEARPG (O.T. Buruk & Özcan, 2018) — is an augmented role–playing game system that examines customisability, tangibility and character identification with wearables. These playful wearable projects show that wearables can increase the connectedness to imaginary worlds and thereby the immersion experience, which is critical for XR experience. The projects have focused on uncovering the design features of wearables, which were rarely considered by most XR wearable studies. *However, these projects have not focused on XR and have not put forth how* the physical properties of wearables can be augmented in virtual environments and how this would affect the user experience.

We have given many examples of different types of wearables that were developed for XR environments. These examples were heavily oriented towards increasing the tangible feeling of the virtual world and collecting the body data for using it as part of the interactivity. There were also few examples that exploit the features that wearables, by design, afford such as transformativity or social facilitation. Still, these examples are quite limited, and the field lacks the comprehensive design knowledge

about how the devices that can be worn or attached to the body can contribute to an improved and more immersive user experience in virtual environments. In this direction, this chapter presents my critical reflections on the unexplored paths by informing field for the possible research branches that can be opened for the integration of wearables in extended reality environments.

Critical reflections

At first sight, it might be hard to imagine what wearables can bring more than the things we counted above. Of course, I do not imply that use cases such as advanced haptic feedback or the appropriation of biometric information are meaningless or improper. Just the opposite, these are perfectly suitable and very fitting to the nature of the wearables. However, the field focus on too much on elaborating these topics and missing other affordances of wearables that can enhance the XR experience dramatically. Here I present my critical reflections on the current practices and shed light on what is to come.

Virtually Augmented Body Expressions

One of the most neglected properties of wearables are the mutual properties that they share with our clothes. For the most of our time in a day, it is hard to imagine our existence without our clothes. For the particular place and the time of the day, we also imagine ourselves in different type of clothes. They are so integrated into our life, they are even considered as the "second skin" (Berzowska, 2005; Wilson, 2004: 376; Yao *et al.*, 2016). In this fashion, they are a considerable part of our self–expression. This is why we change our look according to the occasion, place, time and the social environment. The look of our clothes, and thereby our body, also is affected by the physical properties of the environment. We try to choose what to wear according to the weather conditions, temperature, light conditions or the body substances that will be produced according to the activity. Therefore, our clothes are the representation of how we choose to express ourselves and how we perceive the mechanic needs of the environment. They are continuously in interaction with our environment and with the desire of

self–expression we possess. Then, how does turning our clothes into electronics that can have more advanced interaction with the environment and also with ourselves can contribute to these traits of clothes?

There are several interesting interventions to understand how wearables can actually enhance our body expressions. For example, Monarch is a project developed by Social Body Lab of OCAD University (Hartman, McConnell, Kourtoukov, Predko & Colpitts–Campbell, 2015) and it is a shoulder pad that can be swollen by the user with pneumatic pumps.

The project mainly aims that giving users a chance to exaggerate their body expressions. It can be for intimidating others while in conversation or simply an expression of excitement. There are other similar projects such as Spider Dress that were designed to keep other people away by protecting the body–bubble of the wearer or more playful dresses such as Intimacy 2.0 (Roosegaarde, 2013) whose transparency changes according to the excitement level of the wearer (yes, it gets more transparent as the wearer gets more excited). In one of our previous design workshops, there were also ideas of using micro–robots that walks on the body to express disturbance and intimidation to people who get too close to our body (Genç, Buruk, Yılmaz, Can & Özcan, 2018). All these projects are great examples showing how wearable technologies can be an extension of the body and enhance the self–expression in ways that were not tried before.

Along these lines, wearables promise even more when it comes to body expressions in the virtual environment. With the involvement of extended reality, we can push the boundaries of what physically possible is when it comes to augmenting our bodily expressions. However, currently research done on this area does not inform us about how physicality and the experience of wearing and using these devices can translate into virtual expressions and eventually how these expressions can become an integral part of our virtual selves and affect our real selves. I think we have the opportunity to treat wearables as tools that will uncover an undiscovered social identity that exists simultaneously in both real and the virtual world. How can the physicality of wearables affect the augmented body expressions that will be created through XR technologies? How can wearables be a bridge between our virtual identity and real identity through augmented bodily expressions? I believe these questions are of interest not only to the wearables community but to other communities who research on topics such as virtual embodiment, fashion and smart textiles.

Kinaesthetic Transformation of the Body

What we wear also affect how we move (Keali'inohomoku, 1973). I may give many examples from our daily life about how a piece of clothing would affect our body movements, but I prefer to go with an example from Nigeria drawing upon the brass njaga anklets which were worn by the Nigerian Women between 1930 and 1940. According to Tremain (2011 as cited in Adams, 2007), the weight of the anklets changed the way wearer moves creating a distinct body posture that can even be imitated without the anklets worn to carry the feeling of wealth they provide. Although this example implies a longer term and a permanent change on how we move our bodies, immediate and short–term examples are also existent. For example, wearing a skirt may motivate a dancer to move their body in accordance with how their skirt sway and even they can explicitly manipulate the movement of the skirt which can be then thought as an extension of the body. Similarly, wearing a uniform might prime the wearer to get in a posture that is associated with that uniform (a police uniform might put the wearer into a stronger and more intimidating stance). Although more of a mental transformation, a previous study called Enclothed Cognition (Adam & Galinsky, 2012) put forth that what we wear actually also change how we think. In this experiment, participants who wore a lab–coat described as a doctor's coat had an increased sustained attention compared to the participants who were told that it was a painter's coat. Therefore, wearables can be a remarkable asset for transforming our bodies into distinct embodiments.

Previously Dag Svanæs tried to understand how extending our body affects our bodily experiences and the movement of our body by designing and implementing mechanical wearables in the shape of a tail and elephant ears (Svanæs & Solheim, 2016). This project actually is an interesting attempt because it tries to rise a phenomenological questioning of our body, by drawing upon the phenomenology of Merleau–Ponty's lived body (Merleau–Ponty, 2013), by defamiliarizing the body itself (Svanæs, 2019) (or with the authors' own words, by making it strange!). A similar study was also conducted by Karpashevich *et al.* (2018) where they made observations on the movements of a dancer who wears an interactive costume. In their study, they addressed how this costume restricted the movement of the dancer and altered the proprioception of them with

an unconventional mass distribution. They also observed how the lights scattered around by the garment affected the interaction of the wearer with the environment. These projects show that how wearables (when we can get rid of the limited image of them being wrist watches or bracelets) can have a bigger impact on how we perceive our own body and how we move it.

One of the very intriguing features of extended reality environments is that they can provide remarkably unique sensation about our own body. One of the examples I can remember immediately is a very simple implementation which allows couples to explore each other's body as if their own through a camera which is attached to virtual reality headsets (Woollaston, 2014). Another compelling example is an application which aims at making people experience near–death experiences by showing them as if they leave their own body and ascend towards the sky (Barberia, Oliva, Bourdin & Slater, 2018; Slater, 2018) These examples are just a few and quite simple implementations showing that the extended reality environments can animate truly transformational experiences. Our virtual body can turn into many different shapes and forms. Considering the power of wearables that can transform us both cognitively and kinaesthetically, I believe that wearables can be great tools for providing the full transition into another object by morphing the physical shape of our body dynamically. I think we need to start asking questions such as "how can we design interactive costumes that would alter the perception of our virtual bodies?" or "how can wearables help to transform our bodies into different beings that we can embody in the virtual environment?" These questions will help us to envision wearables that are beyond bio signals collectors or haptic feedback providers and will also reveal new dimensions of virtual embodiment.

Complex Interaction through Virtual Layers

Embodied interaction methods have been the dominant way of interacting with wearables. Every time I organize brainstorming sessions on wearables with different participants, many ideas revolve around gestural controls, touch–screens or heartbeat sensors. It is true that these interaction methods are now well established in the field of wearables, however wearables can promise many other different interaction modalities that

the field misses to focus on in the current state. They can turn the body of the users into a surface for switches, buttons or tangible parts such as studs, cranks in a way that can encapsulate various embedded and tangible interaction modalities.

Previously Tanenbaum & Tanenbaum put forth speculative ideas on how bodies can be turned into a surface for switches and buttons (Tanenbaum & Tanenbaum, 2015). Taking a similar idea further, one of my previous projects incorporated tangible parts (elemental stones) that interact with an interactive gauntlet (of course, elemental gauntlet) in a game called WEARPG (Buruk, 2018; Buruk & Özcan, 2018). Again, in the design framework that I and my colleagues Katherine Isbister and Tess Tanenbaum developed (Buruk, Isbister & Tanenbaum, 2019), interactive features and the information structures of wearables have been described through four dimensions that will shift the interaction of the user towards the periphery or the artefact itself. These dimensions create a design space whose boundaries are defined by spectrums between tangible–digital, embodied–embedded, private–public and connected–standalone. I believe that focusing on less explored interaction modalities are key to divulge fulfilling bodily experiences that both extends what we feel about our body and how we interact with it.

When it comes to XR environments, I think that distinct interaction modalities of wearables will gain more importance in the near future. Just recently, Facebook announced that the Oculus Quest devices will be able to do real time hand tracking that will drop the need for the tangible handheld controllers. Even more, these controllers will become redundant because they will prevent us to use our hands freely. Therefore, as I also indicated in the beginning of this chapter, extended reality systems will be complete only with wearable companions. I think that we need to start exploring the different interaction modalities these wearables will possess in extended reality environments and the virtual layers of wearables that will augment, shape and alter the interaction affordances around these devices and around our body. Few curiosity points of mine when it comes to interaction modalities with wearables in extended reality environments are hidden in the following questions: "How should we configure tangible form and parts of wearables in a way that will promise versatile experiences in interacting with the virtual layers of our body?" or "How does the augmented virtual layers of wearables can dynamically

alter the affordances of the physical artefact and reconstruct our somaesthetic experiences in real time?" Research topics can also extend towards exploring the augmented representations of the interaction happening in the real–world but experienced in the virtual world through virtual layers. I believe that the steps towards understanding the distinct interaction modalities that can be provided by wearables will also be critical for unveiling the augmented bodily experiences.

Concluding Thoughts

In this chapter, I tried to reflect the current state of wearables for extended reality environments and presented my critical reflections for revealing the unexplored paths that can be point of interest for the field in the near future. Currently, developments in this area are heavily oriented around providing tactile feedback and collecting body data such as hearth beat or movement. Although these modalities are perfectly fine and suitable to wearables' nature of being attached to and worn on the body, I think that the same characteristics are source of other great advancements if we can shift our focus more towards the formal qualities of wearables.

The three topics that I think are underexplored currently are the utilisation of wearables as augmented expression tools in extended reality environments, the contraptions that can transform our body physically for embodying things in the virtual world and consideration of the untouched interaction modalities with tangibles, switches and buttons to explore the affordances that will be formed when the virtual layer affects those. These directions have the potential to open new paths and research branches for the extended reality wearables and also will uncover many questions about the representation of our body in the virtual world and its virtual layers.

Investments on extended reality headsets and the ecosystem are raising and these technologies move towards being a part of our daily lives. They will change how we interact with the environment in our daily lives and will also bring novel social interaction paradigms. These implementations are likely to create a solid virtual identity (we already have virtual identities but this time we will adopt it embodiedly) in which wearables will be needed to provide a complete experience of embodying this new identity.

I think that focusing on these missing parts will help towards better identification, enhanced interaction and improved extended reality experiences.

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Virtual Reality Tourism

A Journey Across Time and Space

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Resource: https://www.vrfocus.com/2018/04/real-time-vr-views-of-earth-from-space/.

Abstract: Virtual reality, the computer–based 3D simulated technology, is reshaping our reality. Especially in tourism, virtual reality is playing an increasingly critical role in helping tourists obtain simulated, highly immersive, and novel traveling experiences. As researchers in this area, we are curious about

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the traveling experience in virtual reality and thus present a series of related discussions. This chapter aims at answering the following four questions: 1) How is virtual reality technology applied to tourism activities? 2) What are the most prominent impacts that virtual reality has had on tourists' experiences? 3) What limitations does adopting virtual reality to tourism have? 4) What aspects of tourism have been deconstructed and reconstructed by virtual reality? This chapter investigates how virtual reality can be integrated into tourism activities to enhance tourists' experiences. Virtual reality technology which incorporates visual, auditory, olfactory, tactile and other senses, allows tourists to explore the environment from a first–person perspective and also change the environment as well. Thus, virtual reality not only generates an illusion of space and time for tourists, it endows them with multi–sensory experiences and combines aspects of utilitarianism and imagination during their tours. Four aspects of tourists' experiences most influenced by virtual reality are discussed. Virtual reality improves accessibility innovatively by creating a 3D computer–based virtual destination. Virtual reality could also be used to help preserve heritage by conserving the current situation of these sites in the forms of graphics and data. Furthermore, virtual reality enriches the forms of recreation activities and helps tourists to explore tourism sites in a novel way by acquiring experiences co–created with those sites. Last but not least, virtual reality enables potential tourists to experience the tour before they make a travel decision. However, a virtual tour is not completely optimal in terms of experience, thus this chapter also discusses the limitations of adopting virtual reality in tourism. The authenticity of virtual reality is doubtful, as many experiences gained during a tour are so complicated that recent technology cannot adequately stimulate them. People also find virtual reality incapable of stimulating the long–time feeling that are created by a real tour. Moreover, once people have experienced the site virtually, this will probably satiate their desire to visit the site for real. Virtual reality also cannot stimulate social interactions very well, so a virtual tour that excludes tourism gazes may be critically received. While most people pay attention to virtual reality's promising potential, we cast our sights on aspects that virtual reality cannot realize, at least at present. So in the fourth section of this chapter, we employ a post–modern discourse and discuss the deconstructional and reconstructional powers of virtual reality in tourism. We conclude with the view that a tourist may be confused by losing a sense of reality in a virtual tour, and their journey may become flat, one–off, fragmented, and be devoid of personal interaction.

Keywords: virtual reality; tourism; presence; post–modernity.

Virtual reality technology is part of the "technological utopia" (Lister *et al.*, 2009). It carries our eager dream of in–depth dialogue between human beings and the world. However, being one of the "meta–narratives" that characterized the discourse of modernity, the technological utopia itself has received as much following as it has reconsideration in the post–modern era. Thus, virtual reality is worshiped by some while doubted by others, highly expected by some while deeply feared by others. However, in regard to tourism, it seems that using virtual reality to improving its efficiency and expand its forms has gradually destructed its meaning. We re–examine the relationship between virtual reality and tourism (a domain among the earliest advocates of virtual reality technology) and discuss the deconstructive and reconstructive power of virtual reality. We apply a perspective of time and space throughout this chapter to step into the essence of virtual reality and shed light on its post–modernity.

The Embrace of Virtual Reality by Tourism

Embracing virtual reality by tourism has lead to many benefits. Virtual reality accelerates the delivery efficiency of tourism products and services by providing a unique and rich experience to tourists. In order to see how this has happened, let's first consider how the feeling of "presence" works.

Presence and its Metaphor

From a technical perspective, virtual reality is a sophisticated yet manageable composition of techniques and devices. But looking at it philosophically it is another thing, full of metaphors about reality and virtue, departure and arrival, and direct and indirect experiences. These metaphors are implanted within the core concept of "presence".

Virtual things are no stranger to us. Human beings not only seek the truth of the real, but also seek the best representations of the real. Paintings, photographs, radio shows, movies, etc., are all media forms (also art forms) invented by us to represent the real world. Throughout all these years of endeavor, we have, to some extent, fulfilled our deep–down desires to replicate nature artificially. From this perspective, virtual reality is a marvelous technique that establishes a world full of three–dimension-

al images, senses users' reactions and emotions, and changes objects in the virtual environment according to actions taking place in real–time (Greenbaum, 1991; Coats, 1992). There is virtually no other information technology that enables human beings to observe and change the virtual world in such a natural way like virtual reality.

Virtual reality involves us, fascinates us and empowers us, by imposing illusions on us. The concept of "presence" is at the core of virtual reality's magic. That is to say, many have believed that "presence" is one of the main reasons that virtual reality has such profound effects on the human psyche. Scholars prefer to understand it under the metaphor of "transportation", that is, a sensation of being conveyed to a virtual world (Lombard & Ditton, 1997; Schuemie *et al.*, 2001). Transportation has two measures: departure, a feeling of detachment from the physical environment, and arrival, a feeling of being attached to the virtual environment (Kim & Biocca, 1997). A well designed virtual reality world can make users generate feelings of "being there", and they will have illusions that they are physically in the world depicted by virtual reality rather than in the real world (Herz & Rauschnabel, 2018).

This may sound like a human–made daydream or a technology–based wonderland — you may think you're diving of the coastline of Australia one moment, however, once you remove the HMD (head–mounted display) you are wearing on your head, you find you are in fact in a dull office room. You have not been physically transported to the coastline of Australia, yet you have a beautiful memory of that diving experience. So, what else matters?

Especially in tours which are composed of a bunch of highly experienced activities, virtual reality enables the tourism industry to reshape its space and time by changing how tourist experiences are created and transferred (Huang *et al.*, 2016). In a virtual reality tour, it is not our physical body that travels, but our technology–mediated virtual body that travels around without time and space limitations.

Multi–Sensory Experience in Virtual Reality Tourism

Presence imposes illusions about space as well as time. Tourists can temporarily "escape" from the real world and be immersed in the virtual world by the help of virtual reality techniques. The more advanced the

reality technology is, and the more vividness and interactivity the virtual reality tour has, the more real the illusion of space is. Do tourists have any illusions of time during a virtual reality tour? The answer is yes, and this is related to an experience of "flow" which is "the holistic sensation that people feel when they act with total involvement" (Csikszentmihalyi, 1975: 36). When experiencing flow, one can lose one's sense of time (Skadberg & Kimmel, 2004; Shin, 2017 & 2018).

The reshaping of space and time technically rebuild a tourist's sensory experience in virtual reality. The visual sense comes first, as it is our prominent way of exploring the world. As an example, once visitors enter the virtual space of Dunhuang Mogao Cave in China, they can freely rotate their body to view the stone walls from different directions. To achieve the effect of close observation, they can control their point of view to zoom in on the murals. According to one virtual visitor: "The murals are clearly recorded in digital high definition, even more so than if you were physically there".

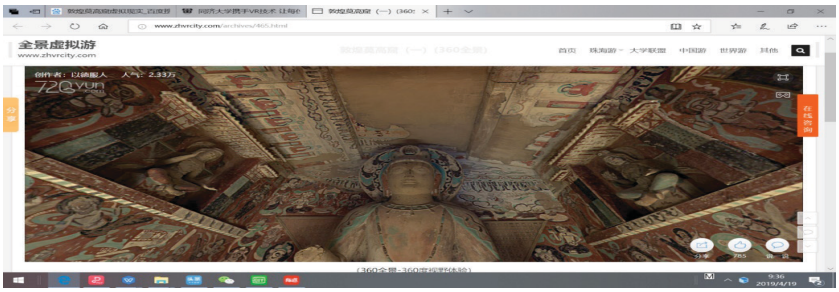

Figure 1. An image from the visitor's perspective in the virtual tour of Dunhuang Mogao Cave. Resource: http://www.72yun.com.

With a highly realistic simulation, virtual reality can represent natural landscapes or historical heritages with deep visual cues. The vividness of imagery presentation enhances the visual image appeal for tourists, and according to Ye and Tussyadiah (2011: 132) "the interest that a picture generates when viewed by potential visitors inspires them to visit the destination whether they are first–time visitors or repeat visitors". This visual experience provides pleasing imagery of a destination in the mind of potential tourists (Hyun & O'Keefe, 2012; Tussyadiah *et al.*, 2016) and

thus encourages potential tourists to come to visit the real site (Marasco *et al.*, 2018).

However, not only the visual sense, but also the experiences of audio, olfactory, and haptic can be enriched by virtual reality. For instance, Finland offers adventure rides which combine a roller coaster with virtual reality technology in Linnanmäki Amusement Park. The rides allow visitors to experience space scenery in a 360 degree field through video animation where they dodge planets at high speed. The music, acceleration and distance sensors constantly synchronize the 360–degree virtual image as the rides move around (Dieck *et al.*, 2018).

Figure 2. The virtual reality roller coaster "Linnunrata eXtra" in Linnanmäki Amusement Park, Finland. Resource: https://www.linnanmaki.fi/en/rides/linnunrata-extra.

Combinations of Realism, Hedonism and Imagination

Advancing senses by way of Virtual reality technology adds much more realism to tourism comparing to how tourism products and services in the forms of text and pictures have been presented in earlier days. Such an increase in perceived realism affects tourists' visiting intentions and behaviors. Compared with solely picture–based presentations of tourism destinations, the virtual reality tour arouses tourists' emotional states and

thus has superior effects on tourist attention, interest, desire and intention (Yeh *et al.*, 2017).

Almost all tourism activities involve some hedonic aspects, which can be interpreted as "a longing to experience different kinds of bodily and/or spiritual pleasure" (Jansson, 2002: 436). Researchers have pointed out that virtual reality and the feeling of 'presence' generated during a virtual reality tour can lead to tourists' experiencing hedonic feelings or pleasure (Tussyadiah *et al.*, 2017). This feeling is likely to root in the novelty of the virtual reality technique and to generate creative cognitive fulfillment. As an example, people virtually visiting the ancient city of Miletus enjoy a much more vibrant and more exciting exploration experience than simply site–seeing, being able to virtually select clothing from different periods, conduct virtual experiments related to some of Archimedes' discoveries, be archaeologists who reassemble ancient vases from virtual shards of ceramic, and assist an ancient sculptor in creating a statue of Zeus (Gaitatzes *et al.*, 2001; Roussou, 2004).

Virtual reality also adds an imaginary facet which can compensate for the realism orientation of tourism. Being used to tell and create stories affectingly, virtual reality can involve tourists in scenarios which only exist in people's imagination. For example, in the "Aladdin's Magic Carpet Ride" in DisneyQuest's Indoor Interactive Theme Park in Orlando, tourists race on a virtual magic carpet using a motorcycle–type apparatus and wearing HMDs; in "Pirates of the Caribbean: Battle for Buccaneer Gold", a four–person crew cooperate with each other (one guides the ship and the other three fire imitation cannons) to fight virtual enemy pirates (Mine, 2003; DisneyQuest, 2009); in the virtual reality roller coaster trip at the British theme park Alton Towers, tourists are recruited by an imaginary company called Galactica to accomplish a space–exploration task. Thus, virtual reality creates ravishing narratives, which inspire tourists' imagination and add to the charm of tourism sites.

Reshape of Tourism by Virtual Reality

Indeed, scholars have summarized various applications for virtual reality within the tourism sector (see: Guttentag, 2010; Tromp, 2017; Moorhouse *et al.*, 2018), based on functionalism mostly. What we want to do here is

to apply a perspective of space and time and focus on four experiential aspects of tourism influenced most prominently by virtual reality. All of these four aspects imply the tremendous reconstruction power of virtual reality.

Accessibility

Transportation infrastructures work as the link between tourists and tourist destinations (Leiper, 1990), and are considered as the primary means of improving tourism accessibility. An example is the way high–speed railway receives a lot of attention because it can "compress" time and space (Chew, 1987) by means of its ability to reducing the traveling time from a tourist's departure to arriving at their tourism destination from days to a matter of hours (Givoni, 2006), and thus expanding the radius of tourists' traveling space by 2–3 times than before (Theobald, 1994).

Virtual reality innovatively solves the problem of accessibility to tourism destinations, although in a diametrically opposite way. Once tourists are immersed in the virtual reality environment, their traveling time can be compressed within minutes or seconds. Meanwhile, their traveling radius can be enlarged to encompass as large an area as the imagination features of the virtual reality system allow. Technically, you can dive in the coastal waters in Australia in the first second, and walk on the Great Wall of China in the next.

Increasing accessibility in tourism not only brings convenience, time and cost savings, but also gains the well–being of all kinds of tourists, especially those who are disabled. For instance, Shakespeare's house in Warwickshire, Britain helps people in wheel chairs by providing them with a virtual reality tour of the second floor. With this help, they can navigate and observe the environment where Shakespeare once lived freely, without the need for physical activity that may otherwise prove challenging (Wiltshier & Clarke, 2017).

As well as disabled people, older adults, those with poor health conditions, people too busy for a trip, and the "hermit" group (meaning those who choose to stay at home) can all benefit from a virtual reality tour. Some of the national parks in Canada have applied virtual reality as a promotion to attract the "hermit" group, and persuade them to come to see the areas first–hand (Wiltshier & Clarke, 2017). Also, the Marriott hotel

brand has created facilities called "Teleporters" which are somewhat like telephone booths, "transporting" people to different corners of the globe by way of a fully immersive, 4–D sensory experience to enable couples to have a virtual honeymoon (emarketer.com, 2015). From the above perspective, virtual reality largely improves or even redefines the concept of accessibility, by "bringing down the final set of walls, having the world brought into our homes, while at the same time, from our homes, entering the world" (Cranford, 1996: 90).

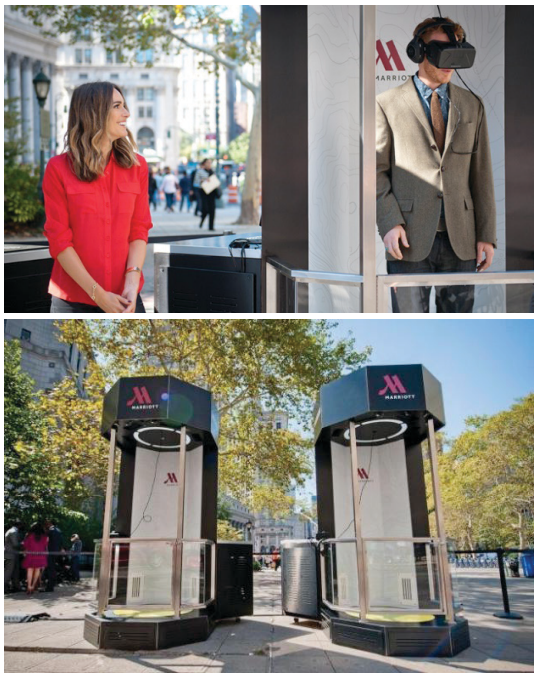

Figure 3. The "Teleporter" applied by Marriott to offer virtual reality experiences.Resource: Mhttp://www.creativeguerrillamarketing.com/augmented-reality/free-vacations-marriotts-virtual-reality-teleporter/.

Preservation

> Heritage is our legacy from the past, what we live with today, and what we pass on to future generations. Our cultural and natural heritage are both irreplaceable sources of life and inspiration. (UNESCO)

The majority of people cannot forget the date of April 16th, 2019, when France's famous Notre Dame Cathedral was enveloped in a serious fire and the main body of the tower was severely damaged. The rebuilding process will last for a very long time, and as such, it is guessed that this cultural treasure may not be able to receive new visitors for more than a decade. Luckily, since 2015, Dr. Andrew Tallon has performed laser scanning on Notre Dame and formed its 3–D model. So, even if people cannot see it for real, they can enter a virtual world where it still exists and appreciate its past glory.

For heritage sites which are still open to visitors, virtual reality can be used to develop their spatial capacity. There seems to be a dilemma towards these types of sites where the cultural items they hold are worthy of people coming to see and learn, but if too many visitors come, they risk causing them harm. Virtual reality seems to be an excellent way to resolve this dilemma by allowing visitors to see the heritages virtually without disturbing them. Immersive visualizations and 3D reconstructions of heritage sites provide a choice for visitors. By doing this, virtual reality offers protection for heritage sites too fragile to be visited (Bruno *et al.*, 2010). What's more, it brings heritage sites back to life, over and above simply providing a virtual means of access. So, for example in recalling a virtual reality visit to an ancient Greek city, virtual reality can afford visitors a potentially richer experience than merely viewing the sites first hand.

Figure 4. The tower of Notre Dame before and after the fire and its 3D model. Resource: the micro blog of CCTV news (left); https://en.softonic.com/articles/notre-dame-rebuilding-apps (right).

As a further function, virtual reality can save information about tourism sites for the future. This function goes with the aims of the World Heritage Preservation Project initiated by UNESCO (United Nations Educational, Scientific and Cultural Organization) which plans at saving the precious historical and natural heritage resources in case one day, natural or human disasters destroy them. To further this aim, UNESCO has been creating a documentary image bank of panoramic pictures and virtual reality films of all its listed heritage sites.

A virtual tour is like a bridge connecting the past, the here and now, and the future. Through a virtual tour, we can travel back in time to see what a heritage site was like in its heyday. Our off–spring can share the same visions we saw in the future, but virtual reality saves the stories and experiences related to heritage sites rather than merely storing information, data and images that relate to them. So, what a wonder it would be to imagine people visiting Notre Dame Cathedral virtually in the future, not only seeing its images but also witnessing all of its glory times. How did it look when Napoleon I was crowned here? What was it like when Joan of Arc was canonized here? What was it like when Esmeralda and Quasimodo met in Hugo's novel? These virtual visitors can even feel the grief we felt when it was destroyed by fire, and the joy that we look forward to experiencing when the rebuilding and restoration is finished.

Exploration by Co–Creating

Educational tourism is one of the trends that has had higher growth in recent years. However, visitors have come to dislike the passive receipt of information and want to be more involved. That is why many museums have tried to apply reality technology to innovate the traditional formats of exhibitions. Because virtual reality allows users to observe the virtual world from a first–person perspective, visitors who were onlookers before can now walk into great works of art, such as e.g. the "Wilton Diptych", "The Virgin of the Rocks", "Mars and Venus", etc., exhibited in the Sainsbury Wing gallery in the British Museum. In China, the Palace Museum has cooperated with the internet company Tencent to immerse visitors in the painting "The thousands of miles of rivers and mountains" allowing visitors to become absorbed into the space and timeline created by the painting.

A virtual reality tour enables visitors to positively interact with the tourism sites, their history, and the surrounding knowledge. Virtual reality museums excel in the context of traditional museums because of the extraordinary experience they offer to visitors, granting unparalleled levels of access. Such a visitor experience can be seen in the virtual reality journey provided by the Geevor Tin Mine Museum where visitors can experience an underground mine (Jung *et al.*, 2016), or the Oculus cooperation between the British Museum and an Egyptian collection, allowing users to navigate an ancient Egyptian tomb, see the mummies and appreciate the funeral art. Additionally, some tourism destinations have developed virtual reality applications and games to attract tourists and supply them with further knowledge (Zarzuela *et al.*, 2013).

Virtual reality encourages visitors to co–create experiences and values with tourism content providers. Recalling the virtual reality visit to the ancient Greek city and the "Pirates of the Caribbean" battle mentioned previously; virtual reality can generate an imaginary environment which does not exist and is otherwise impossible to exist (Slater & Sanchez–Vives: 2016). Thus it provides a broad space with almost no physical restrictions for tourists to imagine, think, and explore. Virtual reality can bring cultural relics that can only remain static in a museum, back to life. Visitors can decide how to navigate within the virtual landscape and how they interact with the sites' facilities. Tourists begin to interpret touristic content themselves inside the virtual world they are provided with, instead of just standing and observing from outside. So, they merge their living space with the tourism space, and thus create marvelous experiences for themselves.

Pre–Tour Promotion

The travel process can be divided into three phases: the pre–visit phase, the on–site phase, and the post–visit phase (Neuhofer *et al.*, 2012). The pre–visit phase is crucial in the overall travel process since, in this phase, tourists develop their expectations about the visit and make their decisions about the trip. However, many tourism products and services are actually "confidence goods" that consumers are unable to try before actually purchasing (Wang *et al.*, 2015). In the past, when people made travel decisions, they relied on descriptive information provided by two–dimen-

sional pictures or videos. Considering the richness of tourism products and services, this kind of presentation is far from adequate.

The subjective experience of presence in virtual reality can translate into real–world attitudes and induce behavioral change (Fox *et al.*, 2014). Thus a virtual tour can be persuasive and act as an effective communication tool in the pre–visit phase. A virtual reality tour not only provides more detailed information compared to two–dimensional pictures or videos, but also offers an immersive experience of the upcoming tour. It has the capability of "satisfying the goal of acquiring functional and esthetic trip information as a preparatory step to the trip intention phase" (Kaplanidou & Vogt, 2006: 205). Consumers often use product experiences for product evaluations, and direct product experiences advance indirect experiences that are derived from visual and verbal messages in helping persuade people to make a favorable decision (Hamilton & Thompson, 2007). The information gained from direct experience is more concrete and credible, and it strengthens confidence and lessens uncertainty in consumers' purchase decision making. Virtual reality can provide an extensive sensory experience to potential tourists. Particularly, virtual reality gives tourists a sense of what it is like to be there, a "try before you buy" experience, and an experience close to the direct experience. According to Cho *et al.* (2002), the usefulness of virtual tour experiences for destination marketing lies in their ability to make potential tourists evaluate the value of the actual experience more accurately. More specifically, it improves tourists' efficiency of information searching, enhances their searching ability to gain experiential attributes, and increases their confidence that the actual tour experience will satisfy them.

A deeper mechanism may lie in the fact that marketing itself has a close relation to virtual scenes. For instance, advertisements are like a play rehearsal where potential customers imagine the situation where they touch, feel and use a product. Their self–referencing and self–persuasion processes will be stimulated, which will in turn help the customer to make a more positive evaluation and decide about the product. The same can be said for tourism products, and an experience during a virtual reality tour connects the pre–visit stage and the on–site stage, making the pre–visit stage a vivid rehearsal of what tourists will experience during the real tour. So, to better understand and evaluate the actual tour, you may want to try a virtual one, and the information and feeling acquired during

this rehearsal might make potential visitors behave more positively when choosing their tourism destinations.

Virtual Reality is not Almighty in Tourism

The above analysis implies that applying virtual reality in tourism can generate exceptional value, regardless of the economy, society or culture in which it is implemented. The era of the virtual reality tour is indeed coming. However, it is necessary to notice that virtual reality still has limitations, which remind us of the essence of virtual reality technology: As an information technology with high fidelity that represents the real world, virtual reality is leading a widespread discussion about the contraction and cohesion of realism and simulation. What needs to be asked is whether this stimulation completes the real world, substitutes it, or maybe one day twists and subverts it? There is no definite answer at present, however, what is admitted is that although virtual reality technology and its application in tourism hold with high potential, their consideration and implementation is far from mature.

Authenticity

With regard to virtual reality, a question of authenticity rises above all. Authenticity mainly refers to what is true, genuine, or real (Beverland & Farrelly, 2010). A tourist's perception of the authenticity of a virtual reality tour experience will be a crucial factor that influences his or her acceptance of it as a substitute for a real tour (Guttentag, 2010). As Paquet and Viktor (2005) have said, "most people want to see reality and not only virtuality" (p. 1).

From the traditional view of "objective authenticity", people evaluate their experiences with an objective, criteria–based evaluation (Wang, 1999). So, it is no surprise that there are considerations about the authenticity of a virtual reality tour, given that virtual reality cannot fully revivify all of the detailed cues that are encountered in traditional tourism. As noted by Cheong (1995), "how is VR able accurately to simulate the smell of ocean spray and the splash of seawater on one's face as one participates in virtual surfing?" (p. 421). There are indeed surveys that show virtu-

al reality tourism is not always welcomed (Sussmann & Vanhegan, 2000; Prideaux, 2002). However, since the technology is still developing, it may one day be able to perfectly simulate the smell of the ocean, the splash of seawater on tourists' faces, a fragrant breeze wafting across their arm, or a sweet song of birds in the morning. Regardless of how accurate technology can render these experiences, what truly matters is how tourists perceive these imitations.

From the perspective of "constructive authenticity," the authenticity of the virtual reality tour experience is negotiable. People rely on their personal perceptions to evaluate the authenticity of a thing (Cohen, 1988), so even if a tourism product exhibits features that are staged or contrived, tourists may still view it as authentic. This is good news for propagating applications of virtual reality in tourism. However, a somewhat harsh post–modern question can be raised: Do people really want to see the real, especially if one day in the far future, virtual reality is as exciting or perhaps more exciting than the real thing? Virtual reality might make people gradually perceive the simulation is in fact the real, denying the fact that it is merely an image or a sensational reflection of the real, so we will discuss this question further in the following section.

Temporality

With a virtual reality tour, you can escape from the physical world for a while. However, if you are looking for days or weeks of escaping from your ordinary life to visit a strange place, there is a large chance a virtual tour will leave you disappointed. Tourists cannot immerse themselves in virtual reality for too long because a condition known as cybersickness prevents them from doing so. With symptoms such as eye strain, disorientation and nausea, cybersickness becomes more severe as the exposure time increases (LaViola, 2000; Sadowski & Stanney, 2003). Thus, long–term virtual reality exposure does not seem currently viable.

A real tour can easily build a feeling of fleeting time and a dynamic perception that may never be achieved by a virtual reality tour. No matter whether it is the experience of diving on Australia's Great Barrier Reef, flying over the Lake District of England, or going visiting a glorious Egyptian market, a virtual reality tour is almost always about "heightened moments" and must contain one heightened moment after another in

its script, otherwise people will become distracted. But the real tourist experience contains something more which seems to bridge these gaps, and enable a prolonged but accepted time–continuum. Just as Graburn (1989) pointed out about the essence of temporality to the tourism experience, the real tourism process begins with the "ordinary," progresses into "heightened" moments, and returns to the "ordinary". A real tour dynamic involves both heightened moments and ordinary moments. When a tourist has turned the heightened moments into ordinary ones, it means that he/she has blended into the life of the tourism destination. This is more meaningful than just sight–seeing and leaving for the next destination. A virtual reality tour may represent the tourist moment or heightened moments, but what about the ordinary moments, and the transitional process from ordinary to heightened moments and back to ordinary? This kind of problem requires further thinking because as one can never engage in a virtual reality tour for too long, one cannot have the exact experience change that occurs during a long–duration journey. Therefore, the tourist's experiences during the tour may never "become embedded within the totality of lived experiences" (McCabe & Foster, 2006: 194).

Satiation

The satiation problem presents a dilemma of choosing between the real tour and its artificial replica. While the motivation for employing virtual reality is to attract people to consume the experience in real life, it is not clear as to whether this always works. People normally acquire less utility per unit of product when they consume more (Andersen, 2001). So once a tourist has experienced the scene in a virtual reality tour, will the satiation they achieve make them more or less likely to visit the spot for real?

Deng *et al.* (2018) found that a virtual reality tour generating similar experiences to those seen in reality may in fact dissuade tourists from future consumption. To be specific, the more vivid and interactive the virtual reality tour is, the more similar the virtual experience is to the actual experience. Thus, satiated consumers are more likely to have less desire to engage in future consumption. Deng *et al.* (2018) declared that there is a close relationship between satiation and the types of experiences that are afforded. Experiences which can be stimulated by virtual reality to a high fidelity level generate the most satiation, e.g. watching shows, or visiting

museum exhibitions. When it comes to activities that virtual reality cannot fully simulate (e.g. some type of vigorous outdoor activity), a virtual reality tour works better as it causes less satiation. These kind of studies open the door for us to notice the dilemma of virtual reality's fidelity, and it seems that a highly level of fidelity doesn't always result in good outcomes. A further thought may be that consumers seem to expect virtual reality to create content that is not only highly representative of the real, but which also goes beyond the real in some way. Thus, they are looking forward to something special being provided by virtual reality.

Tourism Gaze

Urry (1992) introduces the term 'tourist gaze' to describe the process through which a tourist objectifies and interprets the place that he or she visits. The term "tourist experience" is a socially constructed term, and its meaning is associated with multiple interpretations from social, environmental and active components of the overall tourist experience. Tourists travel to different places, interact with people from diverse cultural backgrounds, and bring back travel memories. Tourists "gaze" at the local people's daily life during their visits and take such glimpses as one of the most novelty–affording parts of their tours. At the same time, they are being gazed at by local people, and this is well illustrated in the travel photo presented below taken by a tourist in Iran, which happens to capture the interesting "gazes" that take place (Nikjoo & Bakhshi, 2019). In the photo, a tourist is sitting beside local soldiers on the steps of a historic site. A second tourist takes a photo of all of them. His photography causes different responses, where the first tourist is smiling at him while one of the soldiers is staring at him. These interesting gazes are happening at the same moment and are captured in one photo, revealing how complicated and amazing the interactions are between the landscape, residents and tourists.

However, virtual reality cannot currently simulate tourism gazes. Virtual reality tours are usually designed for a single tourist, and this orientation eliminates the most complex and uncontrolled factors that influence the tourism experience — the tourist's companions and local residents. This somehow makes it easier to realize a virtual reality tour. But it is also possible that a virtual reality tour which excludes encounters with other

tourists and native residents may be criticized as being a 'tour without a soul'?

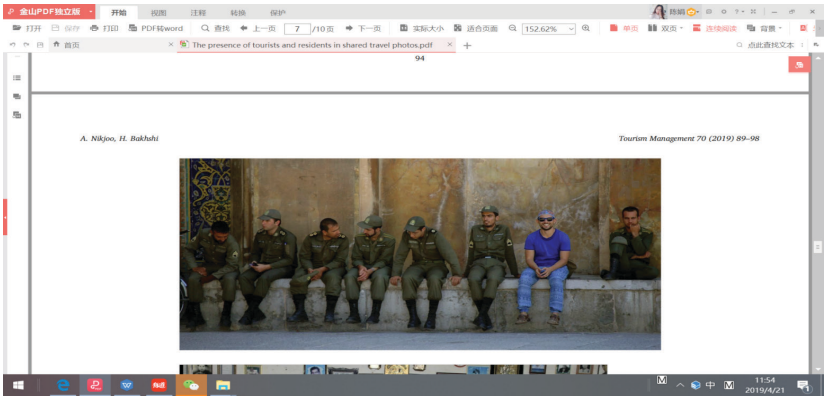

Figure 5. A photo of local people sitting with a visitor in Iran. Resource: Nikjoo and Bakhshi (2019).

The Deconstructive Power Embedded in Virtual Reality

> Virtual travel opportunities are prevalent and mass–market. As such they are generic, formulaic, all–ages and affordable. […] Family–friendly "real life" travel will be the norm, […] Travel is dangerous, expensive and highly out of reach for most people […]. (Whittington, 2014)

The scene above depicts a holiday 'norm' in 2050 under the driven forces of technology, including virtual reality, as described by Whittington (2014). It is a fascinating, yet thought–provoking foretelling of what a future tour might be like.

Questioning the validity of things that already exist or feature commonly in our daily life is one of the main issues of post–modern era. Virtual reality tourism is no different, and its validity is still questionable and subject to our opinions. Will the day that people decide to go on virtual visits instead of actually traveling arrive? If that day really comes, then is it a step forward or backward for human beings? How do we deal with the relationship between physical body and images in mind? How do we rethink realism in a time of virtual reality? How does our behavior change

under the influence of these reality technologies? In asking such questions, we must realize that applying virtual reality in tourism has not only limitations, but even potential risks. Therefore, it is worthwhile taking a second look at these questions.

Confusion by Losing Reality

Does virtual reality change our mindset just in the same way that other media forms (e.g., television, social media) have in the past? The answer to this may be yes, and something we have designed has finally changed how we think about a number of issues.

The new formulation and content provided by virtual reality have begun to challenge tourists' subjectivity. Virtual reality may have gradually changed our traveling motivations, our emotional appraisals towards the products and services provided in tourism, and even our understanding of the meaning of traveling. For example, Campbell (2005) has pointed out that information–mediated environments have caused a gradual shift in people's hedonistic orientation, from realistic hedonism to one of imaginative hedonism. In the past, hedonism meant bodily pleasure for people, but nowadays, hedonism has broadened to include pleasure sought via emotional and spiritual stimulation. It is exotic yet uncomfortable to imagine that in the future, people might refuse to undertake real travel, and turn to a virtual reality tour as a replacement. Thus, their pleasure in traveling would root in the technology simulating traveling, rather than in traveling itself.

At this point, we want to mention the Kremer Museum which is the first "virtual reality only" museum. It was founded by the Dutch art collector George Kremer and his son Joel Kremer, and the collection consists of 74 Dutch and Flemish masterpieces of the 17th century. It has no physical location and exists only in the virtual reality environment. The establishment of a "virtual reality only" museum is an event with special meaning. Besides its positive meaning that tourism now can break the limitations of space and largely reduce operation costs, it also suggests that tourism (which was once seen as a highly region–related industry) is now getting rid of its regionalism and becoming "dis–embedded". As more and more parts of our life become "dis–embedded", and the meaning of "places" is de–constructed, it is reasonable to ask whether our concepts

of spaces be torn down? This leads us in thought to a situation depicted by several scholars, where people will be "transported" by virtual reality to one virtual space after another, just like homeless vagrants who would possibly never return to their spiritual "home".

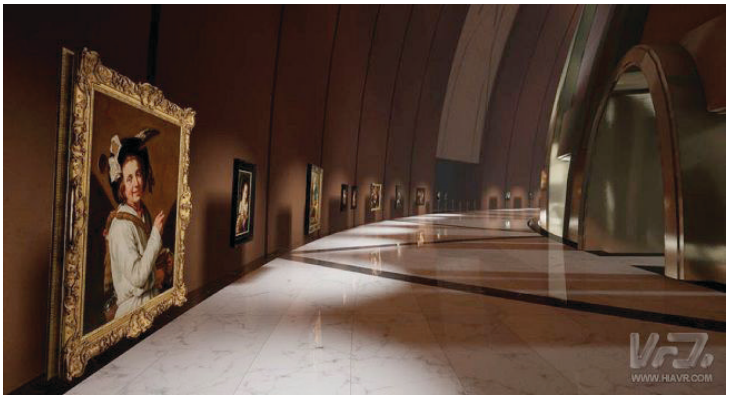

Figure 6. Kremer Museum existing only in virtual reality. Resource: https://www.thekremercollection.com/the-kremer-museum/.

Fragments of a Journey

Tourism means a lot more to tourists than just sightseeing around different scenic spots. Especially today, many citizens have a strong impulse to get away from the pressure of modern life. Can virtual reality fulfill their need for escaping? Virtual reality seems only able to allow us to escape for a while, and even after a virtual journey lasting perhaps half an hour, we may still have to return to our real–life circumstances and admit that we still haven't gone anywhere.

Even with cumulative use of virtual reality to attend several tours, we may still only get a few fragments of 'getaway time' which can never have the same meaning as a couple of days of genuine leisure. This raises a question of whether the whole tourist experience can be achieved by putting all the fragments together? We think not.

Because of the time limitation, we can never indulge in every activity for a long time. There are indeed many activities that are worth taking a long time to appreciate, such as sitting on a bench in a tranquil garden, appreciating a fine painting, learning how to make a ceramic piece, or

perhaps hiking in a deserted location. These activities all need plenty of time for people to appreciate their charm. It is therefore worrying that activities which do not need much deep thinking in terms of effort and time are more suitable to be transformed into a virtual tour and may survive, while activities which are not so suited in terms of investing effort and time may be marginalized and perhaps one day vanish.

The Flat, One–Off Experience

Cohen (1979) first identified five modes of the tourist experience, which are the recreational mode, diversionary mode, experiential mode, experimental mode, and existential mode. The tourist experience is an overall experience consisted of social, environmental, and activity components, ranging from experiences aiming at simply seeking pleasure, to experiences pursuing a particular meaning. During all these levels of experiences, virtual reality seems to have more potential to enrich our experiences of seeking pleasure, rather than seeking for a meaning. For instance, the awe generated by witnessing a marvelous heritage site, an admiration for the wonders of nature and biodiversity, or transcendental religious experiences which may be experienced in some sacred place: none of these complicated and deep feelings can be replicated by virtual reality's direct, efficient, yet shallow information presentation. Perhaps even worse, we wonder if tourists in the future might value traveling only for gaining sensational and pleasant experiences, and whether travelling in search of something serious or grand will become a thing of the past.

Virtual reality seems to provoke a taste for technical vividness, and we are beginning to get used to accepting vivid information imposed on us and then acting on intuition, almost without a second thought. In the virtual reality context, enhanced vividness not only allows us to steer clear of deep thinking, but also makes us lose our ability to imagine since all the details have already been provided by the designer of the virtual reality tour. We are tamed to a world with vividness generated by technique, rather than our own experience. Virtual reality does provide us with tremendous knowledge, but this can be seen as direct and shallow knowledge, sometimes referred to as "flat" knowledge. But can virtual reality enhance the depth of our understanding about the world? This is questionable.

If we go a step further, we'll find that a tourist can visit the same place more than once, and get different experiences each time. As seasons change, the weather and even the sunlight in a particular area changes in very delicate ways. Visitors themselves are changing, communities are changing — nothing remains the same, so it is worth appreciating things again and again. However, as most virtual tours are based on content scripts with limited factors that change, every time a visitor goes into the virtual environment, he/she will find the content more or less the same. So it is unlikely that he/she wants to involve themselves in the virtual tour repeatedly and can be expect to enjoy himself/herself to the same degree each time.

Stretching our imagination, perhaps someday, virtual traveling will become a standard part of our lifestyle. It is somewhat ironic that we could embrace a substitution and treat the authentic activity as old fashioned. Because of the satiation potential of virtual tours, future traveling patterns may be like "punching in" at work. We visit spots only to get something that proves we have been there. After hovering for a little while, we leave for the next destination. This traveling style makes traveling like a labor of Sisyphus: the journey may never end, and our deep–down needs may never be fulfilled.

The Loneliest Time and Space Traveler

The most dubious aspect of tourism is the isolation of tourists from local residents, and while they are in the same place, they are not connected in any genuine form of social relationship. Virtual reality worsens this problem, by immersing people in a simulated world, segmenting them from all others. We have to consider social presence as the weakest point of virtual reality, compared to the real world. A virtual reality tour excludes many of the social factors that sociologists believe are essential reasons for how people behave. So far, little attention has been paid to how we interact with local residents and other tourists, so virtual reality would be incapable of depicting how we ask for directions, how we imitate natives when praying, how we ask a vendor for a bargain, how tourists help each other during a trip, etc. Without these social actions and interactions, a journey could be seen as somewhat tasteless. When we recall Whittington's depiction of travel in 2050 given at the beginning of this section, in

the future, a family trip may simply be a symbol of the good old days. In a virtual reality tour, we may never enjoy a family get–together on a beach, talk with a stranger in a music bar, or bathe with people of different religions in the Heng river under a splendid sun. So, by this time, will the tourist who has the power to shuttle across space and time, in fact feel a little lonely and bored?

Conclusion

What has virtual reality brought to tourists and tourism other than the various applications of this advanced information technology? This chapter re–examines the influences of virtual reality on tourists' experiences.

In the first section, we connected the technological features of virtual reality such as presence, multi–senses, and imagination to tourists' uses and gratification. We found that virtual reality enhances both the utility and hedonic experiences of tourists.

In the second section, we dug a little deeper to summarize four main aspects of tourism that are reshaped by virtual reality. Accessibility was innovatively improved with virtual reality by simulating tourism sites so that tourists need little time and cost to gain access to them. Preservation of both sites and artifacts becomes more manageable and advanced because information can be stored and presented in a virtual reality world. Tourists' exploration activities also become more vivid and creative, and overall, no technique has yet provided the interactions and co–creating experiences that virtual reality affords. Pre–tour promotion is also largely changed since potential tourists can not only see the images or read introductions about the tourism destination, but also experience the virtual tour for themselves before they make a travel decision.

In the following two sections, we focused on the trickier aspects of virtual reality. Going through its various applications, we pointed out four critical problems about applying virtual reality in tourism, related to authenticity, temporality, satiation and tourist gaze. These problems show clear dilemmas when applying virtual reality in tourism, and also imply its tremendous destructive power. So, in the last section we expressed our concerns that a tourist may be confused by the loss of reality in a virtual tour, and we cannot cease to worry that if the tourist's journey becomes

flat, one–off, full of fragments and without personal interaction, then is the meaning of tourism still as the same as before?

It is a post–modern issue to look for deconstructive and reconstructive roles of virtual reality in tourism. We ask if a virtual reality tour is a viable alternative, a substitute, or a subversion of tourism? How do we understand the reality presented by a virtual reality tour? How close to reality is a virtual reality tour? Virtual reality indeed overcomes the constraints of space and time, but not by going beyond the physical space and time, only by making some illusions as to the subjective perception of space and time in tourists' minds. However, it is not clear whether everyone will welcome this substitution or whether the distortion of space and time will prove too disruptive.

This era has witnessed many "grand narratives" being torn down. Will the grand and romantic tradition of tourism be the next? The content that virtual reality provides is no more than merchandise, and even traveling itself would be degraded to merchandise, if we discarded all of its poetic and intangible elements. Would the distortion of real space and time, and the separation of the individual from other human beings make the virtual tourist a homeless, lonely time and space traveler? Because of a lack of study in this area, we are unable to conclude the validity of virtual reality tours in this chapter. However, in our view, maintaining a research focus on this issue seems to be a sensible approach.

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The Augmented Dead

Videogame in Realtà Aumentata, riconoscimento facciale e immaginari zombie

Mirko Lino*

Abstract: This chapter examines both technical and cultural connections between Augmented Reality experiences and the notion of zombies, considering especially the videogames entertainment field. The purpose of the following analysis is to demonstrate how the Augmented Reality is conceivable as one of the marker of a double allegorical–symbolic process: the humanization of the zombie and, vice–versa, the zombification of the human. Augmented Reality in its multifarious applications is used as a medium able to combines physical spaces and virtual elements. Starting from this premise, the essay will argue the way in which the imaginary of a zombie invasion, borrowed from films and Tv series, is extended in real spaces by Augmented Reality media products. In the first part, the analysis will focus on the description of the main cultural practices marking allegorically an intriguing human–zombie continuity. In the second part, the focus will be on the functional and symbolic role of zombies within traditional videogames and Augmented Reality games. In the last part, the essay will trie to reinforce the idea of the overflow of a zombie imaginary into the reality of the physical spaces considering those media objects which integrate Augmented Reality with the technology of face recognition for gameplay purposes. In conclusion, as the analysis will argue, the figure of zombie is conceivable as symbolic interface for the exploration of spaces where reality and virtuality collide.

Keywords:

* Afferenza.

Scenari urbani

Una mattina, a Vienna, la gente in attesa del tram si è trovata coinvolta nel bel mezzo di alcune scene caotiche, tipiche di un'invasione zombie (passanti assaliti e divorati, zombie uccisi con il classico colpo in testa, ecc.). Per due giorni, i pannelli posti alle fermate del tram della capitale austriaca sono stati sostituiti con degli schermi, che si sono prestati a divenire la soglia tra il mondo della finzione (l'apocalisse zombie al centro di un consolidato immaginario filmico, e più largamente mediale) e il reale, colto nella sua più cocente quotidianità (l'attesa del tram). Nell'occasione, lo schermo sospende la funzione protettiva (l'azione di "schermare") per divenire una superfice porosa, l'interfaccia della presentificazione di un immaginario prettamente cinematografico come quello dell'invasione zombie.

L'installazione appena descritta si chiama *Scary Shelter*[1], ed è stata realizzata girando degli assalti zombie *ad hoc*, con tanto di attori sottoposti a un ricco *make–up*, e l'impiego del *green screen* in combinazione con la tecnologia dell'Augmented Reality (AR). La collaborazione tra tecniche filmiche e di *augmentation* ha permesso di sovrascrivere le immagini digitali su dei contesti reali, con il risultato di "far apparire" scene collegabili a un qualsiasi *zombie movie* negli spazi urbani circostanti alla fermata del tram. L'installazione è stata realizzata dall'azienda Gewista per Sky Austria, in occasione della premiere della quinta stagione (2014) della Tv series *The Walking Dead*[2] (2010–), ed è stata accompagnata da un video divenuto virale, dove, vengono illustrate le reazioni spaventate e poi divertite degli astanti colti alla sprovvista[3]. Il video rimanda esplicitamente alla tradizione della *candid camera*, un tipo di format televisivo (mutuato dalla radio) dove la gente comune veniva ripresa da una troupe televisiva in situazioni poco ordinarie e bizzarre organizzate a loro insaputa. La differenza risiede, però, nell'impiego delle tecniche di *augmentation* che, al di là dell'effetto di stupore e paura negli astanti, vengono impiegate con il fine di espandere il mondo finzionale di *The Walking Dead*, lasciando che questo

1. https://www.youtube.com/watch?v=B7FzWUhgqck (ultimo accesso 31 Gennaio 2020).

2. La serie è l'adattamento per la Tv ideato dal regista Frank Darabont e prodotto dall'emittente AMC dell'omonimo *comic novel* (2003–2019) di Robert Kirkman.

3. In coda al video è stato inserito il *making of*, che mostra le varie tecniche utilizzate per creare l'installazione.

invada la sfera del reale, sovrapponendosi alle pratiche e alle immagini del vissuto quotidiano. La strategia attuata da Sky Austria e Gewista rientra chiaramente in una logica di *branding*, il cui fine è quello di provare a far risalire gli ascolti della serie, investendo sulla compenetrazione tra finzione zombie e realtà tramite una tecnologia, come quella dell'Augmented Reality, la cui promessa riguarda l'iscrizione del virtuale nei tessuti della realtà fisica. Per Naja McFadden, gli utilizzi mediali di questo tipo illustrano il potenziale allegorico dello zombie di superare in modo intrigante certi confini, come quello tra *fictional* e *real medium*," che conduce il pubblico e i fan a confrontarsi con ciò che viene dato per scontato quando si parla di "reale" (cit. in Darby, 2014: 232).

In precedenza, il franchise *The Walking Dead* aveva già attuato simili strategie di interazione tra spazio reale, prassi quotidiana e virtualità dell'immaginario zombie. Nel 2013, per la promozione della quarta stagione della serie, Fox Germany aveva installato dei *morphing billboards* in alcune fermate della metro di Berlino[4]. Il cartellone raffigurava il volto di una modella che pubblicizzava un detergente per struccarsi; sotto lo sguardo stupito degli astanti, il volto limpido della ragazza si trasformava gradualmente in quello emaciato e decomposto di uno zombie che promuoveva invece l'avvio della nuova stagione di *The Walking Dead* sui canali Fox. La metamorfosi dell'immagine sul cartellone veniva avviata una volta rilevata la presenza di un astante sul marciapiede opposto e in posizione frontale all'immagine pubblicitaria. Come ha affermato Dennis Pfisterer, Creative Managing Director dell'agenzia Sant'Elmo che ha curato la realizzazione del cartellone elettronico, la campagna promozionale ha avuto come fine quello di provare ad incrementare la percentuale di pubblico femminile della serie, cavalcando la scia di un più ampio aumento di consumo femminile del genere horror: "The campaign was inspired by a surprising insight — that the horror genre is now as popular with women as it is with men" (cit. in Roxborough, 2013).

Infine, sulla scia del successo del modello di gioco *Pokémon Go*[5] della Niantic, anche Skybound in collaborazione con l'agenzia finlandese Next Game (già coinvolta nella realizzazione del videogame *The Walking Dead:*

4. https://www.youtube.com/watch?v=bjZlPTZvoe4&feature=emb_title.

5. Il 2019 è stato l'anno che ha segnato il maggior profitto alla Niantic Game. Come è stato riportato dai dati raccolti da Sensor Tower, l'app di *Pokémon Go* ha raggiunto un profitto record di circa 894 milioni di dollari; si veda G. Panzano (2020).

No Man's Land, che ha riscontrato un buon successo), ha lanciato *The Walking Dead – Our World*, app–game in Augmented Reality legata all'universo iconografico dell'omonima serie Tv[6]. Diversamente dai casi segnalati in precedenza, dove lo schermo avviava un processo metamorfico (il *morphing billboard* di Berlino), o dove scompariva dietro le apparizioni in strada di zombie (*Scary Shelter*), l'app–game in questione pone al centro dell'esperienza lo schermo nomade dello smartphone, rendendolo l'interfaccia di riferimento per lo *shifting* tra due ordini ontologici differenti: la realtà dello spazio urbano, la virtualità dell'immaginario della serie Tv. Lo schermo del *portable device* ospita infatti la trasformazione di luoghi reali, spazi urbani, e interni, negli scenari di un'apocalisse zombie in cui fanno irruzione anche i personaggi della serie tv nella loro versione in *computer graphic*.

Anche in questo caso, e forse con un maggiore coinvolgimento rispetto a quelli menzionati precedentemente, l'Augmented Reality viene impiegata al fine di attuare una fitta compenetrazione tra il reale e la finzione all'interno di un'esperienza videoludica. In questo modo, il *player* viene stimolato il *player* all'esplorazione di uno spazio ibrido, che Pietro Montani ha descritto come una mappatura "non cartografabile, in quanto sorta *nella zona di intersezione tra spazio urbano e cyberspazio*" (2014: 95 – enfasi aggiunta). Le possibilità di esplorazione spaziale del *player* si coordina sull'esperienza fruitiva e la conoscenza delle dinamiche narrative della serie Tv (se non dell'intero quanto pluriarticolato progetto transmediale di *The Walking Dead*). In questo modo, e in linea con le osservazioni di Lev Manovich (2006: 227), il ruolo del virtuale tende a modificare il rapporto con il reale.

Gli utilizzi dell'Augmented Reality si prestano, dunque, a istituire una fluida continuità tra reale e virtuale, sfruttando alcuni motivi intrinseci all'immaginario zombie, tra cui, come ha affermato Teemu Huuhtanen (CEO di Next Game), l'ossessiva domanda "What would I do in a zombie apocalypse?" (cit. in Webster, 2017). Il tentativo di organizzare un'armoniosa collisione tra reale e virtuale per finalità di *branding* si allinea allo storytelling di *The Walking Dead*, che pone al centro la sovrapposizione tra l'orrore intrinseco nell'umanità nel momento in cui prova a soprav-

6. https://www.youtube.com/watch?v=lAQ5PhHJPFc e https://www.youtube.com/watch?v=hKZwotdaGXo.

vivere nello scenario apocalittico che lo circonda, e l'orrore a cui rimanda l'essenza cadaverica e antropofaga dello zombie[7]. Pertanto, come si evince anche dalle parole di Huuhtanen, il motivo della sopravvivenza in *The Walking Dead*, grazie alle tecniche di *augmentation*, viene introdotto in chiave ludica e simulativa nello spazio reale e familiare: "AR enables players to live through the fight for survival in a whole new way in their familiar surroundings" (cit. in Webster, 2017).

L'immaginario seriale di *The Walking Dead*, ricodificato con l'Augmented Reality, sembrerebbe attivare quello che Manovich, in relazione alle interazioni tra immagine virtuale e spazio, ha proposto di definire come *augmented space*: "the physical space overlaid with dynamically changing information. This information is likely to be in multimedia form and is often localized for each user" (2006: 220).

L'Augmented Reality instaura una fitta relazione dialogica tra il reale e il virtuale. Ronald Azuma, in uno studio pioneristico (1997), ha osservato le differenze basilari tra le definizioni degli ambienti virtuali (*virtual environments*), dove viene sospesa la percezione del reale, e gli ambienti "aumentati", in cui si assiste piuttosto alla sovraimpressione di dati e informazioni direttamente nel mondo fisico, senza la sostituzione di quest'ultimo con una simulazione di ambienti in *computer graphic*:

> Virtual Enviroments technologies completely immerse a user inside a synthetic environment. While immersed, the user cannot see the real world around him. In contrast, AR allows the user to see the real world, with virtual objects superimposed upon or composited with the real world. Therefore, AR supplements reality, rather than completely replacing it. Ideally, it would appear to the user that the virtual and real objects coexisted in the same space. (p. 356)

7. Più volte nel racconto fumettistico e televisivo di *The Walking Dead* il motivo della sovrapposizione tra l'umano e lo zombie viene apertamente esplicitato in chiave narrativa e figurativa. Ad esempio, i sopravvissuti spesso ricorrono all'espediente di coprirsi il corpo con il sangue e le viscere degli zombie per mimetizzarsi tra loro senza essere divorati; lo scivolamento repentino della civiltà verso un'etica della violenza e dell'orrore porta il protagonista, Rick Grimes, ad affermare drammaticamente "We are the dead"; sempre Rick uccide un *villain* che sta cercando di violentare suo figlio, Carl, strappandogli la carne dal collo, emulando così la modalità di aggressione dello zombie; la rivalità contro altri gruppi di sopravvissuti che fondano il loro "contrato sociale" sullo "zombismo", come il caso degli "cannibali" dell'insediamento di Terminus (presente solo nella serie Tv) che per continuare a vivere si nutrono allo stesso modo degli zombie, o i Sussurratori, un altro gruppo che confonde il confine tra l'umano e il post–umano indossando le pelli degli zombi per camminare indisturbati tra loro, cancellando totalmente le proprie identità soggettive.

Giulio Lughi (2017), considerando il ruolo del corpo nei processi culturali avviati dai media digitali, sottolinea la continuità tra Augmented Reality ed esperienza quotidiana, rispetto alla sospensione apportata dalla Virtual Reality:

> Augmented Reality on smartphone is not in contradiction with everyday life, it allows the user to interface with physical environment and the media using a *soft* approach, as opposed to the more invasive and *hard* features of Virtual Reality devices (visors, glasses, cardboard, etc.). Indeed, Augmented Reality devices guarantees a *multulayer* approach, it enables the simultaneous use of different levels of communication: an experience that is much closer to the daily experience of the average user, who perceives the communication context as full of glimpses, perspectives, people moving, screens, and all kinds of signals; on the contrary Virtual Reality — closed within an artificial perceptual atmosphere, albeit immersive and "realistic" — maintains a vaguely obsessive claustrophobic, "laboratory" feel. (pp. 145–146, corsivo dell'Autore)

Nei paragrafi che seguono si proveranno ad analizzare i nessi culturali, funzionali e tecnici tra le esperienze in Augmented Reality e le concettualizzazioni dello zombie all'interno delle modalità dell'intrattenimento videoludico. L'obiettivo di questo studio è quello di provare a dimostrare come il contagio mediale dello zombie, ben espresso nella sua ubiquità all'interno delle forme dell'intrattenimento, sia uno degli indicatori di un duplice processo allegorico–simbolico che si esprime nei termini di una progressiva *umanizzazione dello zombie* e, viceversa, di una inevitabile *zombificazione dell'umano*. Dopo una rapida panoramica sulle pratiche che determinano i modi di un'intrigante messa in scena della continuità tra vivi e morti viventi, l'analisi si sposterà verso il territorio dei prodotti videoludici, prendendo come esempi alcuni videogiochi in Augmented Reality che provano a includere nel loro *gameplay* le possibilità tecniche del *face recognition* (riconoscimento facciale). L'integrazione tra Realtà Aumentata e riconoscimento facciale implementa le negoziazioni tra reale e virtuale all'interno del medesimo testo ludico: l'Augmented Reality permette di trasformare l'aspetto di un giocatore in zombie, e il *face recognition* di rivelarne l'identità. L'esperienza di gioco viene implementata da una duplice relazione tra reale e virtuale: quella che vede lo spazio fisico divenire luogo ludico attraversato da figure digitali; quella che attua la trasformazione

dell'aspetto fisico di alcuni giocatori in morti viventi. Attraverso l'analisi di questi oggetti mediali si proverà a dimostrare come certe esperienze finzionali, mutuate da immaginari mediali di lunga durata, come l'invasione zombie, grazie alle tecnologie digitali dell'*ubiquitous computing*, negozino una presenza immersiva e performativa nei tessuti del reale.

Zombie virtuali in spazi reali

Negli esempi precedenti sono stati illustrati una serie di casi legati al mondo di un *franchise* fumettistico e televisivo, corredato da un'intensa espansione transmediale, che investono sulla riduzione spettacolare della distanza tra regimi ontologici differenti, portando, sia metaforicamente sia tecnicamente, gli zombie virtuali dell'immaginario finzionale negli spazi reali (per strada, alle fermate dei mezzi pubblici, in qualsiasi posto)[8]. È interessante notare come questi esempi si concentrino su quei posti notoriamente etichettati, secondo la fortunata definizione di Marc Augé (2008), come *nonluoghi*: luoghi transitori dove l'organizzazione dello spazio non permette lo sviluppo di relazioni sociali, come, per l'appunto, le fermate della metro e del tram. Tramite l'impiego dell'Augmented Reality i *nonluoghi* vedono ri–semantizzata la propria inerzia, diventando cornici per contenuti narrativi articolati lungo delle esperienze mediali. Come è stato osservato dagli studi sulle relazioni tra tecniche ed estetiche dell'Augmented Reality (Geroimenko, 2018), uno degli elementi fondanti per considerarla un medium, oltre che una tecnologia, risiede nella configurazione tra l'esperienza dell'utente, la dimensione spaziale coinvolta e la mediazione dalla tecnologia. Ad esempio, Rewa Wright individua lo snodo cruciale nella capacità di usare la tecnologia della geolocalizzazione in chiave artistica: "Historians, theorists, as well as the artists themselves have tackled the conceptual and pragmatic implications of mobile augmented reality in public space, focussing attention on the practice of ge-

8. La tendenza del *franchise* di produrre esperienze spaziali e immersive si ravvisa sin dalla sua primissima presentazione al Comic–Con di San Diego nel 2010. Per condurre il pubblico al panel di presentazione della serie Tv, era stato creato un percorso che portava all'interno di una scenografia allestita appositamente per l'evento, mutuata dal fumetto e successivamente riproposta in uno degli episodi della serie: l'interno di una casa di campagna, dove un'intera famiglia si era suicidata per non venire divorata dagli zombie. Si veda P. Ruditis (2011: 190–198).

olocation" (2015: 2). Per Salvatore Iaconesi e Oriana Persico ogni percorso in un territorio richiede un'esplorazione che a sua volta viene commutata nello *storytelling* di un'esperienza: "When we experience territories, we create stories. We model these stories using mental maps, referring to one person's point of view perception of their own world, influenced by that person's culture, background, mood and emotional state, instantaneous goals and objectives" (2018: 277).

La città si presta a divenire il palcoscenico privilegiato per definire lo statuto mediale dell'Augmented Reality. Le caratteristiche mediali dei contenuti "aumentati" sottendono la capacità di produrre degli *storytelling spazializzati*, ovvero narrazioni di esperienze, per lo più urbane, più o meno occasionali o strutturate, costruite attorno all'interazione profonda e costante tra l'interfaccia del dispositivo, la geolocalizzazione e lo spazio coinvolto. Inoltre, nello spazio si avviano le relazioni di continuità tra reale e virtuale, metamorfizzando la città in una struttura di traiettorie e percorsi, dove vengono disseminati dati, immagini, frammenti audiovideo, informazioni digitali, che emergono tra le superfici di edifici, scorci, architetture e *non–luoghi*. Tale tipologia di *storytelling spazializzato* si articola, inoltre, sulla capacità dell'Augmented Reality di configurarsi come un *surfacing medium*: uno strumento che permette di far assistere all'emersione di immagini digitali (*to surface*) tra le superfici urbane (*surfaces*)[9], stimolando l'utente a un'esplorazione dialogica e performativa dello spazio circostante.

Pertanto, la concettualizzazione mediale dell'Augmented Reality verte sulla capacità di rendere "l'invisibile visibile" e "l'assente presente"; poggia, dunque, su una serie di relazioni ossimoriche che si esplicita nella compenetrazione grafica di concetti opposti. Le esperienze "aumentate" si reggono sulla trasformazione dello spazio in una serie di segni, marker, forme geometriche desunte dalle architetture, che si aprono a delle epifanie digitali, o, come nel caso di *The Walking Dead*, permettono di riorganizzare la definizione dei confini tra i regimi della finzione e quelli del reale. Il risultato è quello di esperire una serie di interferenze digitali tali da sospingere lo *storyworld* della serie Tv fuori dallo schermo, tra gli spazi urbani.

Una dialettica sottesa alle mistioni di termini opposti è centrale anche nella concettualizzazione dello zombie. Nelle sue evoluzioni semantiche

9. Per approfondimenti su questa definizione provvisoria rimando a M. Lino (2018: 87–90).

ed iconografiche, delineate e sistematizzate principalmente tramite una serie di figurazioni cinematografiche, rimane costante la sua perturbante familiarità con l'umano, di cui diviene il riflesso rovesciato: il doppio cadaverico oscenamente perturbante. Alla base della concettualizzazione dello zombie vi è una dialettica spiccatamente ossimorica, dove i concetti di vita e morte disperdono le loro differenze nel paradosso concettuale del "morto vivente". Proprio questa collisione di termini opposti, rivolta ad abbattere gli argini delle dicotomie in favore di perturbanti e contraddittorie compresenze, rende questa figura mostruosa un costrutto concettuale che, attraverso la sua particolare "invenzione mediale" e il proprio mitologema culturale, appare in grado di assorbire una serie di dualismi (non solo vita/morte; a seconda delle diverse utilizzazioni allegoriche, anche veglia/sonno, schiavitù/ribellione, integrazione/esclusione, ecc.). In particolare, essendo lo zombie un morto che torna in vita, ovvero una figura che scompagina l'ordine naturale delle cose, nella sua formulazione concettuale è ravvisabile la compresenza tra l'idea di presenza (vita) e quella di assenza (morte). La rappresentazione di questa particolare condizione viene amplificata dalla collisione armonica tra reale e virtuale al centro del paradigma tecnico ed estetico dell'Augmented Reality. Lo zombie, inquadrabile come figura del rispecchiamento e della sovrapposizione tra concetti opposti, trova, dunque, nell'Augmented Reality una forma mediale emergente[10] con cui concorrere a intensificare il proprio discorso allegorico e le controverse relazioni con il concetto di umano e di realtà.

Possiamo provare dunque a considerare l'utilizzo dell'Augmented Reality per esperienze a tema zombie come uno degli ingranaggi di un più ampio processo culturale di logoramento delle differenze tra l'umano e il suo riflesso rovesciato, in atto già in alcune forme e pratiche di mediatizzazione del morto vivente. Per Peter Dendle, autore di una notevole enciclopedia in due volumi sul cinema zombie(2001; 2010), negli ultimi anni hanno preso forma nuove iterazioni dello zombie destinate al pubblico

10. Secondo Helen Papagiannis, poiché l'AR non ha ancora sviluppato un modello di rappresentazione e produzione convenzionale, vivrebbe un periodo fortunato di ricchezza espressiva e sperimentazione intermediale, in cui al centro risiede la tendenza a esibire le proprie specificità tecnologiche. Papagiannis menziona il cinema dell'attrazione, ricordando come la trasformazione dell'immagine statica in immagine in movimento venisse usato come espediente stilistico per illustrare la differenza tra l'immagine fotografica e quella cinematografica. Tale logica è altresì riscontrabile in alcuni contenuti in AR che sfruttano questo medesimo espediente per indicare, però, l'irruzione del mondo virtuale in quello reale (2014: 36).

di un mondo connesso e tecnologico (2013: 159). In particolare, Dendle riflette sui cambiamenti figurativi dello zombie apportati sia dai media digitali sia dai modi del consumo mediale della cosiddetta Generation Y composta dai "millennial": "a tech–savvy, sense–saturated, multitasking cohort whose relationship with the torpid, tunnel–visioned zombie is dynamic and complex" (160).

Il primo cambiamento riguarda l'emergere della categoria del *post–zombie* in abito narrativo, ovvero entità consapevoli della paradossale diversità della propria condizione esistenziale, consapevoli anche del proprio ruolo storico e allegorico nelle rappresentazioni cinematografiche e finzionali: ad esempio, in un episodio della serie Tv *iZombie*, Liv Moore, la giovane protagonista zombie, il cui nome richiama ironicamente l'"essere più vivi" (*to live more*), una volta scoperto di essere diventata una zombie, comincia a studiare i film di George Romero per ottenere una maggiore conoscenza della propria nuova natura. Il secondo cambiamento riguarda l'ingresso dello zombie nel mondo reale attraverso uno strano processo di collaborazione tra narrazioni differenti (Lauro, 2013: 208), che prende la forma di diverse tipologie di performance quali *zombie walk*, *flash mob* a tema zombie, ecc.; tutti elementi che per Dendle segnano il consistente collasso del binarismo tra l'umano e lo zombie (2013: 162).

Assieme all'Augmented Reality, altri media e altre esperienze sembrano lavorare per una ludica collisione tra mondo zombie e mondo umano. App, app–game, parchi a tema[11], ma anche i fenomeni performativi, quali *flash mob*, *zombie parade* e *run*, *cosplaying*, ecc., concorrono a corrodere le distanze, avvicinando l'umanità alla propria controparte rovesciata rappresentata dallo zombie. Per esempio, l'app *ZombieBooth* grazie a una serie di strumenti (*tools*) permette di trasformare a proprio piacere il volto ritratto in un comune *selfie*, o del proprio profilo Facebook, oppure quello di un nostro amico (ma anche quello del nostro cane o gatto, perché no?) in un volto tumefatto, in cui spicca la pelle necrotica, la carne a vivo dilaniata dai morsi, una dentatura da "azzannatore" e gli occhi vitrei esattamente come quelli di uno zombie. L'app produce un gioco di rispecchiamenti, sicuramente ironico, ludico e spensierato; in altre paro-

11. A tal proposito, nel novero delle esperienze immersive e interattive del mondo *The Walking Dead*, presso gli studios della Universal è stato allestito un coinvolgente parco a tema: https://www.youtube.com/watch?time_continue=30&v=v6h28oTDCWQ&feature=emb_title.

le, rovescia il fenomeno narcisistico del *selfie* nel suo corrispettivo *zombie*: nell'immagine del morto vivente che virtualmente è nell'essere umano. Si potrebbe considerare questo *divertissement* alla stregua di una corsa verso la *zombificazione del sé*, delegata al *selfie* e al proprio *avatar*, retto tutto sulla perturbante epifania dell'emersione della macchia cadaverica sul volto umano (in linea con quanto era stato pensato per il *morphing billboard* a Berlino). Un altro fenomeno interessante è quello del *cosplaying*, ravvisabile in una serie di performance come i numerosi *zombie walk* organizzati nelle capitali e città del mondo (lunghe parate in cui le persone sfilano vestite e truccate come dei morti viventi) o gli *zombie run* (*live–game* in cui le persone suddivise tra vivi e zombie, tra vittima e carnefice, tra chi scappa e chi insegue, inscenano uno *zombie outbreak*) atte a trasformare gli spazi urbani negli scenari di una *zombie fiction*. In queste performance il fan si appropria della mitologia consolidata in un fitto immaginario, per lo più cinematografico e seriale, facendo sì che il proprio corpo diventi la soglia dove la finzione e la metafora dello zombie si incontrano negoziando una forma materiale. Questa mediazione corporea, che vede l'umano mascherarsi da zombie, prendersene in carico l'ingombro corporeo e simbolico, allude anche a un progressivo "addomesticamento" della carica mortifera ascritta tradizionalmente al morto vivente (Lino, 2014: 127). Inoltre, come ha segnalato Mario Tirino (2018) analizzando il fenomeno del *cosplaying* zombie in chiave generazionale, con particolare attenzione ai cosiddetti "millennial", l'intenzione di "divenire uno zombie" non tende unicamente a emulare un immaginario, quanto a rovesciarlo in chiave politica e sociale. Queste performance emulative si inseriscono all'interno di un'appropriazione simbolica dello spazio urbano: "le *zombie walk* costituiscono un esempio molto interessante di un tipo di performance corporea, in cui lo statuto ribelle della figura zombica è inscritto nel corpo stesso dei performer e si manifesta attraverso una occupazione del territorio urbano della metropoli" (p. 83). Sarah Juliet Lauro inquadra le *walk* e i *flash mob* a tema zombie all'interno di un duplice potenziale di evoluzione delle forme di intrattenimento e di reazione antagonista alle forme colonizzatrici dell'industria dello spettacolo, arrivando a domandarsi "Is this zombie evolution or zombie revolution?" (p. 208). Alle dinamiche capitalistiche dell'intrattenimento, attente alle evoluzioni di gusto generazionale e dei consumi mediali, si opporrebbe un consensuale processo di colonizzazione delle città reali da parte di entità finzionali: "These performance con-

tinue to emphasize the zombie as uncanny by inserting this mythic figure into the quotidian and dramatinzing its colonization of public space in the real world" (p. 209).

Alla colonizzazione dello spazio urbano da parte di "finti" morti viventi, risponde la *fiction*, insistendo sul motivo dell'umanizzazione dello zombie. Il centro della narrazione sembra tralasciare il consueto motivo della sopravvivenza dell'umano tramite l'eliminazione del mostro, per concentrarsi, invece, sulle possibilità di integrazione sociale di un'Alterità, ben allegorizzata da figure che assumono nei confronti della morte un rapporto ambiguo e poroso. Ci si riferisce, ad esempio, a entità ibride quali i *ritornanti* presenti in alcuni film, come *They Come Back* (*Quelli che ritornano*, 2004) di Robin Campillo, e diverse serie tv, *Les revenants*[12] (2012–2015) di Fabrice Gobert, *Resurrection* (2014–2015) di Aaron Zelman, *The Returned*[13] (2015) di Carlton Cuse, *Glitch* (2015–2019) di Fox, Mrksa e Sandler, che mantengono alcuni tratti dell'iconografia e dell'eziologia zombie e assumono le caratteristiche vicine ad altre teratologie, come quella del fantasma. In queste storie, la narrazione pone generalmente al centro i tentativi dei ritornanti di integrarsi al tessuto sociale di riferimento, come pretesto per illustrare il ricco catalogo di questioni irrisolte in termini di classe sociale, etnia, genere e orientamento sessuale[14]. L'idea che prende forma è quella di una diminuzione del sentimento di repulsione e disgusto dovuta dalla figurazione fortemente cadaverica e dall'intrinseca interstizialità tra vita e morte impressa sullo zombie (Carroll, 1990: 47). I richiami impliciti nelle rappresentazioni dello zombie all'idea del corpo come trauma (Russell, 2014: 94) tendono a smussarsi dinnanzi ad alcuni esempi di riscritture corporee. Un caso che ben esprime la sovrapposizione testuale tra corpo umano e corpo dello zombie è quello che riguarda il personaggio di Rick Genest (A.K.A "Zombie Boy"): il modello canadese appena trentenne, morto suicida nel 2018, divenuto famoso, perché dopo aver sconfitto un tumore ha coperto completamente il proprio corpo di tatuaggi di ossa e organi interni, tali da farlo assomigliare a un cadavere. I suoi tatuaggi estremi lo hanno fatto diventare presto un personaggio pop: è comparso nel video *Born This Way* di Lady Gaga, e ha interpretato al-

12. Ispirata al film di Campillo.

13. Remake americano della prima stagione di *Les reventants*.

14. Una serie Tv che si concentra fortemente sulle tematiche dell'irrisolto socio–culturale, e che vale la pena menzionare è *Into the Flesh* (2014–2014) di Dominic Mitchell.

cuni ruoli cinematografici. Tra le sue presenze nel *mainstream* si segnala il video pubblicitario della L'Oreal di cui è protagonista: all'inizio il modello viene mostrato privo dei famosi tatuaggi, coperti da un efficace prodotto cosmetico; successivamente, viene ripreso frontalmente nell'atto di struccarsi, riacquisendo gradualmente il proprio perturbante aspetto, in una modalità che lo avvicina iconograficamente agli "scorticati" delle tavole del *De humani corporis fabrica* (1542–1543) di Andrea Vesalio[15].

In virtù dell'avvicinamento culturale e sociale tra l'umano e il suo doppio cadaverico, le performance urbane con i loro orientamenti e gli usi culturali delle tematizzazioni zombie aprono possibili e interessanti letture bio–politiche sulla mutualità tra corpo umano e corpo cadaverico; permettono di riflettere altresì sui modi di elaborazione dei lutti e dei traumi che sedimentano nella contemporaneità; infine, illustrano la capillare zombificazione verso cui si dirige l'attuale sfera mediale. Un interessante esempio sull'ultimo aspetto appena menzionato — e oggetto dei prossimi paragrafi — riguarda le modalità di *gaming* modulate sulle tecniche dell'Augmented Reality e ispirate agli immaginari zombie.

Videogame, Augmented Reality e zombie

Sulla scia della *zombie renaissance* descritta da Kyle William Bishop (2009; 2010; 2015), ovvero del prepotente "ritorno dei morti viventi" nell'immaginario culturale a partire dai primi anni del Duemila, la popolarità culturale e l'ubiquità mediale dello zombie nello scenario contemporaneo ha trovato un nodo centrale in una repentina zombificazione degli immaginari consolidati. Intere mitologie pop sono stati rimodulati in chiave zombica (come la saga *Marvel Zombie*, un vero e proprio universo parallelo e rovesciato rispetto a quello tradizionale dei famosi supereroi); un fenomeno, questo, che riguarda anche i classici della letteratura, come nel caso del romanzo *Pride and Prejudice and Zombies* (2009) di Seth Graham Smith, riscrittura del celebre romanzo di Jane Austen e adattato anche per il cinema nel 2016 (*Pride+Prejudice+Zombie* di Burr Steers); anche alcuni gene-

15. Il video della L'Oreal è visibile qui: https://www.youtube.com/watch?v=CukxjO0l67w; mentre, per approfondire la relazione iconografica tra la figura dello scorticato e quella dello zombie, si veda l'intenso saggio di B. Le Maitre (2015).

ri cinematografici, come la commedia, il drama, il western, l'erotico e il porno vengono riarticolati per contenere, decostruire o rovesciare al loro interno alcune istanze dello *zombie movie* tradizionale. In seno a questa *zombificazione del mainstream* si inserisce anche l'epidemia di videogiochi a tema zombie. Come ha ben osservato Felice Addeo (2015), il fenomeno dello *zombie videoludico* prende forma negli anni Novanta del secolo scorso, a partire dal successo dei videogame del ciclo *Resident Evil*. A partire da quel decennio l'ambito videoludico ha funzionato da officina per confermare e rinnovare le iconografie dello zombie, favorendone la "rinascita" e supplendo a un'emblematica carenza in campo cinematografico — non a caso, gli anni Novanta sono l'unico decennio che non vede l'uscita di un film di George Romero sul morto vivente. Al contempo, l'ingresso dello zombie nel territorio dei videogame ha ampliato i suoi consumi mediali; come ribadisce Addeo: "i giochi della serie *Resident Evil*, in particolare i primi due, hanno preservato il paradigma romeriano, riattualizzandolo in un altro medium, e hanno diffuso la figura dello zombi presso un vasto e tendenzialmente giovane pubblico, ovvero una audience i cui gusti erano ancora in fase di sviluppo" (p. 31).

All'interno dei *game studies*, la presenza dello zombie viene ascritta alle dinamiche di una più ampia ricodificazione digitale delle retoriche ed estetiche horror nei testi videoludici. Per via di una trama survivalista, ereditata soprattutto dal ciclo di film di Romero[16], lo zombie viene inquadrato nel sottogenere del *survival horror*[17], in cui il giocatore "Controls a character who has to set out of some enclosed place solving puzzles and destroying horrorific monsters along the way" (Egenfeldt–Nielsen, Smith, Tosca, 2008: 184). Come hanno sottolineato Backe e Aarseth (2013) la ludificazione dello zombie tende a essere analizzata principalmente in relazione alle proprietà meccaniche e funzionali (essere un mostro, minacciare il giocatore, provocare paura e disgusto, ecc.) mutuate dall'immaginario mediale e contenuto nell'impianto narrativo del *survival horror* (scappare, cacciare e uccidere), mentre i possibili aspetti semantici e allegorici ven-

16. *Night of the Living Dead* (*La notte dei morti viventi*, 1968), *Dawn of the Dead* (*L'alba dei morti viventi*, 1978), *Day of the Dead* (*Il giorno dei morti viventi*, 1985), *Land of the Dead* (*La terra dei morti viventi*, 2005), *Diary of the Dead* (*Le cronache dei morti viventi*, 2007), *Survival of the Dead* (*L'isola dei sopravvissuti*, 2009).

17. Per approfondire la questione narrativa e visuale del *survival horror* in reazione al cinema, si vedano, rispettivamente, Ewan Kirkland (2009) e Bernard Perron (2009; 2018).

gono tendenzialmente messi da parte. Lo zombie diviene rapidamente una figura videoludica di successo per via della sua natura di nemico da eliminare in quanto "entità già morta", in conseguenza alla ripetitività e prevedibilità delle sue azioni: "zombies pose a threat in themselves through their mindlessly determined hostility" (p. 3).

In virtù della minacciosa abiezione cucita addosso al suo corpo, Tanya Krzywinska (2008: 153) vede nello zombie digitale dei videogame la realizzazione del nemico ideale (*ideal enemy game*); dello stesso avviso è Nathan Hunt (2014), che arriva a definirlo l'antagonista funzionale (*utilitarian antagonist*), poiché privo di identità e soggettività: lo zombie diviene equiparabile a un'immagine che rimanda a se stessa, e dunque eliminabile senza il peso di una colpa morale per il giocatore. La cornice del *survival horror* nelle sue declinazioni — si pensi soprattutto alla modalità "sparatutto" (FPS – First Person Shooter) — pone lo zombie al centro di efferate mattanze, illustrando tutta la sacrificabilità simbolica di un'entità che non merita di vivere[18]. Nell'intervista girata per il web doc francese *Tous Zombie*[19] (ep. 8, "RessuZcités", 2015), Hunt illustra la questione etica della relazione tra zombie e violenza prendendo come esempio il caso del videogame *Carmageddon* (1997): uno degli scopi del giocatore era quello di investire con la guida spericolata di un'automobile il maggior numero di pedoni, ma per le numerose polemiche suscitate sull'uso della violenza, le versioni successive del gioco hanno visto i pedoni sostituiti con degli zombie, alleggerendo così il peso morale del giocatore e rendendo "catartica" la brutalità delle azioni simulate.

Analizzando le modalità della ludificazione dello zombie, Backe e Aarseth rivolgono la loro attenzione sulle possibilità di utilizzare le forme del videogame per ribadire, o anche implementare, le costruzioni allegoriche tracciate in altri media. I due studiosi provano, dunque, ad andare oltre alla mera applicazione delle proprietà meccaniche dello zombie al testo (*gameplay function*), approfondendo l'indagine sulla presenza di sistemi più complessi di costruzione allegorica: "In which ways are zombies gamified? Are they part of simplified gameplay in the arcade tradition (power–ups, bosses, highscores) or of more sophisticated systems?" (2013: 7). Attraverso un corpus di videogiochi — da *Call of Duty: Black Ops*, dove il giocatore deve

18. Il richiamo è ovviamente al concetto di *homo sacer* teorizzato da Giorgo Agamben (1995).
19. https://www.arte.tv/fr/videos/RC-014283/tous-zombies/.

eliminare degli zombie nazisti (equazione estrema della legittimazione della mattanza senza colpa per il giocatore[20]) passando per *Plants vs Zombie*, sino a *Fallout 3* e *DayZ* – i due studiosi illustrano la varietà di utilizzi sia funzionali al *gameplay* sia allegorici, tali da indicare nella presenza videoludica dello zombie non solo una vittima sacrificale ma anche uno strumento di critica politica e sociale. L'ubiquità mediale dello zombie torva dunque una solida conferma nell'ambito del videogame, tale da innescare, ripercorrere e "aumentare" l'intensa portata critica costruita nel lungo corso della metaforizzazione sancita dalla mediatizzazione avvenuta nel cinema:

> The zombie we recognise and enjoy dispatching in great numbers on our videogames does not just call into question how we develop definitions and create new meanings, but also opens new doors towards understanding the mechanisms and processes of consumerism, social and cultural discourses, cultural appropriation, post–colonialism, feminism, and ever ideology and that thorny and convoluted self–referential condition we call postmodernity. (Webley, 2020: 19)

Gli spunti sin qui tracciati si prestano all'analisi degli utilizzi e delle implementazioni apportate dall'Augmented Reality nei videogame a tema zombie, delineando una duplice prospettiva: quella che considera l'AR una tecnica per accrescere l'esperienza di gioco, estendendo le regole del *gameplay* lungo lo spazio fisico; quella in cui la progettazione in AR, oltre a estendere i modi dell'interazione reale/virtuale nello spazio, fornisce anche degli spunti per una riflessione allegorico–simbolico sulla dialettica tra l'umano e lo zombie.

Tendenzialmente, l'Augmented Reality viene utilizzata al fine di aumentare l'interattività con la grafica del gioco, attraverso le "interferenze" tra un universo simulatorio e quello reale. Questo è il caso del progetto di gioco survivalista *FaceOffZombie*[21], in cui l'utilizzo della tecnologia

20. La mistione tra zombie e nazismo si ritrova in alcuni horror come i due film norvegesi *Dead Snow* (2009) e *Dead Snow 2* (2014) entrambi di Tommy Wirkola, dove si denuncia il ritorno di vecchi fantasmi politici come emblema di una profonda crisi sociale. In chiave ironica, si ritrova anche nell'ambito della *zombedy* televisiva, come nella serie *Santa Clarita Diet* (2017–2019) di Victor Fresco, dove ritorna la questione morale tracciata in ambito videoludico: la protagonista zombie, Sheila, per nutrirsi di esseri viventi senza sentirsi in colpa, decide di far fuori alcuni nazisti, pensando così di contribuire al benessere sociale della comunità.

21. Il gioco è attualmente in fase di progettazione, e viene descritto dagli sviluppatori sul modello di un survival horror dove la cui esperienza interattiva viene implementata dal ricorso

è funzionale alle dinamiche del gioco, avviando "an interaction mechanism which in this case is picking weapons, shooting zombies and interacting with the zombie–verse" (Tralsawala, Mathur, Khanna *et al.,* 2019: 819). Secondo gli ideatori del gioco, l'Augmented Reality permetterebbe il dialogo tra universi diversi ma similari nel momento in cui vengono sovrapposti graficamente: un'esperienza dove uno *zombie–verse* fa la sua irruzione, rendendo quello l'aspetto del reale diverso senza però scalfirne la riconoscibilità. Appare evidente, allora, come l'Augmented Reality spinga le riflessioni verso i modi e le tecniche con cui avviene la trasformazione della realtà in intrattenimento. L'esempio del *gaming* "aumentato" rinvia alla produzione di nuove estetiche e conduce l'indagine a interrogarsi sulla solidità della nozione di "reale". All'interno della mediasfera contemporanea e a fronte dei diversi regimi simulacrali con cui si mescola la percezione dello spazio fisico (Augmented Reality, Virtual Reality, Mixed Reality) la solidità della nozione di Realtà sembra vacillare e richiedere l'affissione di un prefisso (Real Reality – RR) per ritagliarsi la propria specificità concettuale. La sovrascrittura del virtuale sul reale produce nuove regimentazioni dello spazio comunicativo, simbolico e percettivo, in cui il dispiegamento di informazioni e grafiche non sono più intercettabili direttamente dai sensi umani, se non attraverso l'impiego di un *medium*. Tale stimolazione dei regimi sensoriali viene ampiamente recepita nel mondo dell'arte digitale, attenta a riarticolare le innovazioni tecnologiche per sondare nuove potenzialità espressive[22].

Le applicazioni dell'Augmented Reality per fini ludici e di intrattenimento hanno visto un forte incremento produttivo e un netto miglioramento tecnico grazie agli sviluppi della tecnologia *mobile* (che ha investito soprattutto lo smartphone e il tablet). I dispositivi portatili sono in grado di contenere al proprio interno una serie di strumentazioni tecnologiche (giroscopio, accelerometro, lenti, rilevatore GPS, ma anche Intelligenze Artificiali e app per la lettura di contenuti "aumentati"), favorendo l'interazion

all'Augmented Reality per l'interazione con oggetti utili ai fini del gioco – kit medici, armi, ecc. (Tralsawala, Mathur, Khanna, *et al.,* 2019: 819).

22. Si vedano, ad esempio, le opere e i progetti di *Mobile Augmented Reality Art, o Mobile AR(t)* (Wright, 2014; 2015; Geroimenko, 2018) e il collettivo Manifest.Ar, il cui obiettivo è di usare l'AR per trasformare il senso profondo degli spazi pubblici attraverso l'installazione di oggetti virtuali; come si legge sul sito del collettivo: "The group sees this medium [AR] as a way of transforming public space and institutions by installing virtual objects, which respond to and overlay the configuration of located physical meaning", https://manifestarblog.wordpress.com/about/.

esplorazione fluida dello spazio esterno. Il *player* diviene paragonabile allora a una sorta di rabdomante, che utilizza il proprio smartphone alla stregua di una bacchetta per scovare e portare a galla una serie di contenuti mediali, di entità digitali, di infografiche, ecc. disseminati lungo lo spazio reale. I primi videogiochi in Augmented Reality come *ARQuake* (2000), erano composti da caschetti o visori (Head Mounted Display – HMD), dei controller e un ingombrante zaino con l'attrezzatura per la geolocalizzazione e un computer portatile. Il gioco si allineava alle modalità dei First Person Shooter, chiedendo al *player* di sconfiggere dei mostri, offrendogli, in aggiunta, esperienze di gioco fuori casa e fuori le limitazioni degli schermi delle consolle, al fine di istituire una maggiore immersività e performatività tramite interazioni più dirette con forme e immagini virtuali (Piekarski & Thomas, 2014: 36). Non è un caso che l'intreccio tra reale e virtuale sin dai primissimi giochi si sia instradato nella direzione dello "sparatutto", sancendo simbolicamente una modalità di approccio verso la compresenza di elementi reali e digitali retto sulla conflittualità: nello "sparatutto", gli elementi virtuali che irrompono nello spazio fisico devono essere "eliminati" e "sconfitti", epurando il reale dalla presenza del suo opposto.

Nell'ambito della progettazione videoludica in Augmented Reality hanno cominciato a fare la loro comparsa alcuni prodotti a tema zombie, attenti a sfruttare le direttrici di un fitto immaginario filmico di cui hanno ribadito le meccaniche di azione (l'eliminazione indiscriminata del nemico zombie).

Da un lato, alcuni progetti, come *FaceOffZombie*, traducono le istanze narrative e rappresentative del *survival horror* videoludico in un ambiente di gioco misto e ibrido, attraverso la sovrascrittura della mappa virtuale entro cui si muove il giocatore sulla superfice urbana. In questo modo, gli spazi reali vengono continuamente transcodificati a seconda delle azioni e gli spostamenti del *player*, prestandosi ad assumere le sembianze di uno scenario da apocalisse zombie. La conversione dello spazio fisico in una serie di traiettorie da percorrere permette all'esperienza ludica di produrre dei contenuti narrativi legati ai luoghi della città (*storytelling spazializzato*). Questo principio è riscontrabile anche in *The Walking Dead – Our World*, di cui si è accennato nel primo paragrafo, dove l'Augmented Reality viene utilizzata per suturare regimi spaziali differenti con lo scopo di portare il ricco *transmedia storyworld* di *The Walking Dead* nello spazio reale. Si tratta di utilizzi dell'AR funzionali ad implementare dei meccanismi di gioco

già noti, come nel caso dello "sparatutto" o della "caccia e raccolta" del modello *Pokemon Go*.

Dall'altro lato, alcuni progetti usano l'Augmented Reality, invece, in sinergia con altre tecnologie, come il *face recognition*, non solo per tradurre in ambienti aumentati le dinamiche consolidate di *gameplay*, ma anche per intensificare alcuni aspetti simbolici, come il corto–circuito della distinzione tra l'umano e lo zombie.

Umano o zombie? Una questione di faccia…

Il riconoscimento facciale è una delle tecniche maggiormente coinvolte nel rendere più fitta l'interazione tra l'uomo e la macchina. Si riferisce ai processi e alle tecniche di Machine e Deep Learning per lo sviluppo della *computer vision*, ovvero la capacità delle macchine intelligenti di elaborare informazioni a partire da una serie di dati visivi[23]. Secondo le ricerche di Zhao, Chellappa e Phillips (2003) e riprese da Corderio, Correia e Jesus (2015: 24), il processo del riconoscimento facciale avviene attraverso tre fasi procedurali:

1. *face detection*: l'individuazione da parte dell'Intelligenza Artificiale di volti umani all'interno di un'immagine;
2. *face normalization*: la correzione dei volti identificati secondo alcuni standard (es. 90 x 90 pixel);
3. *face recognition*: il riconoscimento facciale definitivo, che può avvenire, però, in certe condizioni ambientali, se il volto risulta leggibile (possibilmente in posizione frontale) e non vi sono interferenze (ombre, capelli, barba, trucco, occhiali da sole, ecc.).

Come sottolineano Corderio, Correia e Jesus (*ibidem*), per quanti passi in avanti si stiano facendo nell'ambito della *computer vision*, la qualità del riconoscimento facciale da parte della macchina è ancora lontana dal raggiungere la sensibilità percettiva dell'occhio umano.

Uno dei primi esperimenti di *gaming* che anticipa l'integrazione tra *face recognition* e Augmented Reality è *Moxie Mayhem Augmented Reality Game*:

23. Sulla teoria e le prassi della *computer vision* si veda Arcagni (2018).

uno sparatutto il cui scopo è scoprire se gli altri giocatori sono degli zombie o degli umani. L'interazione tra reale e virtuale, tra umano e zombie, viene garantita dalla presenza di alcuni *marker* posti sopra le teste dei giocatori: una volta puntato il *marker* con la camera del dispositivo portatile, la loro identità verrà scoperta, e se identificati come zombie il giocatore proverà a eliminarli.

Un passo in avanti lungo questa linea di progettazione videoludica è rappresentato dal progetto *ARZombie* ideato e presentato da Corderio, Correia e Jesus (2015). Si tratta di uno *zombie game* pensato per l'integrazione profonda delle tecniche del riconoscimento facciale con quelle dell'Augmented Reality. Lo scopo del gioco è sempre lo stesso: eliminare il maggior numero di mostri, livello dopo livello. Per raggiungere l'obiettivo, il giocatore, puntando la camera del proprio tablet direttamente sul volto delle persone, deve riuscire a distinguere gli umani dagli zombie. A seconda dei casi, il volto della persona inquadrata rimarrà invariato, contrariamente, al volto della persona si sovrapporrà quello di uno zombie. La modalità del gioco indica due interessanti spunti di riflessione di ordine tecnico e simbolico: da un lato, la traduzione del volto umano in un *marker* che casualmente innescherà, o meno, la trasformazione in uno zombie; dall'altro, la necessità di una serie di mediazioni tecnologiche per rendere visibile la dimensione zombica nascosta sotto l'aspetto "reale" delle persone.

Il *game concept* di *ARZombie* è incorniciato all'interno di una storia che si allinea alla declinazione narrativo della "pandemia zombie": un virus creato nei laboratori di una Università comincia a infettare le persone trasformandole lentamente in zombie; tuttavia, la trasformazione non è visibile a occhio nudo, ma solo tramite dei dispositivi portatili e altre apparecchiature. Questo piccolo particolare legittima narrativamente l'utilizzo del *face recognition* e dell'Augmented Reality, in una modalità che rimane aderente all'immaginario filmico, con rimandi alle trame apocalittiche e complottistiche. In tal senso, è possibile trovare una prefigurazione di una visione "rivelatoria" in Augmented Reality e tramite il *face recognition* in nel film *They Live* (*Essi vivono*, 1988) di John Carpenter. Il protagonista, John Nada, indossando dei particolari occhiali da sole, assiste all'emersione visiva di ciò che è invisibile. Lo sguardo di John si trova davanti una Los Angeles in bianco e nero, misteriosamente tappezzata da scritte e messaggi subliminali inneggianti al consumismo e al comportamento passivo

delle masse. Anche il volto umano necessita di essere scansionato grazie agli occhiali da sole: infatti, molte persone, soprattutto quelle che occupano le sfere di rilievo, si rivelano degli alieni, i cui tratti emaciati e scheletrici si rifanno ampiamente a un'iconografia zombica.

L'aspetto della portabilità dei dispositivi — espressa anche nel film di Carpenter — rimane un argomento chiave nello sviluppo e diffusione mediale dell'Augmented Reality, assieme ad altre questioni maggiormente tecniche che richiedono ancora dei miglioramenti, come il *tracking* delle superfici o dei volti, il *lighting* per rendere tridimensionali gli oggetti e la *mobility*, cioè, il coordinamento tra il movimento dell'*user* nello spazio e quello degli oggetti digitali in 3D (Corderio, Correia, Jesus, 2015; Tralsawala, Mathur, Khanna *et al.*, 2019). Non è un caso che gli ideatori di *ARZombie* concludano la loro ricerca auspicando la riduzione dei problemi tecnici e immaginando le esperienze del loro gioco attraverso la tecnologia dei Google Glass[24] (Corderio, Correia, Jesus, 2015: 30). Bisogna aggiungere che *ARZombie* sembra non essere andato oltre la fase di test e di rilievamento delle problematiche relative soprattutto al riconoscimento facciale e a una giocabilità fluida. Tuttavia, proprio questa fase di progettazione, stimolata dall'idea di integrare due tecnologie nella formula interattiva del *gaming*, si allinea a tutta la dimensione sperimentale, fatta di tentativi, prove, intuizioni e anche fallimenti, che contraddistingue la transitorietà delle forme e delle pratiche mediali emergenti.

Conclusione

L'utilizzo del *face recognition* negli *zombie game* in Augmented Reality viene impiegata per distinguere gli umani dagli zombie, perpetuando sul volto dei giocatori la sovrapposizione tra le forme del reale e del virtuale; ovvero, giocando a dissimulare le reciproche differenze. Allora, possiamo inquadrare l'utilizzo dell'Augmented Reality in ambito videoludico all'interno delle dinamiche di logoramento delle distinzioni tra l'umano e il suo doppio rovesciato (il morto vivente) in atto nei canali dell'intrattenimento contemporaneo (*zombificazione del mainstream*). La specificità

24. A tal proposito, il modello Google Glass Enterprise 2 al momento non permette di utilizzare app di riconoscimento facciale.

teratologica del morto vivente risiede nella materializzazione corporea, ingombrante e repulsiva, della virtualità della morte: quello dello zombie, sia filmico sia videoludico, è un corpo in cui emerge epifanicamente tutto il peso della corporeità messa a confronto con la propria deperibilità organica. Pertanto, l'integrazione tra l'Augmented Reality e il *face recognition* lascia intravedere degli utilizzi mediali concettualmente adatti a inscenare le scompaginazioni dei regimi ontologici che caratterizzano anche la *zombieness* come categoria culturale e critica: reale e virtuale; presente e assente; visibile e invisibile. Sia lo zombie sia l'Augmented Reality non riproducono delle relazioni dicotomiche quanto il loro corto–circuito, declinandolo nei registri dello stupore (nonché della paura e del disgusto, nel caso dello zombie) e impiegandolo nelle meccaniche di ingaggio tipiche delle esperienze videoludiche immersive e interattive.

Nei testi videoludici tradizionali e sperimentali (in AR e con l'integrazione del *face recognition*) lo zombie sembra assolvere diverse funzioni: non soltanto quella di figura generata dalla traduzione di un immaginario e della sua narrazione nelle diverse forme ed espressioni del *gaming* e nelle tecniche di *computer graphic*, ma anche di figura mediale in transito, che da contesti virtuali si sposta a cornici reali, e con cui vengono indicate idealmente le nuove intense interazioni tra l'uomo e la macchina. Lo zombie, dunque, da maschera allegorica dell'umano si presta a divenire un'interfaccia che promuove l'esplorazione di mondi dove reale e virtuale sperimentano, negoziano e riarticolano le loro esperienze.

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Unsatisfied with Space

Hyper–Readers in the Cybercosm of the 21st Century

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Abstract: In contemporary times there are no linear structures in the reading exercise. Today everything is distorted and augmented by the various directions that texts and hypertexts propose to the reader. However, a semiotics of contemporary reading is not an analysis of the structure or the referent but a semiotics of dispersion. The current reader is a hyper–citizen and therefore a hyper–reader. He is connected to multiple textual universes and a type of hybrid reality where bytes are integrated into atoms. This figure appears in the context of hyperlinks, augmented reality scenarios, hybridization with Artificial Intelligence (AI) and navigation practices dominating symbolic speeches and emerging aesthetics of the 21st century. This paper explores, through this disruptive figure, two different aspects: at first the idea that no image of reality is a truth but a network of possible arguments, secondly that the cyber–cosmos of the 21st century is, at the same time, the sum of all the destinies and all the origins that can have any argument about reality.

Keywords: Semiotic; Hyper–Reader; Reality; Virtual Reality; Contemporary City; AI.

After all what can be said about the act of reading, I remain with an idea of Roland Barthes (1987), coherent with this disquisition: "reading would be that place in which the structure transforms" (p. 49). Reading, in that sense, is not a discipline but a form of desire and fight; it is not an order but a deformation, not a matter of sight but of the whole body. It is not a mechanic act but an organic experience, not a registration about the order

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of the content but a subversive intervention of both though and senses about the text.

Probably the most disturbing thing about reading is not the journey that the eye makes through the linear pattern of a syntax, but that where this linearity is affected and extended to infinity. Reading includes certain distortions provoked by our human condition, for the way in which space and time are inhabit. It is all about constants interruptions: tiredness, laughter or tears, commodity, concentration movements, thirst, pauses of the thought or the need to go backwards to find a clue, or forward searching for the next cut. Comments on the margin, alternative ideas, underlines, appropriations, quotations, conceptual relationships; that is to say, the cluster of everything that we take after the act of reading: the experience and the interpretation.

No lecture ends at the border of individuality. Its performance continues in public or private discussions, in specialized criticism or in social networks where it expands in a way of comment. Reading is an active process, that is why it is essential to empower it in a way of semiosis: read–interpret–expand. All lectures result in writing and in a way of expanding what said about the world, the reality and the history. The experience of a human being with a text is to be enlarged, to evolve in other texts. The effect produced by the sum of all those experiences and interchanges, of all those lectures and its implications, of the possibility of affecting and disrupting what is already mentioned results to be the sense of reality: the world's appearance, its argument.

Reading is always a double road distortion: inevitably the text and the reader are being affected. Both of them suffer a shock, since space and time, necessarily, rearrange by the given interchanges of that relation. Another scenario occurs with the structure of that 'reality' because in the flux of that instant, where the reader and the text admixed, a shift occurs in the argument about the world we inhabit. Reading is to be in discomfort with the space and to live with fulfillment the becoming of the present time. This seems to be reaffirmed more and more in our contemporary world.

Steven Pinker assures that "narrative is a way to explore the vast space of humans relationships in the secure enclosure of mind" (Lago, 2012). Nevertheless, can we even understand that this strength of the narrative is linked to the experience of the body, of the space where we move during a reading or of the connections between them?

The psychologist at Harvard University also explains that "immersion in imaginary worlds allows us to cherish the possibility of miracles, magic, the possibility of extending the limits of the world by violating the laws of physics, logic and psychology" (Lake, 2012). The issue, then, is whether we can make the whole of our experience a way to cherish those possibilities. Not to leave it in the mind and allow it to occupy all the spaces of ourselves and the relationships it has cultivated.

A reader is a being in transit, a passerby. This idea asks to take its image out from the body–book dichotomy and place it in the space of all existence. Insert it, at least, in the urban context and make the entire scope of its existence an immense text whose main goodness is to be read and written at the same time, lived and disturbed at the same time. The reader is a cyborg connected to multiple technologies and a collective consciousness called contemporary city. The technological environment of this century is a hyperconnected and variable sensitive density. Therefore, that cyborg is not necessarily a subject expanded by outlandish gadgets but someone embedded in a digital ecosystem. Read and believe at the same time: this can be conscious or unconscious.

For example, when it comes to fiction texts, many are quick to point out the assembly of history as an absolute to be consumed: the strength of its structure, the semantic fields of content — social, moral, political or psychological, among others — and how the reader gets involved within the momentum of his channel. This is certainly essential and there is no doubt that it will continue to function in that way. But if we go beyond the idea of a reader as a consumer of closed texts, that idea can change. Not only because of interactive strategies where stories change due to the user/consumer decisions or because of the analyzes made with AI, but for those who are responsible for reading reality and fiction in order to assemble them in a hybrid text that will later be shared and expanded on the networks.

The current scale of human perception is not the one that dealt with the existence of a still, secure, and determined–sized cosmos; but the one revealing the space as a consequence of the transformable, the transitory, the provisional and even the marketable. From the impressionism it was clear that the effort to represent the passage of time was an exercise shared with the viewer. The reading of the modern city in Camile Pizarro's paintings — on Montmartre Boulevard for example — was conditioned by the

fleeting moment. From that moment, perhaps a little earlier, the representation has been freeing itself from the accumulation of chronological successions, central concepts and of the identity of power. Principally the image of the reader as a subject turned on itself.

Beyond art, if we evaluate a bit the conditions of popular culture, in the effects of our reality marked by the spectacle and through the approaches of digital technology — although we are talking about a post–digital culture since a few years — it would be necessary to point out that the reading time is not a mark but a move. Reading and representing is an act of transformation, nothing can be fixed because everything is in process. Walter Benjamin had already sensed it by pointing out the loss of the aura of the aesthetic object. And it is because the aura, as understood by this German philosopher, is a seal, a sign, a trace, a lighthouse that today we cannot perceive in art or in communication, for current time is not the fixed system but the dispersion of all systems.

What defines the reader today is not even the ephemeral — something so valuable for the actions of performance and improvisation in Fluxus artists — but the permanence of the action. What does this mean? Precisely that time is not fleeted but remains, in all its possibilities, while it is the human being who travels through his alternatives across action. For example, in social networks people mobilize in the past, present and future without weighing their differences. On Facebook there are the people we once met but we stopped seeing for years; we may not speak to them but they remain in our virtual temporality. There are the interactions of the present and we are four steps away from any of our possible futures: friendships, relationships, business, jobs or studies that circulate as we all do on the network.

If we review the progress in what is known as augmented reality, we also find this new condition of time. History, in this sense, ceased to be a retrospective reading, and the future a possibility. Digital devices merge the action of the past with the present: I can walk through London and merge the ravages of World War II with my present, I can go through a forest surrounded by dinosaurs or sit in a park and participate in a concert that happened five years ago. I can enter any past and future scenario with the power to move local objects, accelerate people's rhythm of life, mix styles and narrative sequences. In this sense, reading is not only living the experience of the narrated, it is also that the narrated suffers the experi-

ence of my own interventions. The time of virtual reality is the becoming of transformation: the movement of semiosis in a process of infinite transformation without leaving the experience of the lived moment.

If we take into account that the contemporary way of reading is associated with participation, with collective action and with openness in the exchange of information, then we can say that a reader is a transformer and also someone who contaminates. To talk about Internet browsing is to point out a type of active reading that generates consequences. The human beings of the 21st century are agents of erosion and hybridization. What McLuhan called the technosphere is today a "cybercosm" of infinite relationships. The human–digital environment of our time is a field of metamorphosis. However, it is also a field of morphologies where we can recognize, in its different variations, the structure of reality without losing the sense of direction. It does not matter if today the speed and density of interaction is greater or the scenario of the present is more complex because it integrates media, content platforms and modes of interaction. Orientation does not depend on being in fixed coordinates but on dealing with multiplicity. In this sense, Pierre Levy has drawn attention to the collective responsibility in the formation of this environment of incessant transformation:

> People have to accept their personal and collective responsibility. Because every time we create a link, every time we "like" something, every time we create a hashtag, every time we buy a book on Amazon, and so on, we transform the relational structure of the common memory. So we have a great deal of responsibility for what happens online. Whatever is happening is the result of what all the people are doing together; the Internet is an expression of human collective intelligence. (Álvaro, 2014)

Reading is a way of expanding subjectivity through a field of transformations. There is nothing linear about it, everything is augmented towards the various possibilities suggested by the texts and their crosses at a given moment. A semiotics of contemporary reading is not an analysis of the structure or the referent, it is a semiotics of dispersion. The contemporary reader is a hyper–reader connected to multiple textual universes. This figure was not possible while the reading was reduced to the eye and this subjected to linguistic syntax. Now it seems that hyperlinks, augment-

ed reality scenarios, hybridization with AI and other navigation practices dominate the ways of addressing symbolic discourses.

The New Objectivity

This scenario is not yet a realized utopia. The fact that the topology of a flat space of representation has been changed to a three–dimensional form of interconnected and expanding tissues does not mean that the human being is more free than before. Perhaps there are more opportunity to be free, however, a greater participation does not necessarily implies a more critical and active awareness. As technology expands human capacities to unimaginable territories, it also multiplies the tools for the reader into more powerful seduction strategies. While each exchange that it makes modifies the complex space of contemporary culture, nothing guarantees you to be aware and alert to the movements of the great flux dominating the world.

Pierre Levy understands that the relationships in this global exchange are not symmetrical and therefore are not crystalline. People are transparent to corporations, however they are not transparent to citizens. Human actions are exposed to control systems in social networks, intimacy is a concept less and less valued by power and innocence is the dominant human condition on the Internet. We do not know the sources from which the large data flows, programming systems, and even less, the destination of content freely ceded by users, come from. That keeps most of the readers at a disadvantage level.

The problem of objectivity has nothing to do with the way we describe the world but with the openness to a global consciousness, to readings where everyone has unrestricted access and to the disappearance of obfuscated codes: "Transparency is the new objectivity" says Levy (in Álvaro, 2014). The problem is not in the referent or in the way we approach it in the speech. Today we are clear that every look is an interpretation and that we do it on something that is moving and changing without pause. The issue is that the strategies of data distribution, the production of messages flows and the opening of codes are opaque to the citizen. Subjectivity, then, in the collective exchange is subject to asymmetry in its relation to power. This means that there seems to be no way to escape trends and social uniformity strategies.

Considering that there is not a dominant utopia, then we are not locked into a stable social body. That is why there is not a definitive and impassable fence. Information flows and trends do not constitute closed organisms, nor they manage to differentiate or to impose absolute hierarchies. Although the group is beset by opacity strategies, it is not reduced to a set of mechanical functions. Large corporations and governments are also subjugated to variations. Both in the inside and in the outside, the fields of interaction produce distortions and subvert the efforts to build linear relationships.

The permanent mobility of data flows produced by interactivity and global migration — the last basically as a consequence of wars and social conflicts — makes the interior/exterior dichotomy a fiction. The tissue where the exchange is produced and, therefore, where the reading occurs belongs to a problematic morphology. It is a mischievous space against the definitions and even more against the relations of absolute opposition. The operations of assertion and denial, constituting the logical basis of narrative principles, do not realize for the stories that are now more complex. Contemporary narratives are spaces where no relationship is stationed in a central conflict. Much of what Deleuze and Guattari defined are found when they referred to those other models that cannot be reduced to the State: "We are facing something that does not reduce either the monopoly of an organic power or a local representation, but refers to the power of a turbulent body in a nomadic space" (2010: 372).

The Reading, the City

Studies in communication have made it clear that the city is also a symbolic space, therefore, an area of reading and writing, of sensory exchanges and semiotic relationships. The studies of cultural consumption, for example, offer us a symbolic perspective of the human beings, of their looks and appropriations, of the narratives that seduce them in both arts and popular manifestations and, finally, of the media mixture that compose their urban identities. The passers–by of the 21st century are beings synchronized with the permanent mutation of media and technology. But also with the constant updates of the walls submerged by graffiti and the different manifestations of street art, with its culinary

sensibilities, smells, colors, emotions and temperatures; with the transformations of the body from the tattoo to the aesthetic prostheses and with the differences of speech in the different sectors of a certain city. Marcelino Bisbal (2001), referring to the city and the cultural consumption, states that:

> The history of the present is built — or as someone would say, reconstructed — on the cinema and television screens, in the pages of newspapers and magazines, also in books as the media 'artifacts' they are, on the personal computer console and finally, throughout the complex communication system formed today by cultural industries. (p. 88)

We usually rush to point out, in a first reaction to the connection of the human being with the symbolic character of the city, that the spaces are full of signs coming from advertising, laws, architecture, art and architecture. Fashion among others. And this, indeed, is true. However, it may not be the fundamental thing. It is essential to admit that the determining force of this urban symbolic space is manifested thanks to the fact that all this is circulating alongside words, gestures, distances and, as a whole, to the modes of human interaction. In turn, also that extraordinary system of semiotic functions is interconnected to the digital. So, it is a problem of mobility, of active forces, of multiple operations and not of forms, formats, techniques and materials. Reading is to subsume in that combination of tensions.

If we want to better visualize this idea, we can compare the complexity of that space, imbricated by multiple overlapping relationships, with the penetrable ones by Jesús Rafael Soto. In the moment of entering into this work, the body, space and time acquire a new meaning. They do so by activating the effect of movement, mutation and instant experience. In their structures the problem is not the object: the metal rods and the geometry where they are grouped. The work appears when the environment as a whole is disturbed, when the vibration of all the levels of material and immaterial existence is activated. Anyway, when that altered state offers us a heterogeneous reading of existence.

The Mexican artist Rafael Lozano–Hemmer (2012) has a proposal called Shadow Object, which we can also take as an example for this disquisition. In specific, I will make reference to the work Bifurcation. It

is an interactive installation in which a branch suspended in space, like a mobile, casts the full shadow of the tree where it comes from. When touched, both the object and the shadow rotate in an operation that combines branch, tree, human, machine, light and software. However, beyond those components, its meaning is precisely in the linking of what we can find not in the system but in its depth: the idea that the present and the absent are not opposed. Thoughts that the artist can track in Octavio Paz and Adolfo Bioy Casares.

In these works, experience is not associated with the structure of a model but with variable phenomena. The conditions of its space are generated within the processes that make them possible. A contemplation from a distance, an outside look would always be, according to what they are, an incomplete experience. Perhaps, a useless relationship, because without the contact experience there is no aesthetic space. The same happens in transit through the city. The reading, there, is a performance full of small actions not coordinated with a center.

In contemporary cities, the double exercise of reading and production occurs on the basis of variable vital pulses, of visibilities and invisibilities, which permanently alter the shared space. The reader modifies, increases and makes new connections. The citizen as a hyper–reader is a body that moves and an immateriality processed by the software. This semi–phantasmal character of the contemporary human is possible because its "reality" is neither real nor virtual: it is made of multiple experiences and scraps of digitally enhanced symbolic imaginary. In its transit through space, the density of the place goes "in crescendo" because all actions raise new content. That density is a form. However, it does not keep a unifying code behind it. There is no legislator of spaces and yet there are fluxes of power. Therefore, the city is increasingly rebellious to Euclidean geometry and affects the tetradimensionality of the interaction.

Holographic City, not Geometric

The city had, in many cases, a geometric origin. There was a center that gave order and identity, and from which the urban grid was employed. From that "omphalos" the civil and religious foundational monuments proposed orderly readings of life. The narratives were sustained by the

discourse of power. Today, that seems to be just the drill. At least that is how Félix de Azúa (Hernández, 2007) understands it, stating that "the centers, converted into the image of their own image, are the logo of the city. A city without a scenography center will have a very bad time in the coming years" (p. 15).

In the perspective of Ascensión Hernández (2007), the contemporary city is the space of simulation, cloning and versions thanks to the fact that in architecture, as in almost everything, copying has become a valid mode of cultural representation, accurate and indispensable. The copy not only multiplies what has been said but also gives it a good density thanks to noise or sharpness. It doesn't matter if a copy wins or loses information, it will always be a thick space, with a lot of mass, full of content that can be confusing or can saturate us with data. The low resolution makes blurry spaces an important ingredient in reading: it complicates it, decelerate it and presents it to us as forced. High definition, a paradigm of audiovisual consumption of the 21st century, increases the amount of information in bytes. Over and over constitute an ecosystem of relationships.

In Michael Najjar's Metropolis project, the digital fusion of the multiple perspectives of the megacities of the planet — Berlin, Beijing, Dubai, Hong Kong, London, Los Angeles, Mexico City, New York, Paris, Sao Paulo, Shanghai and Tokyo — transforms the landscape in a complicated grid of visual relationships. The heterogeneous texture of these cities is re–thought from the imbrication of many overlapping layers. In this work the density of information is very high. The problem is not geometric but telematic. However, it makes all dimensions possible and probable at the same time. None is absolute and yet each of them in that overlap is possible.

Another example of the substitution of urban geometry with telematics can be extracted no longer from art but from popular culture, specifically from that sub–genre of science fiction that is the comic. In the film The Dark Knight by Christopher Nolan, billionaire Bruce Wayne creates a machine that turns every Gotham City phone into a microphone attached to a complex computer network that he will use to get his alter ego Batman to catch the Joker. In this way, the city threatened and collapsed by the terrorism of Batman's archenemy will no longer be the urban space of

geometric layout to become a gigantic digital network. But both of them are true. The first is formed by atoms, the second by bytes. The digital gadget is a kind of GPS made from the exchange of data and voice of all users.

Then, beyond its urban planning and its architectural forms, the city of communication, of semiotic hyper–relations, of symbolic vibration, of the data that circulates — which we should not confuse with the materiality of technological interfaces — can be assumed like a kind of multidimensional hologram. A structure similar to the model that David Bohm drew up in his quantum description of the Universe. "Everything implicates everything" (Bohm, 2008: 197), said this American physicist and that, as well, can be sustained according to the contemporary condition of the reading–writing processes of the city. At least we can assume it as a metaphor for the urban fabric we inhabit in the 21st century.

Isn't every human being constituted as a node similar to the system of the entire network? Do the modifications we make to the density of data in the space of a city modify us too? Let's think about the GPS applications for mobile phones like Waze. Every citizen circulating in the streets is a node in the complicated scaffold of the traffic. Through the application the user is reading the contribution that all users make and at the same time writing their experience around the city. Both what he reads and what he writes — with texts and images — influences the form of the system and its circulation. Both are imbricated in the same texture of the city. However, that writing — and that is one of the most relevant elements of the communication / city relationship in our era — is not only about words or images, but also about the circulation. The mobility of network's users through avenues is shaping the traffic we see reflected in the interface. That is, what we read is also the effect of 'transit'.

Something similar happens with urban art interventions. I am going to allow myself to approach one work made by the designer and artist Teresa Mulet on the Boulevard de Catia in Caracas. On a wall stained by political graffiti, plus old remains of different posters and a decadent blue paint, she began, gradually, to paint the word 'to walk' in stencil. She did it repeatedly, and in white color, again and again, until she "got a full–white space, which shows the emptiness". This space is the effect of the relationship between the transit of the citizen and the accumulation of the word 'to walk' in the space.

The metropolis of relationships is built by circulations and we read the effects of that circulation. Mulet, in another proposal entitled Cada–veres[1]. Each time, she printed over and over again on black plastic the silhouette of a corpse as it is drawn by the police on the asphalt. Layer upon layer, by the accumulation of the same, the silhouette ends up transfigured in a white abstraction. It is a metaphor for the effect of crimes committed in Caracas, one of the most violent cities in the world. Due to the accumulation of bodies, individual death is lost in the unmanageable data which is produced every week: statistics, official words, political complaints, citizens fear, publicity of security companies, laws, graffiti, messages, calls and everything that circulates symbolically around the problem of insecurity. The result is an almost holographic image where corpses and accumulation 'interpenetrate' to show the only reality: disproportion.

Multiple Narratives

The researcher Margarita D'Amico has affirmed, in her research on communication and contemporary aesthetics, that the culture of the 21st century has been invaded by a new generation of creators. Heterogeneous groups and independent people who come from different humanistic, scientific and technological disciplines. They do not have a common method, they are not defined by a technique and we cannot group them on a name, a style or an unitary manifest. They are scattered throughout the planet and in general there is no direct relationship between them. However, they agree, immersed in its dispersion, in the extensive plot of calls in which they are mobilized as a kind of digital bohemia.

These "neo–bohemian" no longer problematize the fall of the Berlin Wall, the end of history or the postmodern *potlatch*. For them, the hybrid, the paradox, the trans, the appropriation, saturation and globalization have lost their halo of novelty. Such categories, among others, are now part of their natural creative ecosystem, their social relationships and the way they practice the rituals of global techno–civilization.

Taiye Selasi, writer and photographer, defines herself as "afropolitan". With this term, she seeks to express the difficulty in trying to define her

1. In English 'cor–pe–ses', alluding the word 'corpeses'.

as an artist, as a citizen and as a debtor of a culture: "nobody claims me as his own: I am never British enough, African American enough or African enough to satisfy those who find fun on the issue of identity" (Jury, 2013). For Teju Cole, also a writer, identity seems a problem that is resolved by accepting ambiguity and emphasizing it:

> About my origin, I move between two worlds: I was born Nigerian and I was born American. I think this invalidates all claims about purity and absolute loyalty. I have always understood that we are, first and foremost, human and that one's country is a matter of historical accident. (Jurado, 2013)

Nevertheless, that problem it is not an issue of certain auto reflexives looks, most of the creators share that point of view. No doubts that all the narratives and aesthetics developed by this bohemians are displaced from each center. This is about discourses in transit, similar to those who can be found in ambiguous and creative exercises at 'El Blog de los Hermanos Chang' (http://hermanoschang.blogspot.com/) where literature has sense when published marginally. Also in "Neural Glitch", from Mario Klingemann, where the artist change the processes of the Generative adversarial networks (GANs) in the search of an aesthetic of inducive error in the field of AI network learning.

The hypermediatic bohemian, as D'Amico used to refer about that generation, inhabit a cyber–cosmos where the common dynamics are the interpretative media dispersion, the unstable meanings, the plurality of interfaces, the changeable variable, and the will of putting into crisis any standardized syntax. More than a variable they search for a test, the quest; their attitude it is not about who is innovating but experimenting. They are, thinking from McLuhan postulates, anti–environmental "testers". Paul D. Miller, aka DJ Spooky, deals with his proposals' outputs processes from the concept of a 'total work' An idea which destabilized, deprogram and, therefore breaks with the imposed environment by the hyper–specialization of the technocratic thought.

> I'm in the process of editing my first two nonfiction anthologies, Sound Unbound and Rhythm Science. I'm going to have multimedia, I'm going to have web, I'm going to do a limited edition CD, I might want to do some performances around them. That's what Wagner was trying to do with the whole idea of the

> Gesamptkunstwerk ["total artwork"]. But that approach is actually more of an African kind of thing in general. In Europe, because of the specialization trip, you had to specialize and just do one thing. But why? I guess I'm just deprogramming out of the specialization thing. Why not have a book that can be HTML code, or a building that's a symphony, or whatever? (Davis, 2013)

The artist Rafaël Rozendaal, in the world bigger led screen, at Seúl, shown some of his websites collection. Works that can circulate in any space because are determinate by mobility. The city was another node in the web, just like a tablet, an iPod or a cellphone. The definition is an inexistent station inside that instability. In one of his blog's published post, after the question 'how could you define an #internet #artist?' made by Filippo Lorenzin in the twitter account @idaumentata, he proposes the following question:

> Complex.com recently posted an article called "25 Internet artists you need to know".
> @idaumentata asked on Twitter:
> How could you define an "#internet #artist"?
>
> Here is how I feel about it:
> Cultural categories can be helpful to discover things, but we shouldn't take them too seriously.
> Art can't be defined. Try it. It can't be done. We all kind of know what it is but no one really knows. No one really knows what happiness is either. The moment you know it, you're not really happy. When you're really happy, you're not thinking about happiness.
>
> The internet can't be defined either. It's part of our subconscious and dreams and daily lives and relationships and business and family and identity… it's everything[2]. (Rozendaal, 2013)

2. Complex.com recently published a paper named "25 internet artists that you need to know". @ Idaumentata asked in Twitter: How can you define an #artist of #internet? This is how I feel about it; Cultural categories can be useful for discovering things, but they should not be taken too seriously. Art cannot be defined. It has to be tested. It can't be done. We do all kinds of knowledge, what it is, but nobody really knows. Also, nobody really knows what happiness is. In the moment you know it, you are not very happy. When you are really happy,

The authorship crisis, the temporary nature of concepts, the oscillation of identities, and the aesthetics in transit are already common to contemporary cities. All of them are in the same context of our ways of urban reading and writing. Transmedia narratives defined by Carlos A. Scolari (2013) are going in this direction. A narrative can start in a book, a comic or at the cinema and arrived to a thematic park, videogame or a product of industrial design. For him it is clear that "it can be know where transmedia narratives start but not where they finish" (Scolari, 2013). Proposals of citizen activism create as well landscapes about the already existent, helping to increase the complexity, the distortion of the evident and the proliferation of readings.

In Caracas there has been a contribution in this context made by all the cyclist, runners and travelling explorers of architecture and gastronomy. All of them have been opening a path across the urban spaces, already full of meanings, in order to offer different readings, provocative stories and even new relations of identity and communication. Their actions is not only the route or the conceptual content of their search, it is also the city they are narrating with the appearance of those circuits, as well as the city they are reading to later, multiply it in words, images or proposals of transformation of the streets and the architecture. The same has happened with activism in citizen protests where shields, helmets and bibs have reconfigured the political imaginary, thanks to an aesthetic that blends national identity with the iconography of superhero sagas.

Reading, City, Data, Inflation

One of the great contemporary complexities has been caused by the explosive and sustained growth of the data. Although it looks like an overflow of information and, perhaps, a problem, it has not ceased to be, likewise, the engine of new disciplines of research, business and investment. It has also produced an emerging aesthetic in applications which are made of the administration of that "big data" in art and design.

you are not thinking about happiness. The Internet cannot be defined either. It is part of our subconscious, of dreams and everyday life, of relationships and business, of family and identity… It is everything.

The shape of that "stretch" that inevitably involves, relates and affects both atoms and bytes — unlike those studied in traditional structures such as syntax, unlimited semiosis and rhizomes — is similar to continuous inflation. It is not, therefore, a geometric or organic system. It is not an evolution, a linear system, a mutation or a revolution. It is about the expansion of the space in which all the information has been expanded. The metaphor that can help us to understand this situation is derived from the inflationary theory of the Universe exposed by Alan Guth.

Let's Imagine that the expansion of the data is the product of a primary "seed", dense and hot, containing everything that contemplated the culture before the digital era. That is to say, what was kept by the books, the works of art and the incipient format of the radioelectric media. Now, we can consider that this primary density, of a very small size with respect to the information we handle today, was capable of containing all the mass and energy of our cultural universe. Suddenly, it was dismissed outward, in an unusual expansion, thanks to the explosion produced by the development of contemporary technology and communication. We would be, then, facing an inflationary force that in a few years has multiplied, in quite an extraordinary way, the constitutional data of our reality.

Such an inflation has altered our appreciation of events around the world and, therefore, The reading we made about them. Hence, the expanded, the hyper, the big, the mega and many other superlative scales dominate our relationship with reality. It doesn't mean that things have grown. The problem is, in fact, how our image of reality has been expanding into extraordinary levels and, with it, the density of information where we mobilize. For example, the issue is not about the overpopulation on the planet, but a superior number of people connected to social networks and making the data structure, which communicates that reality, more dense and wide. The vehicle of this extension is, according to Lev Manovich, the software:

> I don't need to convince anybody today about the transformative effects internet, participatory media, mobile computing already had on human culture and society, including creation, sharing, and access to media artifacts. What I do want to point out is the centrality of another element of IT which until recently received less theoretical attention in defining what "media" is. This element is software.

Aggressive changes in matter of perception carry crises with them. If there is something characterizing the reader's relationship with urban stimuli, in their immediate and global reality, that is an unstable reading. Of course, this complicates the possibility of increasing the critical reflection, discernment and security. We are insecure readers because these hybrid and changing spaces — called Caracas, Lima, Buenos Aires, Brasilia or Tegucigalpa — are, in turn, accidental and transitory texts, subject to the variations that in our perceptual scale, has been introduced by that inflation. Cities are no longer encyclopedias, complete works or collections providing us the eternal validity of an identity. Maybe at some point they intended to be, but it is no longer possible.

Today it is not just about the transformation or renovation of urban spaces. Imagine that cities are texts and that for a few seconds we look up from the sheet where we are. When we turn our eyes on the page, the text has grown disproportionately and we can no longer find the line where we were. That is what happens frequently today. Clearly, history as a whole has made clear to us the dynamic character of cities in every way. However, the aspect I want to explore goes far beyond the architectural and urban planning. That is why my intention moves away from the given criteria of stages and styles, and show to its draft's format from approximately the last quarter of the twentieth century.

Today's metropolis are incomplete and interconnected texts. Reality is heterogeneous and imbricates the visible and the invisible. They are constantly sieged by amendments, cross–outs and projects to be made. As we read, we are writing and accumulating. We cannot even define them as 'versions' because they are actually 'sketches'. As citizens, we are living immersed in narratives crossing each other, affecting us and from which we cannot be separated. The world, seen in this way, is a space for editing and collaboration. Current job offers, as well as other activities, point in that direction.

In 2013, for example, an event entitled *Libre Graphics e Interactivos?'13: Herramientas para un mundo legible y editable* was held in Madrid. The organizers of the event, among which is Medialab–Prado, proposed that in contemporary reading–writing the user is both a consumer and a transformer. The task of designing content implies the idea of sharing and leave an open source for transformation. In a similar conceptual line, the Italian artist Salvatore Iaconesi made an open source work called La Cura.

After "cracking" the clinical data of his own disease — a brain tumor — and extracting it from medical systems, he made it available to the entire planet on a webpage. From there he launched the question: what can you offer me to cure my illness? Iaconesi made the treatment of his cancer an open source and shared with everyone the data that was arriving: clinical reports, specialized 3D models, scientific studies, recipes, poems, images, and videos among many others. His illness became a collective reading–writing of which he states: "We can transform the meaning of the word 'cure'. We can transform the role of knowledge. We can be human" (Iaconesi, 2012).

City Sketch: the Hyper–Reader in the Cyber–Cosmos

In the ancient world, the issue was about transformation by replacement or renewal. Pre–Columbian cities were overlapping versions of each other, products of the same centralizing thought and the cyclical conception of time. Then, as in countless cases, the conquest of America erased them and replaced them with another central systems from Europe. In the West, generally, cities were designed to be the eternal monologue of power. However, this has ceased to be that way, especially in Latin America where the relationship with identity, memory and the concept of permanence memory is closer to the conflict than to the truth. As I write this article, many Latin American cities burn due to citizen protests and blur themselves due to political variations, whose destinies are uncertain.

The idea of thinking the city as a sketch can be rescued from design and art, aspects that are not so far from each other. The sketches have not only the proper charms of modifications, in them it is also appreciable the conflicts of the provisional. Ideas come and go looking for a way: the promise of an end where utopia seals the agreement between client, designer and user. The difference here is that we are over the collective's sketch; the one multiplying itself because it is an open source, either because the city itself has decided to open or because the activists have decided to "crack it".

Eugenia Fratzeskou (2013), in an essay entitled *Mapping Emergence: Nomads, Nodes, Strings & Paths — Urban Transcripts 2012*, talks about space as an informative substance that we can also understand as a disturbing

multiplicity of real and virtual layers. For the author, the visible/invisible dichotomy has been replaced by dynamic interactions that occur between many orders and spaces. This leads to propose some disquisitions about the space which wasn't in traditional systems. When we talk about layers, we are talking about overlays, however we cannot appeal to a geological look to exemplify it. Here 'layer' is not what covers but what is added to the complexity of a figure composition. They are the layers of software of image edition: superimposed on each other, they are all invisible and visible at the same time. Each of them represents a part and the whole.

Reading a sketch does not necessarily mean to repeat the memory of the utopia planned by a city. One can stay in it, be satisfied with the limits that return it to its complex and fragmented structure before becoming a product, of the interaction between its layers. Shortly, it is to decide that the value is in the superposition of ideas that continue to expand it unstoppably. Thus, everything that is displayed in its space is proof of the triumph of the moment.

Virtual reality is just one dimension of the city sketch as a real life experience. The cyber–cosmos of the 21st century is multi–media, multi–spatial, multi–perspective, multi–speech, multi–polar, multi–touch, multi–channel, multi–functional. Multiple monitors, the display of windows in the space, holograms, fragmented looks by the speed of updates, voices that move forward or backward across the different levels of perception, fallible theoretical perspectives, complex truths and electronic signals from heterogeneous sources support the practice of most modes of production and consumption of messages.

The existence of the hyper–reader is determined by transgender, transcode, transmedia, transdisciplinary and transdimensional aesthetics. Likewise, in the fashion revival of previous decades there is also a multiple–time aesthetic. In this sense, every text is sketch and every city is a text–sketch. Reading, without a doubt, is to interfere, interact and affect. Participating stimulates an invasive action that spreads in everyday life a display of never original, exclusive or isolated stories. They are always alternatives. What does this mean? First of all, no image of reality is a truth but a network of possible arguments. Secondly, this cyber–cosmos of the 21st century is, at the same time, the sum of all the destinies and of all the origins that can have any argument about reality.

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