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VIRTUAL REALITY AND JOURNALISTIC CULTURE: AN ACTOR-NETWORK THEORY APPROACH

Radwa Mabrook

A thesis submitted in partial fulfilment of the requirements of City,
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Declaration

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Abstract

This study examines the relationship between VR and journalistic culture, with a special focus on role perceptions and ethical ideologies. It identifies the dramatic changes in journalistic practice and the emerging cultures of work in VR content creation. The study focuses on how these changes interact with normative ideals, such as facticity, accuracy, objectivity, detachment and transparency, drawing on Actor-Network Theory (ANT) and sociological explorations of journalistic culture. ANT enabled the researcher to trace every actor involved in VR content creation, allowing the technology to be an object of study. The sociological explorations of journalistic culture then allowed the researcher to situate the VR culture in a broader context. The researcher used methodological triangulation of semi-structured interviews with fact-based content creators and social semiotic analysis of VR content to provide a holistic understanding of VR journalism. The researcher conducted semi-structured interviews with a purposive sample of thirty fact-based content creators between November 2017 and April 2018. She then conducted a social semiotic analysis of a purposive sample of sixteen VR pieces produced by Al Jazeera, the BBC, *The Guardian*, *The New York Times* and PBS, the US public broadcaster. The findings indicated that the significant change of journalistic practice in VR does not reflect a corresponding change in content creators' normative understandings of journalism. Content creators insist that their normative understandings remain unchanged. They uphold ideals of facticity, accuracy, objectivity and detachment, and emphasise transparency as a means of demonstrating journalistic rigor. Content creators actively seek creative ways to address normative challenges and maintain their jurisdiction in VR. They adopt an exceptionist ethical ideology, in which they allow journalistic ideals to guide their work and remain pragmatically open for exceptions to prevent potential negative consequences. Content creators are, thus, outcome-oriented journalists, who make situation-based ethical judgments guided by their normative understandings. The findings also indicated that the emerging cultures of work in VR are not new, they have long existed in narrative, entrepreneurial and interactive data-driven journalism. VR is, indeed, a stage within the long continuum of shifting journalistic practices, representing the constant attempt of journalists to remain truthful to journalistic norms while adapting to change.

Chapter I

Introduction

Media organisations have been recently experimenting with Virtual Reality (VR) technology, exploring its potential in journalism. *The New York Times* did a year-long Daily 360 service in 2017; *The Guardian* partnered with Google by the end of 2016 to produce twelve VR projects over eighteen-month period; Al Jazeera established Contrast VR studio, which has been experimenting with VR since 2017.

As media organisations continue to explore VR, journalistic practice and narrative structure change dramatically. The technology increases user agency, turning the content into a storyliving experience (Maschio, 2017). Users actively participate in VR, determining the outcome of their experience. Content creators reduce context to avoid information overload, increasing the user engagement level. VR content, thus, becomes a less informative experience compared to traditional journalism.

The disrupted narrative in VR reflects a complex content creation process. Multi-disciplinary teams of journalists, technologists and creative artists collaborate to create compelling VR experiences. The collaborative VR work requires personal qualities of risk-taking and self-learning, giving rise to experimental and entrepreneurial cultures. Content creators, in many cases, actively seek external funding opportunities to cover the expensive production costs. They constantly switch between their roles as journalists and fundraisers.

These significant shifts raise questions about journalistic culture, which consists of ideas and practices legitimating the journalist's role in society (Hanitzsch, 2007). VR changes journalistic practices dramatically and challenges normative ideals, including facticity, accuracy, objectivity, detachment and autonomy. Content creators constantly look for ways to address the normative challenges and emphasize transparency as a tool to demonstrate journalistic rigor.

The research about VR journalism is limited due to the infancy of such journalistic innovation. Some research studies examine the challenges of VR content creation processes (Aronson-Rath et al., 2015; Watson, 2017) and narrative structure (Jones, 2017; Marconi and Nakagawa,

2017). Other studies focus on the psychological impact of VR on users (Maschio, 2017; Archer and Finger, 2018; Shin and Biocca, 2018), and the degree of VR perceived credibility (Sunder et al. 2017; Kang et al., 2018). To date, Aitamurto (2019) is the only researcher who has examined the normative paradoxes in VR experiences.

This study investigates the influence of VR on journalistic culture. It explores the dramatic changes in journalistic practice and narrative structure to find out whether the changes reflect a change in the normative understanding of journalism. The study examines how VR challenges the normative ideals of accuracy, facticity, objectivity and detachment, and how content creators address these challenges. It explores VR transparency, identifying its degrees and functions. The study also maps the collaborative and experimental cultures in VR journalism and describes personal qualities of content creators needed to work effectively. The study aims to put VR journalism within the larger scope of cultural discourses around narrative, entrepreneurial and interactive data-driven journalism.

To achieve these goals, the study combines two theoretical groundings: Actor-Network Theory (ANT) and sociological explorations of journalistic culture.

ANT decomposes phenomena into their basic elements and traces the interrelations among them. It allows the technology to become an object of study, exercising a level of agency (Latour, 2005). This study uses ANT to explore the complex interrelations between VR technology, content creators and users. ANT helps trace the significant changes in journalistic practice and narrative structures, which may challenge normative ideals. ANT then helps investigate how content creators respond to these challenges, and whether their normative understanding of journalism is changing or not. As content creators interact with technology and users to address normative challenges, new cultures of work emerge. ANT helps explore these emerging cultures as actors, shaped by interrelations among other VR actors while simultaneously shaping the personal qualities of content creators.

Combining ANT with a deep understanding of journalistic culture helps place VR journalism within a broader context. It allows the researcher to determine whether normative challenges and emerging cultures in VR journalism are new. The deep understanding of journalistic culture also

helps connect the study findings to cultural discourses around narrative, entrepreneurial and interactive data-driven journalism. It helps separate the themes that are unique to VR from the ones that have already existed in other forms of journalism.

Drawing on the theoretical groundings, this study attempts to answer questions related to how VR journalism influences facticity and accuracy norms, how it influences objectivity and detachment norms, how VR content creators demonstrates transparency and what cultures emerge from VR work processes.

The study uses methodological triangulation to answer these questions. It combines semi-structured interviews with content creators and social semiotic analysis of VR content. The triangulation approach provides a holistic understanding of VR journalism through the use of different but complementary datasets. This approach adds rigor, richness and comprehensiveness to the findings.

For the semi-structured interviews, purposive and snowball sampling techniques enabled the researcher to recruit a sample of thirty fact-based content creators. The participants were a mixture of freelancers, content creators in VR studios, and content creators in established media outlets, including the BBC, *The Guardian*, Al Jazeera, CNN, *The New York Times* and the Frontline series on Public Broadcasting Service (PBS), the American public broadcaster. The interviews were mainly online synchronous video interviews that lasted up to three hours. They enabled the researcher to capture the diverse opinions of VR creators about normative challenges in VR and how VR creators address them. The interviews also allowed the examination of the organization of work and the emerging cultures in VR journalism.

For the social semiotic analysis, a purposive sampling technique enabled the researcher to select a sample of sixteen VR pieces produced by established media outlets, including *The Guardian*, the BBC, Al Jazeera, *The New York Times* and PBS. The sampled VR pieces were diverse in content and interactivity level, enabling rich and comprehensive analysis. The social semiotic approach

allowed the researcher to unravel ethical issues, journalistic roles and user roles as conveyed through the content. The researcher was able to further understand the normative challenges in VR journalism and how content creators respond to them.

The thesis contains eight chapters, starting with the introduction and followed by a detailed examination of Actor-Network Theory (ANT) as a theoretical framework. The second chapter moves from identifying origins and basic concepts of the theory towards examining the use of ANT in journalism studies. It ends with a detailed discussion about the differences between ANT, hybridity and Human-Machine Communication (HMC).

The third chapter examines journalism culture as a conceptual framework. It starts with defining journalism and moves towards the sociological exploration of journalistic processes until it reaches a conceptualisation of journalistic culture. The chapter then explores the dynamic nature of journalistic culture through a detailed examination of narrative journalism and collaborative cultures in interactive and entrepreneurial journalism.

The fourth chapter explores VR technology and its applications in the field of journalism. The chapter starts with defining the basic concepts of VR and separates 360° videos and high-end VR as distinct genres on the same VR spectrum. The chapter then discusses VR implications on journalistic culture through explaining partnerships, the experiential nature of the medium and the experimental nature of VR work.

The fifth chapter lists the research questions and discusses the methods and sampling techniques. The chapter is divided into two sections to address the semi-structured interviews and social semiotic analysis.

The sixth chapter details the findings of the interviews. It starts with reflecting on the heterogeneous nature of interviewees and then goes through the various themes that emerged from the findings, including reality re-constructions, content curation, the experiential nature of

the medium, collaborative and experimental cultures of work and the characteristics of VR content creators.

The seventh chapter details the findings of the social semiotic analysis of VR content. The chapter organises the findings according to the categories of social semiotics. It first decomposes the audio-visual narrative structure, analyzing its elements and their potential meanings. The chapter then analyses the VR design, examining the interactive elements in the VR to identify their potential meanings.

The last chapter combines both datasets, discussing them in the light of the research literature and the theoretical framework. It organizes the findings according to the research questions and ends by concluding the broader implications of the study and points the way towards future work.

Chapter II

Actor-Network Theory (ANT)

1. Origins and Basic Concepts

Actor-Network Theory was developed in the field of Science and Technology Studies (STS) primarily around the work of Bruno Latour and Michel Callon in the Centre de Sociologie de l'innovation in France (Muniesa, 2015).

ANT was a response to the problematic double standards used by sociologists when dealing with scientists and engineers (Callon, 1986b). On the one hand, the sociologists granted complete freedom for engineers and scientists to explain their work through a variety of differing theories. On the other hand, they censored the engineers and scientists when they attempted to veer into any sociological context. Sociologists tended to impose their own generalised theories to explain sociological problems, opposing the multiple potential explanations identified by engineers and scientists. They believed that “nature is uncertain but society is not” (Callon, 1986b, p.2), so felt social explanations should be reduced to existing norms and generalised rules. They believed that society cannot be discussed in an open manner, where different explanations are given without establishing priorities.

ANT introduces a descriptive approach that tries to understand phenomena, or collective entities, by deconstructing them to their major components. Then, it traces the associations among these components, without resorting to invisible or intangible social explanations (Latour, 2005).

Any ideas pointing towards an invisible entity whose associations cannot be empirically studied are denounced by ANT (Latour, 2005). For example, ideas about God's will or capitalism as explaining a course of action, or social structure as the reason for victimising a certain category of people, are rejected.

This materialism-based approach (Law, 2008) contradicts the critical sociology domain. It rejects the idea of abstract frameworks, meaning “simple, banal, homogenous, multipurpose term[s]” that attempt to provide causality (Latour, 2005, p. 100).

Moreover, ANT is a relational approach (Law, 2008), promoting the idea that each component of a phenomenon shapes and defines the others through associations. Thus, these entities and components never remain the same, as they are constantly redefined through their associations (Latour, 2005).

The theory draws on Greimas’ work in semiotics (Müller, 2015), narrative theory, and the actantial model – a tool for analysing any action depicted in literary text or images (Hebert, 2007). Based on this semiotic approach, actants - a major concept of ANT - are entities in the narrative syntax defined by their relation to one another and their roles such as senders, receivers, objects, helpers, and opponents (Hebert, 2007).

This semiotic approach and narrative theory are mainly applied to literary texts, where there is opportunity to see a tree, an animal or even a stone exercising a level of agency. ANT perceives anything that provides a source action as an actant/actor, not just humans (Latour, 1996). For instance, Sayes (2014) indicated that non-humans could be scallops, rocks or ships.

In other words, as long as the object can make a traceable difference, it is an actor/actant. Thus, technology is viewed as an actant/actor, exercising agency through its associations. It is viewed as a mediator instead of an intermediary, as mediators can exert an impact and change meaning rather than merely transporting actions from one place to another (Sayes, 2014; Latour, 2005).

ANT is a fluid theory, and various scholars and theorists over the years have proposed new understandings of its constituent components and its overall concept.

For instance, scholars have been inconsistent in differentiating between actors and actants. Akrich and Latour (1992) described actors as actants that have human characteristics.

However, Latour (2005) stated "anything that does modify a state of affairs by making a difference is an actor —or, if it has no figuration yet, an actant" (p.71). Figuration, according to Latour, refers to having "some flesh and features that make them have some form or shape ... it can be ideo, techno or bio-morphism"(p. 53).

Sometimes the terms actors and actants are used interchangeably to refer to all entities, removing the differences between social and natural, or between humans and non-humans (Sayes, 2014; Nimmo, 2011). "The hybrid status gives to *all entities* both the action, variety and circulating existence recognized in the study" (Latour, 1996, p. 375).

Moreover, Actor-Network indicates two meanings: either an actor within a network, or an acting network (Muniesa, 2015). A network could become simplified or black-boxed to the extent that it is viewed as a single actor taken for granted (Tatnall and Gilding, 1999). ANT then serves to disassemble such a simplified network, tracing its internal components. News interviews, for instance, became black-boxed to journalists although they were invented in the late 19th century as a complex two-way "social thing" involving "conventions and practices" (Schudson, 2015, p.64).

Actor-Network is also closely related to assemblage, the English translation of "agencement", a concept developed by French philosophers Gilles Deleuze and Félix Guattari (Law, 2008, p. 146). It refers to bundling heterogeneous entities, either humans or non-humans, in a way that creates agency (Müller, 2015).

Therefore, the terms an actor, actant, hybrid, actor-network, assemblage or even black-boxed network imply the idea of attaching agency to non-humans. This idea originated in semiotics, as explained earlier. It has been widely criticised because it entails a dismissal of humans' intentions and their pursuit of interests as distinctive from non-humans (Müller, 2015). Sayes (2014) tried to ease that tension by asserting that non-human agency differs in intensity and levels and that it is decoupled from intentionality, free will and subjectivity. Agency, in the context of ANT, indicates being a source of difference, not necessarily intentional purposeful human behaviour,

as “things might authorize, allow, afford, encourage, permit, suggest, influence, block, render possible, forbid and so on” (Latour, 2005, p.72).

In addition to flattening the distinctions between humans and non-humans, ANT erases dichotomies between far/near, large/small and inside/outside (Latour, 1996). What matters for ANT are the connections between actants/actors no matter how far they are from each other. And since ANT is focusing on associations, there are no boundaries to the network, no outside or inside. ANT simply expands to include new connections between entities seen as equal in their power, providing an empirical version of Foucault’s discourses about power mechanism (Law, 2008).

For Foucault, power cannot be an inherent characteristic of an entity. He refuses to perceive individuals as powerless and the state as an omnipotent, superhuman agent. Rather, he conceives power as dispersed and negotiated (Bălan, 2010). Medieval monarchies, for instance, held no inherent power, in his views, but rather were an outcome of the multiple and heterogeneous relationships between them, nobles and serfs. Thus, power is a bottom-up structure, created via associations (Flohr, 2016).

In short, Foucault’s genealogy begins with studying micro mechanisms as a way of understanding power, instead of state-centred political economic practices (Fraser, 1989). Foucault stresses that power is not “a consequence of law or social structure but ... has its own dynamics and rationality” (Power, 2011, p. 49). It emerges through “multiple relations that intersect and affect each other in varied ways” (Flohr, 2016, p.43).

In a similar vein, ANT sees power as an outcome rather than a cause; it presumes that all actors are on the same level of power to begin with. Afterwards, their associations and interaction produce asymmetric and spatially dispersed power among them. As Callon (1986b) explains, “the capacity of certain actors to get other actors – whether they be human beings,

institutions or natural entities – to comply with them depends upon a complex web of interrelations in which Society and Nature are intertwined” (p.4).

Thus, agency/power is performative and a relational outcome (Law, 2008). An actor obtains power, which positively correlates with the number of networks for which this actor is a crucial passing point. Actors gain power through the number, extensiveness and stability of their connections (Couldry, 2008).

In addition to ANT’s radical materialism-based views about non-human agency and the performative nature of power, ANT is criticised because of its descriptive nature. It describes how, rather than stating why, things occurred (Law, 2008). Nonetheless, Latour (2005) defended the descriptive label of ANT, stressing that a good description that accounts for all actors, along with their traceable associations, does not require an external framework for explanation. “Actors themselves make everything, including their own frames, their own theories, their own contexts”, he said (p. 147).

ANT traces the translation process taking place between different actors/actants in the network. Translation refers to “the collaborative process in which diverse entities assemble, form new associations and disconnect old” (Mutzel, 2009, p.879). It is “the reciprocal relation between the social and technical” (Cressman, 2009, p.10). Translation is the process of associating heterogeneous entities (Callon, 1986b), after disentangling them from their previous associations, and framing them – that is, identifying and assigning them new roles (Callon, 1999).

Translation as a process consists of four stages, during which “the identity of the actors and possibilities of interaction ... are negotiated” (Callon, 1986b, p.6). These four stages, according to Callon, are:

1. Problematisation: this stage starts with a problem/cause that identifies a number of potential actors, and their potential associations and roles. They could be humans or non-humans.
2. Interessement: these potential actors are attracted through different methods such as seduction or persuasion. However, they maintain the right to accept or refuse roles assigned to them based on their identity, goals, orientations and even interests.
3. Enrolment: Actors become enrolled in the network. They accept and enact roles assigned.
4. Mobilisation: Each actor becomes a representative to its whole species, mobilising them to act in the same way, creating a relatively stable network.

For example, Shiga (2007) used the translation concept to investigate iPods, MP3 file-sharing networks and different actors associated with those products. In the problematisation stage, he examined the legal, economic and cultural realities surrounding those products. He identified free music download legalities as a major problem involving heterogeneous actors such as “record companies, soft drink manufacturers, musicians, football fans, and users of unsanctioned file-sharing networks” (p.42). He highlighted the Pepsi Super Bowl 2004 advertising campaign as a possible interessement method. The campaign depicted teenagers prosecuted due to free music downloads, then announced a partnership between Pepsi and iTunes to offer 100 million free songs. Afterwards, Shiga showed, the actors were enrolled effectively, enabling associations that led Apple, the American multinational technology company, to become a central passing point. Apple’s role was transformed from “software/hardware production” to “digital music sale” (p.43). Eventually, the translation process was mobilised and enacted on a large scale: iPods were modified to have durable batteries and huge storage capacities to accommodate the large number of downloaded music files. Hence, iPod and MP3 file-sharing further reinforced their position in the market, with a steadily increasing number of users.

However, not all translation processes pass smoothly through all four moments of translation to reach successful mobilisation because each moment marks a site of power struggle (Horowitz, 2011). Actors may resist performing their assigned roles (Callon, 1986a). Key actors, or the obligatory passing points in the network, also can be displaced (Callon, 1986b) due to the progressive redefinition of actors/actants and their roles (Callon, 1999). Translations thus can be impermanent and contingent (Law, 2008). They become “recurringly instantiated *kinds* of things or structures” indicating “denial of natural stabilities and repeatedly instantiated types” (Elder-Vass, 2015, p. 105).

In an exaggerated example, Harman (2009) showed how Latour was radically denying the natural stability of an actor’s identity:

“Whether I jump, unbutton my shirt, or lose the least hair from my head, my existence in each case will become an entirely different event, since Latour leaves no room to speak of ‘accidental’ variation in the same enduring thing ... [E]vents are effectively frozen into their own absolutely specific location and set of relationships, and cannot possibly endure outside them” (p.65).

The durability of the translation process depends on the durability of the bonds holding it together, as well as the durability of the simplified networks composing it (Callon, 1986). In a simplified network, various interactions and associations become simplified, black-boxed and treated as a single actor. Such network simplification, the pillar of network durability, can be endangered by the entry of new actors and changes in the alliances (Tatnall and Gilding, 1999). These changes lead to black boxes being opened and their content being reconfigured, perhaps forming a different network.

Law (2008) depicted three factors that can help increase the relational durability of the translation process. The first is “configuration of the web” where different actants/actors in the network perform their roles while perfectly complementing each other, moving in the same direction towards an eventual goal. For instance, the system of imprisoning criminals is only rigid if it is supported with tightly guarded prison walls, strict penalty rules, and well-equipped

prison guards. The second is “durability strategies”, which largely drive the formation of networks and enable them to face unpredictable events. For example, traffic systems will never work properly if they have no strategies to deal with potential street closures, providing alternative routes for commuters. The third is the “discursive ability” of actors to relate to the mode of order used. For instance, the discursive ability of international students to familiarise themselves with academic plagiarism rules allows them to conform to the learning system and to blend into the simplified network of a postgraduate education system.

In other words, ANT is mainly focused on how actor-networks are established and held relatively steady, rather than on causes and effects (Tatnall and Gilding, 1999). Therefore, it is better conceived as a methodology than a theory. It is essentially a tool for categorising various entities involved in the action, without determining their shape, size, or proximity (Latour, 1996). It is also a tool to explain and describe associations, without proposing overarching explanations or strict, rigorous, comprehensive claims, as in traditional social theory (Sayes, 2014).

“ANT is a method to describe the deployment of associations ... to create a generative path of any narration ... it is just a recording device that does not say anything about the shape of entities or actions” (Latour, 1996, p. 374).

Because ANT is a method, researchers should follow certain rules in recording the translation process and identifying the various actors. They should remain impartial regarding the explanations provided by heterogeneous actors/actants, accepting their plurality and avoiding attempt to “fix the identity of the implicated actors if this identity is still being negotiated” (Callon, 1986b, p.4).

In short, ANT is perceived as radically constructivist, supporting the existence of a scientifically objective truth that is constructed through the material process of associations (Muniesa, 2015). It starts with objects and traces their active associations (Latour, 2005); heterogeneous actors “assemble and together enact a set of practices that make a more or less precarious reality” (Law,

2008, p. 151). This is different from the traditional constructivism approach that frees researchers from the concept of a single objective truth (Oulasvirta et al., 2005).

2. ANT and Journalism

When applied to journalism studies, ANT allows for a pre-modern vision of journalistic social organisation. It shifts from the modern vision, with its clear divisions between humans and non-humans and their agencies, towards recognising hybrids for analysis and critique (Turner, 2005). Indeed, complex hybrid networks of news production were the major ontological contribution of ANT in journalism (Primo and Zago, 2015).

These socio-technical hybrids were only made possible by recognising technological agency. One form of that agency is material recalcitrance: when used to solve a problem, agency may create another problem, compelling humans to work at solving that new problem (Braun, 2015). This recalcitrance was evident in the acquisition of Newsvine by MSNBC.com, the joint venture between Microsoft and NBC Universal (Braun, 2015). Newsvine was mainly a collaborative news platform for both citizen and professional journalism; users could contribute stories and comments as long as they adhered to ethical and quality standards. However, integrating Newsvine with MSNBC.com pulled in a wider variety of users unfamiliar with Newsvine standards, resulting in abusive and inappropriate content. These problems encouraged Newsvine and MSNBC staff to look for effective ways to prevent this inappropriate content.

Another form of technological agency is the ability of algorithms to curate content produced by human actors or even to generate content themselves (Primo and Zago, 2015).

More broadly, Lewis and Westlund (2015) emphasised a socio-technical approach to journalism studies in place of the dominant socio-cultural trend. Such an approach helps clarify the relationships among humans, technological and economic entities; however, it does not privilege technology over human, instead seeing them as equal (ibid.).

ANT in journalism research does not stop at explaining technological agency. It also calls for deconstructing black-boxed truths about technological and media products to reveal the complexity of the elements and associations involved.

For instance, Meese et al. (2015) studied TiVo – a digital video recording system providing schedules for TV programming and enabling users to record new episodes. They employed ANT to disassemble the system and to analyse its socio-technical network, which affected its rise and subsequent failure in Australia.

Poell et al. (2014) conceptualised Weibo, a Chinese microblogging website, as an actor influencing political activism. They showed how its technical architecture, including for example character limits, prompted users to find a way around it; users produced long Weibo to attach photos to essays and better express their opinions. The researchers viewed Weibo as an assemblage, composed of its technical architecture, user culture and graphics editing software. This assemblage was capable of circulating satirical images and political sarcasm; reconfiguration of meanings surrounding certain events then had the potential to lead to political activism. Thus, technological products, when decomposed, demonstrate how crucial they are in the dynamic process of meaning-making – that is, translation.

Using ANT, a variety of actors/actants in news organisations can be identified, not just journalists. Other humans include specialists such as designers, project managers and programmers in the editorial and business sides of news organisations. There are businesspeople such as sales associates, marketing and big data analysts, and experts of behavioural targeting. There are also hybrid teams such as those that analyse traffic patterns, shape paywalls and help optimise mobile apps (Lewis and Westlund, 2015).

Non-human actors include outward-facing technologies designed for the users, such as news apps, and inward-facing ones designed for journalists, such as Content Management Systems (CMS) (Kumar and Haneef, 2016; Schmitz Weiss and Domingo, 2010). CMS can dictate the format

of online news, such as setting character limits in headlines. They also can facilitate new formats and genres of content, such as photo galleries and chat sessions (Witschge and Nygren, 2009).

Technology thus is not just an intermediary "cold machine" adopted by "constellation of people and practices" to reproduce their differences (Deuze, 2008, p. 204). Instead, it may become a source of conflict and tension in the news organisation because new tools are often imposed by management. According to Deuze, journalists are insufficiently prepared to utilise technology, giving software engineers influence over them.

Domingo et al. (2015) developed News Network concept based on ANT. They defined it as:

“a notion that attempts to embrace the practices and discourses that people (journalists, managers, activists, public relations practitioners, citizens) perform to produce, circulate and use news (collections of ideas, facts and points of reference about matters of common concern in society such as reportages, articles, comments, pictures, etc.), considering professional ideals (autonomy, quality, transparency, democracy, public sphere, etc.), symbolic constructions (newsworthiness, shares, ratings, etc.) and material artefacts (technologies, tweets, newspapers, newsrooms, etc.) as elements that are all important in the process”(p. 56).

Thus, journalism is a network of actors/actants that could be human (journalists, editors, managers, technical staff and users) or non-human (technology, tools, knowledge, skills, structures protocols and rules) (Spyridou et al., 2013). They can work as intermediaries or mediators to form associations and engage in the process of translation, where they negotiate their roles to reach the ultimate outcome — that is, a media product (ibid.).

However, applying ANT to journalism poses several challenges. Some of them stem from the general criticism of the ANT research approach, for instance around the ideas that all actors stand on "equal ontological footing" and that power arises due to associations and network dynamics

(Müller, 2015, p.30). Critics say such viewpoints neglect traditional centres of power that tend to persist regardless of ongoing dynamics (Stonbely, 2013).

In response, Domingo et al (2015) proposed the concept of flattened ecology, that all actors/actants stand on the same level of power. They explained how ANT summarises journalistic actors' constant struggle to challenge the existing distribution of power in the news network through their connection and assembly.

Another problem is ANT's deep focus on the establishment of media networks while neglecting their later dynamics (Couldry, 2008), which affect the time dimension and the long-term consequences of power asymmetries (Anderson and de Maeyer, 2015). In other words, ANT studies all entities in the news network as equal, with power formed through their associations. However, it stops at that point without explaining the implications of such asymmetries (ibid.). In addition, critics say ANT fails to address the reinterpretation of the media product after it is established. Media products are open to various reinterpretations as they circulate among users, but ANT remains silent about this process (Couldry, 2008):

“[ANT] tells us little about the life of objects, such as texts, that are produced to be interpreted, nor about how other objects, as they circulate beyond their original context, remain to various degrees open to reinterpretation by users, consumers and audiences” (p.108).

Even when using ANT to analyse media texts, researchers are focused on associations and links brought out in those texts (Sørensen, 2012). They generally do not investigate how different users interpret texts based on networks or assemblages in which they are embedded.

Since ANT study is such a complex undertaking, scholars tend to limit it either to a particular social issue tackled through the media, such as the aftermath of the London Underground bombing of 2005 (Potts, 2009); the advent of innovations that dramatically change the actor/actant; or the product of media organisations (Domingo et al., 2015; Goggin, 2009).

The application of ANT to journalism studies encourages scholars to rethink the definition of journalism, its values along with its ethics. They move from the normative perspective of what journalism ought to be, towards a performative definition that accounts for the momentary process of interplay amongst human and non-human actors in a socio-technical hybrid network (Primo and Zago, 2015). For instance, Domingo et al. (2015) recommended focusing on how journalists see themselves, their products and their practices (a performative definition), rather than engaging in philosophical debates about what counts as journalism (a normative definition). Therefore, Anderson and de Maeyer (2015) argued, ANT should be expanded to trace historical and cultural changes of journalism, rather than being limited to “object-oriented” research of technological innovation of journalism. They highlight its ability to recognise the social, material and cultural context that suffuses a “technologically obsessed world” (p.4).

However, using ANT to study the cultural context of journalism and news work is problematic because ANT “radically questions the givenness of culture” (Goggin, 2009, p.153). It rejects dealing with culture as an external, abstract, static form that explains one’s actions, instead viewing culture as an assemblage that is constantly shaped and reshaped through enacted associations between various forms, technologies, objects and humans (Goggin, 2009; Plesner, 2012). And as an assemblage or actant, culture also has a performative nature (Entwistle and Slater, 2014); it guides different actors interact, yet at the same time its fate depends on actors’ associations.

Plesner (2012) defined media logic as “a convenient term for explaining all sorts of editorial choices, transformations of content, and source relations in studies of the mass mediation of research” (p.674). He conceived media logic as an actor that is collectively constructed via media practices and is empirically researched by tracing its impact on such practices. He argued:

“[A]bstract phenomena are not left out of the analysis on the grounds that they do not explain actions theoretically. Rather, they may enter the analyses if they are part of actors’ accounts of their practices and relations. They become significant as they are linked to a myriad of other entities” (p.680).

Nevertheless, Anderson and Kreiss (2013), who used ANT to deconstruct the black box of Content Management Systems in three Philadelphia newsrooms, viewed it as insufficient in the study of culture. ANT largely focuses on culture as a performative outcome, with traceable effects exhibited during the process of network building. However, it does not refer to the cultural structure of “meaning, values, rationales and beliefs” that explain people’s actions (p.369). Therefore, they suggested coupling ANT with a deep understanding of culture, permitting a “thicker view” of social actions.

3. ANT, Hybridity and Human-Machine Communication (HMC)

ANT provides a practice-based approach to the study of news production (Ryfe, 2018), viewing journalism as a discursive practice shaped by interactions among humans and non-humans (Steensen, 2018). It allows for a performative definition of journalism (Domingo et al., 2015) that transcends the binary dualities of social and material, producers and consumers, journalists and technologists, etc. ANT helps examine networks of actors regardless of their hybrid nature, revealing overlooked interrelationships that might contribute to better understandings of phenomena.

Hybridity thus can be seen as an intrinsic component of ANT. Both hybridity and ANT bypass “either/or mode thinking” and emphasize a “generalised principle of symmetry” among diverse actors (Chadwick, 2013, p. 17). They remove the dichotomies between human/non-human, subject/object, small/large, and inside/outside (Hermida and Young, 2017; Latour, 2005), allowing researchers to examine the changing nature of journalistic practice in the digital era. News, for instance, is not confined to the walls of established media organisations anymore. Researchers need to go beyond “traditional newsrooms” to understand “contemporary news flows and practices of journalism” (Steensen, 2018, p. 469).

News actors shape and are shaped by discursive hybridity. The “politico-normative” and “aesthetic-expressive” discourses are blending although they used to occupy distinct spheres in

“modernist minds” (Baym, 2017, p.13). Journalism was typically a domain of political-normative discourse, whereas art was the domain of aesthetic-expressive discourse. Baym (2017) used the concept of discursive hybridity to account for what he called televisual public affairs narrative, or drama inspired by reality.

Although hybridity and ANT both can account for unconventional network building, ANT provides a deeper understanding of phenomena through overcoming the limitations of hybridity.

Hybridity implies an assumed pre-existing purity, as if actors were presumably pure before they started to interact and influence each other (Mast et al., 2017). Hybridity “may suggest a historical ‘purity’ that never existed” in the field of journalism (Witschge et al., 2019, p. 654). Journalism is not only about the dissemination of information, as Kovach and Rosenstiel (2014) defined it. Journalism “tells stories, communicates values, gives voice, represents identities and ideals, and offers particular kinds of pleasure for particular kinds of people – all of which transcend the informational function” (Baym, 2017, p. 14).

ANT overcomes the false assumption of pre-existing purity by replacing the concept of hybrid with actor-network. Actor-network could be an actor within a network or an acting network (Muniesa, 2015), which suggests a hybrid status without implying pre-existing purity. An acting network may consist of diverse components, a hybrid status, but it may become a normalised actor, a black box, within another network. The black box does not reflect purity but overlooked or normalised hybridity. News interviews, for instance, are a complex “social thing” invented in the 19th century, yet they have become black-boxed in journalistic practice (Schudson, 2015, p. 65).

ANT’s emphasis on concurrent translation processes further challenges the assumption of pre-existing purity. Actors are constantly negotiating their identities and roles as they disassociate from their former networks and connect to or build new ones (Callon, 1986b). ANT underscores collaborative processes, reciprocal relations or interactions among actors as networks are built

(Cressman, 2009; Mutzel, 2009), since these interactions enable power asymmetries to arise (Law, 2008). ANT perceives power as a performative outcome that emerges due to interactions among actors, who initially exist on the same level of power (Latour, 2005).

The emphasis on translation processes also adds another comparative advantage to ANT over hybridity. Hybridity refers to anything complex, without sufficiently explaining how such complexity materialises (Mast et al., 2017). Hybridity fulfils its purpose as “a catch-all phrase”, but scholars “need to question its explanatory value” (Witschge et al., 2019, p. 654). Scholars need to move beyond naming phenomena towards describing and explaining their complexity.

In contrast, ANT typically stresses the need to examine the interrelations among networked actors, privileging “performance over practice” (Ryfe, 2018, p. 2441). Latour (1996) described ANT as a “method” and “recording device” that describes the deployment of associations, in which actors’ identities and roles are negotiated (p. 374). ANT is interested in not only naming hybrid networks but also in describing how they materialised. However, journalism scholars adopting a practice-based approach often talk very little about the negotiation processes among networked actors (Ryfe, 2019). Papacharissi (2015) is one of a few researchers who examined the negotiation processes in what she called “prodused” news on Twitter. She explained how Twitter’s affective news streams are “collaboratively constructed out of subjective experiences, opinions and emotions sustained by and sustaining ambient news environment” (p. 27).

ANT research sometimes deviates from the basic concepts of the theoretical framework in many ways. ANT, for instance, flattens the ecology between technology and humans, striking a balance between human-centric and techno-centric perspectives (Law, 2008). Yet ANT research tends to promote an implicit technological determinism due to its overemphasis on technology (Steensen, 2018).

ANT is not the only framework that challenges the anthropocentric approaches to journalism studies. Lewis et al. (2019) proposed Human-Machine Communication (HMC) as a conceptual

framework to study automated journalism, acknowledging the role of technology as a communicator. HMC provides a way to study communicative technologies, how they interact with humans and their implications for self, society and communication. Lewis et al. (2019) privilege HMC over ANT since HMC provides meanings and accommodates the future implications of technology becoming a communicator. HMC can be seen as a response to the calls of Witschge et al. (2019) for “a new type of scholarship” that can “show the patterns amid apparent flux” in the field of journalism (p. 655), a scholarship that seeks to find order inside the messiness perceived by external observers of journalistic practice.

“What is relevant to understand is how that order is constructed, given the complex set of relations in any given context: what is accepted as ideal, as the norm and how practices negotiate their coherence with norms or their rebellion against them” (Witschge et al., p.656).

ANT has, indeed, spurred huge criticism about its descriptive nature and its disinterest in context. Hammond (2017) described it as a model that has “no interest in meaning”, and he called for constructive approaches that provide causations rather than simple correlations (pp. 420-421).

The general critique of ANT’s disinterest in context stems from its radical materialism-based foundation. Latour (2005) stressed that a good description that accounts for the interrelations among all networked actors does not require an external abstract explanation. ANT rejects the idea of hidden global social forces (Fioravanti and Velho 2010). Instead, it removes inside/outside dichotomies, allowing anything that produces a traceable difference to become an actor regardless of its nature (Latour, 2005). Media logic, for instance, can be an actor that enters the analysis as “part of actors’ accounts of their practices and relations” (Plesner, 2010, p. 680). Media logic, from an ANT perspective, is not an outside context but rather a networked actor.

ANT is not actually disinterested in context. Rather, it perceives relevant context as an actor, who enters reciprocal relationships with other networked actors. Context shapes and is shaped by

other networked actors. Media logic, for instance, shapes and is shaped by the interrelations among networked actors (Plesner, 2010). In the same way, journalistic culture is an actor that shapes and is shaped by the interrelations in sociotechnical hybrid networks. ANT thus helps examine the implications of such hybrids on journalistic culture.

Still, critics perceive ANT as a deconstructive approach that has less explanatory value than critical cultural approaches (Hammond, 2017). They perceive ANT as a means to account for complexity and messiness without explaining implications of such messiness in a broader normative sense (Lewis et al. 2019). Critics called for coupling ANT with deep understanding of culture because ANT accounts for culture as a performative outcome but not as a system of values and beliefs that explains human behaviour (Anderson and Kreiss, 2013). Lewis et al. (2019) put it this way:

“ANT flattens the ontological space, erasing distinctions between humans and machines, rather than doing what we need a conceptual framework to do in this case: to show us how, why, and with what meaning machines cross boundaries in taking on human roles.”

In this study, the researcher relied not only on ANT but also on the conceptual framework of journalistic culture. She conceptualised journalistic culture as an actor that shapes and is shaped by interactions in the VR-journalism network. She then attempted to situate the performative outcome of culture within the broader context of journalistic culture defined as institutional roles and normative ideals. The researcher was interested in not only describing practices but also investigating their meanings in relation to normative ideals of facticity, accuracy, objectivity and detachment. “Although it is of course true that how we do journalism has changed, the more important change is in how we think about journalism” (Hammond, 2017, p. 409).

The selection of ANT as a theoretical framework introduced a few research limitations. ANT fell short in theorising the use of VR in journalism due to the denial of “natural stabilities and

repeatedly instantiated types” of actions (Elder-Vass, 2015, p. 105). ANT does not “build a theoretical framework that can predict journalism practice in the digital age” (Wu et al., 2019, p. 1442). In other words, ANT does not provide a generalised notion that can apply outside the studied network. This limitation did not concern the researcher since she is conducting an exploratory study. Experimentations with VR technology are constantly evolving. VR journalism has not reached any point of stability that permits theorising.

Nonetheless, ANT added a great value to this exploratory study and helped overcome the shortcomings of other approaches that have a particular relevance for the study of VR journalism. ANT bypassed the limitations of hybridity, as explained earlier, through rejecting the assumption of pre-existing purity and emphasizing the need to examine how actors’ roles and identities are negotiated. And unlike HMC, ANT accounts for different types of non-human actors other than technology (Steensen, 2018). Thus, ANT coupled with deep understanding of journalistic culture is more suitable than HMC to study VR journalism.

The researcher, thus far, has explained ANT as a theoretical framework to study VR journalism. She explained its origins and concepts. She then examined its application in journalism studies. She ended by detailing why ANT works best for this study through a discussion of hybridity and HMC. The following chapter examines journalistic culture as a conceptual framework. It delves deeply into normative ideals and institutional roles, the basic components of journalistic culture. It also explores the dynamic nature of journalistic culture through an examination of narrative journalism and collaborative cultures in entrepreneurial and interactive data-driven journalism.

Chapter III

Journalistic Culture

1. What Is Journalism?

Journalism is “the business or the practice of regularly producing and disseminating information about current affairs of public interest and importance” (Schudson, 2011, p. 3). This definition emphasises the public service mission of journalists in democratic society to provide the public with what they need to know to become “free and self-governing” (Kovach and Rosenstiel, 2014, p.17).

However, critics regard such ideal definitions of journalism as a truthful, objective and autonomous public service as “naïve, one-dimensional and nostalgic” (Deuze, 2005, p.458). Technical, political, economic and moral factors make journalism a complex phenomenon that can be defined through various metaphors, including a mirror, a story, an engagement, a profession and a set of practices (Zelizer, 2017).

Journalists embracing the mirror metaphor strongly believe that news should aim to reflect reality, despite research findings that describe news as a socially constructed product. As a story, news takes the form of an engaging narrative, with “dramatic heartening stories, moral lessons and compelling plotlines” (Zelizer, 2017, p.19).

Digital capabilities have revolutionized news storytelling, but it still reflects some historical trends (Zelizer, 2017). Internet-connected computers and mobile devices emphasise interactive, hypertextual and non-linear forms of storytelling. Further engagement is provided through User Generated Content (UGC) and social media.

Thus, new forms of narratives are constantly generated, causing journalism to become more fluid as well as harder to define (Kovach and Rosenstiel, 2014). The boundaries among journalism, entertainment and fiction are becoming blurred (Witschge and Nygren, 2009). Rules and norms

of the journalistic profession may be breached, as technology causes confusion about exactly who the journalist is and what the journalist does (Zelizer, 2017).

In addition to technology, political, economic, social and cultural forces influence journalism (Schudson, 2010). These forces operate on various levels that can be understood through a “hierarchy model of influence” model (Shoemaker and Reese, 2014). From macro to micro levels, they include social systems, social institutions, media organisations, routine practices and individuals.

2. Hierarchy Model of Influence

Social System Level

At this macro level, the focus is on the ways in which media content can be affected by contextual factors such as ideology, politics, economics and culture. For instance, capitalism, which is closely tied to private ownership and pursuit of profits (Shoemaker and Reese, 2014), can endanger the autonomy of journalists. Similarly, the political-economic system can create a “dollar hegemony” that alters journalists’ perception of the public from citizens to consumers (Schudson, 2010, p.168). Globalisation also can affect international news coverage (Ting, 2010).

Social Institutional Level

Here, journalism is viewed as a single homogeneous institution, which interacts with other institutions in society such as government, watchdog groups and audiences (Shoemaker and Reese, 2014). Kovach and Rosenstiel (2014) perceived journalism as a single institution, profession and culture, one they suggested shared universal elements that distinguish journalism from other institutions. These elements indicate the dynamic nature of journalistic culture (Shoemaker and Reese, 2014).

This dynamism is partially caused by technology. Deuze (2008) demonstrated how technology makes journalism an “atomised profession, isolated and connected at the same time” (p.204). Journalists in an online newsroom, Deuze explained, can do some of their work from the comfort

of their desks with the help of an internet connection. They can collaborate with other professionals in the news organisation via CMS without having to meet them in person. Technology also can create pressures to emphasise speed over accuracy, so that fact-checking and verification are sometimes overlooked (Kovach and Rosenstiel, 2014).

However, this level of analysis oversimplifies the reality because it views journalism as a single homogeneous institutional actor, suggesting all news organisations are influenced in the same way by external forces such as technology. In fact, news organisations may differ according to governmental policy (Anderson, 2012), geography and national culture (Hanusch, 2014; Hanusch and Uppal, 2015), or the level of technology used (Deuze, 2005; Deuze, 2008, Boczkowski, 2004).

First, government policies related to transparency and accessibility of data or to surveillance of online communication directly influence journalism practice and culture (Anderson, 2012). Second, journalism in some cultures may promote advocacy stances, encouraging journalists to take sides or promote certain ideas instead of being impartial (Hanusch, 2014). Third, technology is subject to “diverging appropriations and uses” that vary among news organisations (Deuze, 2008, p.205). Moreover, technology is often contextualised based on how users are viewed; the more technologically savvy a news organisation perceives its audience to be, the more it will invest in technologically sophisticated work (Boczkowski, 2004).

Organisational Level

At this level, research focuses on examining ownership of media organisations, policies, goals, actions, bureaucratic structures, economic viability and stability (Shoemaker and Reese, 2014). Technology influences the organisational structure, for instance by creating new informal hierarchies when media professionals are not granted equal access to technology (Deuze, 2008). Media organisations also may be encouraged to form virtual collectives to minimize the costs of technologically sophisticated media production (Shoemaker and Reese, 2014). Such collectives may work together to engage third-part companies to complete particular tasks, then quickly disaggregate after a project is completed, as in film production (ibid.).

Technology not only influences the organisational structure but also introduces each media organisation to fierce competition, prompting some to offer new products to gain competitive advantage. For instance, National Public Radio (NPR) in the United States began producing video content when it moved online (Shoemaker and Reese, 2014). Competition also brings the business side to the forefront as media outlets experiment with various business models to support the high costs of content production (ibid.).

At the same time, technology adoption is dependent on the capital of each media organisation (Anderson, 2012). Expenditure is not always proportional to size. Sometimes large conglomerates, where a single corporation owns many media outlets, are slower in adopting technology than smaller organisations. Conglomerates prioritise sustaining their existing political and economic advantages making them less willing to take risks with new technology (Shoemaker and Reese, 2014).

Routine Level

Researchers at this level examine the practices of journalists and how they perceive their roles, as well as the occupational guidelines under which they operate related to such aspects of news work as news judgement, writing styles, and norms and ethics (Shoemaker and Reese, 2014).

Anderson (2012) perceived technology to have less dramatic effects on “the ground level of the newsroom dynamics” than might be assumed (p.1014). Kovach and Rosenstiel (2014) stressed that although specific roles and tasks may be different, the “theory and philosophy of journalism remain unchanged” (p.16); the journalist’s basic purpose is still to create informed citizens capable of engaging in the democratic process. They argued that journalists’ tasks involve authenticating and contextualising events, providing eyewitness accounts, uncovering wrongdoing, organising public discussions, encouraging interaction and empowering the community (Kovach and Rosenstiel, 2014).

Despite the unchanged normative understanding of journalism, digital media have caused significant changes in the journalistic practice (Singer, 2019). Shoemaker and Reese (2014) believe journalistic work routines are constantly changing. Deuze (2008) agrees that the fluid nature of online news challenges “the specific notions of what a ‘story’ is, or how a ‘deadline’ functions, or when the news is actually a ‘finished’ product” (p.205). Constant deadlines weaken the ability of journalists to verify news, moving them towards team-based working. And at least to some extent, journalism becomes a desk job when journalists depend on internet sources, e-mails, wire services, and phone calls instead of actual field work (Witschge and Nygren, 2009).

Journalists' tasks have shifted from news gathering to news processing; in a market-oriented culture, they must create interesting content to attract users and advertisers (Bromley, 2005). More optimistically, Kovach and Rosenstiel (2014) marked a shift in the journalist's role from a gatekeeper to a sense maker, helping the audience understand complex stories about which information is already available online. Journalists also have moved from beat coverage to team-based reporting (Bromley, 2005) following the introduction of a collaborative, converged newsroom culture.

Individual Level

At this level, researchers study journalists' attributes and their effect on work within a larger institutional context (Shoemaker and Reese, 2014).

However, defining a journalist has become a struggle. The advent of new technology enables citizen journalism and other forms of User Generated Content (UGC), permitting people with different backgrounds to enter the journalistic field and generating “an army of semi-reporters” (Deuze, 2008, p.206). In addition to bloggers and other content creators outside the newsroom, programming has become influential in online journalism; journalists now work with programmers or may even do their own coding (Quandt et al., 2006).

Scholars have used different methods to conceptualise and define journalists (Shoemaker and Reese, 2014). Quandt et al. (2006) identified journalists as those who perform “investigating, selecting, writing and editing” tasks that are distinct from public relations, fiction or “self-centred communication” (p.174). In contrast, Domingo et al. (2015) relied on respondents themselves to describe how they perceive their work and define themselves.

Shoemaker and Reese (2014) demonstrated how diverse levels of the hierarchy model are interrelated. They argued that journalists’ attributes (individual level) and their professional roles (routine level) operate within national and organisational cultures at the social system, institutional and organisational levels. These cultures maximize or limit journalists’ communicative power (p.210). For instance, American journalists tend to use more aggressive reporting methods than their German counterparts, such as badgering sources or using confidential documents without permission (Quandt et al., 2006). This is due to cultural differences; Germans tend to view these methods as “unorthodox” and “questionable” (p.180).

The reviewed literature, thus far, shows how complex journalism is. However, this study aims to examine the relation between VR and journalistic culture, in which clear conceptualisations of both elements is needed to offer insightful findings. Therefore, the remaining part of this chapter provides an attempt to deconstruct journalistic culture into its basic components. The researcher revisited the vast amount of research literature and focused on aspects of particular relevance to the study, including objectivity, transparency, the rise of emotionality, and narrative and collaborative journalism.

3. Conceptualising Journalistic Culture:

Conceptualising journalistic culture is not an easy task because of this diversity and constant changes in journalistic practice. The range of scholarly views about what counts as journalistic culture can be organised into two schools of thought. The first views journalistic culture as an independent symbolic system, a kind of abstract knowledge that is unconsciously etched in journalists’ minds (Schudson, 2010). Such knowledge is hard to identify and its influence on news

work is difficult to track. The second school of thought refers to culture as a dynamic ideology formed through a socialisation process (Tuchman, 2002; Deuze, 2005) during which journalistic culture and practice mutually shape each other (Deuze, 2008).

Within the ideology perspective, Tuchman (2002) described culture as a guide for selecting and framing news. She said cultural knowledge results from institutional position and organisational practice. Such knowledge is constantly redefined to perfectly describe the real journalist and real journalistic practice (Deuze, 2005); journalistic culture shifts, as journalistic routines change due to the advent of new genres of news and writing protocols (Tuchman, 2002).

Ryfe (2006) illustrated the dynamic nature of journalism principles concerning the journalist's role, obligations and ideas about "what values and commitments are appropriate in the context of news production" (p. 205). The principles simultaneously demonstrate both consistency and variability: They consist of abstract rules of truth and objectivity, but their definitions and applications vary according to situations. Consequently, opposing actions can be justified by a single rule (ibid.).

Since journalistic culture is translated into text through routines and practices (Tuchman, 2002), it can be inferred, by both journalists and academic researchers, from sociological operations within the news organisations (Shoemaker and Reese, 2014).

Journalists familiarise themselves with occupational culture over time, through trial and error. Breed (1955) found that journalists learn about newsroom policy through an implicit socialisation process that depends on rewards and reprimands instead of explicit written accounts of policy (p.328).

For researchers, sociological investigations are the key to conducting cultural analysis of journalism, and to explaining how culture is produced and reinforced within news organisation (Deuze, 2008). This cultural analysis usually begins with scrutinising journalists' self-presentations (Zelizer, 2017). Such scrutiny can be done through a sociological investigation of

the interaction between the elements of media work including time, space, budgets, ownership, values and norms of professionals (Deuze, 2008). This helps focus a cultural analysis on current practice, distinct from normative biases and journalists' professional aspirations (Zelizer, 2017). Such an approach emphasises the dynamic nature of conventions and routines that are situationally based. It moves from professional standards towards a cultural mindset that embraces "relativity, subjectivity, reflexivity, engagement and construction" (p.168). Removing normative biases in journalistic cultural analysis means non-journalists can occupy the margins of journalistic culture; journalists can become both cultural conveyers and producers, and traditional barriers between different genres are gradually removed (Zelizer, 2017).

Recognising the dynamic nature of journalistic culture as "a whole of disparate, often contradictory, impulses" (Zelizer, 2017, p. 152), Hanitzsch (2007) defined it as a "set of ideas and practices by which journalists, consciously and unconsciously, legitimate their role in society and render their work meaningful for themselves and others" (p. 369). He argued that culture operates at three levels of news production. At the cognitive level, it determines the way journalists perceive and interpret news work, such as exercising news judgement based on newsworthiness and news values. At the evaluative level, it forms their perceptions about their professional roles. At the performative level, it is translated into journalistic practices.

Hanitzsch (2007) proposed institutional roles and ethical ideologies as major components of journalistic culture. He identified institutional roles as interventionism, power distance, and market orientation, and ethical ideologies as idealism and relativism (p.371).

(a) *Institutional Roles*

Institutional roles are the functions of journalists in society. Journalists' perceptions of their roles revolve around "information dissemination, interpretation and investigation, or adversarial relation to institutions of power" (Tuchman, 2002, p.90). More recent scholars also have identified an activist role related to setting the political agenda and addressing public problems; this role can be fulfilled by actors outside the newsroom, such as bloggers, in addition to

journalists (Beam et al., 2009). These roles are usually determined by the integration of practice and professional journalistic ideals (Tuchman, 2002).

Mellado and Dalen (2014) have identified a set of models for journalistic role performance:

- (1) The disseminator–interventionist model deals with journalists’ distance from facts.
- (2) The loyal facilitator model is related to the propagandist role.
- (3) The watchdog model is performed through investigative reporting about the actions of those in power.
- (4) The civic model aims at getting people involved in public life.
- (5) The service model views audience as customers whose problems need to be solved.
- (6) The infotainment model focuses on entertaining the audience (pp. 861, 862).

The way journalists perceive their roles establishes their identity. When journalistic practices contradict professional ideals, practitioners experience an “identity crisis” (Ryfe, 2009, p.198) or a sense of “unfinished professional identity” (Deuze, 2008, p.208).

For instance, in Ryfe’s (2009) case study, journalists who were instructed to avoid covering daily news from their beats thought that doing so would diminish their mission as public service providers, as well as endanger their autonomy. They ended up questioning their identity as real journalists.

Online journalists may face similar identity issues when they try to follow the principle of traditional journalism while developing new practices for the digital platform (Deuze, 2008). They may have a “typical migrant experience ... not part of their home country anymore, but also never fully accepted by their host country either” (p.208).

The changing nature of journalistic work further influences journalistic ideals, creating challenges in the face of economic and social pressures (Rottwilm, 2014). Entrepreneurial journalism, for instance, has blurred the boundaries between the roles of a publisher, fundraiser and journalist

(Porlezza and Splendore, 2016). The journalist has become responsible for securing funds, diminishing the wall between editorial and commercial and “raising questions of independence and funder influence on editorial writings” (Ward, 2015, p.56). In addition, the blurring boundaries between different media genres such as fiction, entertainment and journalism may create a need to reconsider journalism as a profession (Witschge and Nygren, 2009).

Zelizer (2017) underscored several reasons to view journalism as an interpretive community rather than a profession. She extracts a set of journalistic standards from journalistic discourse surrounding key events at different points of time.

First, she says, focusing on journalism as a profession tends to dismiss implicit socialisation that allows reporters to learn about rules and routines from their colleagues in the field, without consulting their superiors. Second, it overlooks narrative and storytelling practices because journalists see storytelling as implying reduced professionalism. The journalism-as-a-profession approach thus fails to address overlaps of fact and fiction that may be produced by storytelling and narrative techniques (Zelizer, 2017).

Technology also challenges a consideration of journalism as a profession with particular ideals and principles. Journalists have moved from being autonomous, independent gatekeepers to becoming a collaborative team of sense makers (Deuze, 2005). They no longer monopolise news since the internet enables everyone to produce and disseminate knowledge. Consequently, journalists’ “control on the mediated public sphere” is fading (Witschge and Nygren, 2009, p.55). Their responsibility shifts towards contextualising information for the audience (Singer, 2009). They become sense makers, who blend different types of inputs in an innovative way to help the audience make sense of complex stories (Kovach and Rosenstiel, 2014).

However, technology does not always disrupt journalistic principles. Nicey (2013) argued that photographic meta-data and geolocations allow user-generated photo agencies to “reactivate” journalistic principles of accuracy and authenticity (p.215). Technology offers new tools to

pursue strongly held journalistic missions and roles. Hyperlinks, interactive features, and multimedia give readers opportunities for greater participation and representation in the story, and permit “experiencing” the story (Robinson, 2007, p. 317).

Considering the dynamic nature of contemporary journalism and on-going calls to reconsider its status as a profession, Hanitzsch (2007) identified three universal dimensions for institutional roles: interventionism, power distance and market orientation.

The interventionist role ranges from completely detached passivity to full social commitment (Hanitzsch, 2007).

At the passive end, journalists exhibit a professional ideology that revolves around objectivity, impartiality and neutrality. Journalists in liberal democratic societies typically posit these as ideals. However, Kovach and Rosenstiel (2014) suggest that objectivity and impartiality are not cornerstones of journalism; rather, they are "a device to persuade the audience of one's accuracy and fairness" (p.103).

At the interventionist end journalists get involved in their stories; they advocate, participate and ultimately promote change (Hanitzsch, 2007). The interventionist roles are apparent in development journalism where journalists consider promoting social harmony, economic growth and education as more important than relaying information objectively. In this view, journalists become “active contributors” instead of “spectators” (Kalyango et al., 2017, p. 579).

The second dimension of power distance ranges from an adversarial position to a loyal one (Hanitzsch, 2007). Adversarial journalists become watchdogs, sceptical about institutions and those in power. Journalism becomes a “Fourth Estate,” especially in liberal democratic society. On the other hand, loyal journalists promote governmental policies, conduct propaganda and engage in self-censorship to please those in power. They tend to follow official statements without question.

The third dimension, market orientation, refers to the way journalists perceive their audience: as citizens or consumers (Hanitzsch, 2007). Journalists may aim to create informed citizens who can participate in democratic life. In contrast, highly market-orientated journalists view the audience as consumers; value is placed on helping them manage their lives by considering their needs, interests, and attitudes.

Highly market-orientated news organisations in a competitive environment often demand higher efficiency levels to ensure their economic viability or profitability (Witschge and Nygren, 2009). The boundaries between the editorial and business sides in these organisations may become blurred, endangering the journalistic principle of autonomy. Growing commercialisation and profit orientation can drive news selection, especially if journalists are under pressure of potential layoffs (Beam et al., 2009). When this occurs, journalists may shift from traditional editing techniques aimed at “supervising the content to meet the professional standards” towards editing content to attract more advertisers (Bromley, 2005, p. 231).

An increase in market orientation has been blamed for the rise of sensationalism and infotainment in the 1990s. However, this form of content did not offer a lasting business strategy, instead damaging the audience’s appetite for news and destroying the authority of the news organisation (Kovach and Rosenstiel, 2014).

(b) *Ethical Ideologies*

Professional roles thus are shaped by the integration of journalistic practice and ideals, as suggested by Hanitzsch’s (2007) consideration of ethical ideologies as a second key component of journalistic culture. Deuze (2005) identified five basic journalistic ideals:

- Public service: journalists provide a public service as watchdogs or “newshounds”, active collectors and disseminators of information
- Objectivity: journalists are impartial, neutral, objective, fair and (thus) credible,

- Autonomy: journalists must be autonomous, free and independent in their work.
- Immediacy: journalists have a sense of immediacy, actuality and speed, which is inherent in the concept of “news”.
- Ethics: journalists have a sense of ethics, validity and legitimacy

(Deuze, 2005, p.447).

More broadly, ethics are the norms and principles that ensure responsible media use of journalists’ freedom to publish (Ward, 2014). Journalists value such norms as providing complete, honest, truthful and fair information; acting freely and independently; being straightforward and transparent; avoiding harm; behaving with justness and honour; and respecting privacy (Hanitzsch, 2007). The Society of Professional Journalists (SPJ) – a US organisation best known for its code of ethics – sets four overarching guidelines for journalists: seek truth and report it, minimise harm, act independently, and be accountable and transparent (SPJ, 2014).

Ethics can be considered along a continuum of idealism and relativism (Hanitzsch, 2007). Relativism refers to the degree to which journalistic practice is based on universal rules and ethics. A highly relative stance denies the existence of universal laws. Idealism is related to the idea that the best outcome is obtained through the right action. A less idealistic journalist accepts that the end justifies the means (outcome-oriented). Along this continuum, Hanitzsch argued that journalists can be absolutists or subjectivists. Absolutists tend to favour ideal actions and adopt universal moral rules. In contrast, subjectivists exercise situationally based moral rules and may choose the wrong behaviour to reach a desirable end (Hanitzsch, 2007). In the middle ground, there exists exceptionists. Exceptionists believe in journalistic ideals but they are more outcome oriented. They are pragmatically open to exceptions to prevent potential negative consequences (Hanitzsch, 2007).

Today, a review of the existing journalistic codes of ethics may be necessary in response to the revolutionary change in digital journalism. Technology has expanded the boundaries of who the journalist can be (Ward, 2014; Díaz-Campo and Segado-Boj, 2015). Citizens, non-governmental

organisations (NGOs), and amateur writers are publishing without sufficient awareness of journalistic norms and ethics. As a result, journalistic norms of objectivity, accuracy, and independence are “relaxing or expanding” in digital journalism (Robinson, 2007, p. 213).

Objectivity, for instance, tended to be conceived as a journalistic norm that originally stems from “the Enlightenment ideals” about the existence of independent discoverable truth (Waisbord, 2018). However, practical limitations and unavoidable distortions caused journalistic objectivity to become an unattainable ideal (Schudson, 2001). Journalists are humans who cannot view things from a nowhere standpoint since they do not exist in a void (Ward, 2019). Technology as well as economic, political and socio-cultural factors influence their work (Schudson, 2010).

Objectivity is, instead, a “strategic ritual” that helps protect the journalist’s authority and jurisdiction (Tuchman, 1972). It is a method that guards journalists against criticism and allows them to perform their watchdog function (Tuchman, 1972; Kovach and Rosenstiel 2014). It consists of various narrative conventions such as the separation of facts and opinions and the use of balanced reporting, detached description, quotes and references to eye-witnesses (Schudson, 2001; Bock, 2016).

Realising objectivity as an unattainable ideal, journalists have found transparency as way “to disclose the constructed nature of their work without stepping outside the boundaries of objective reporting” (Allen, 2008, p. 327).

Journalistic transparency consists of disclosure and participatory transparency (Karlsson, 2010). On the one hand, disclosure transparency implies openness about the news-making process, including evidence, sources and editorial partners, funders and any potential conflict of interest (Ward, 2015, p. 51). On the other hand, participatory transparency implies inviting audience to participate in the news-making process (Karlsson and Clerwall, 2018).

Transparency have gained a recent prominence with introduction of new media that challenged the “journalism monopoly status” as a sole source of news (Bogaerts and Carpentier, 2013). The internet culture with its pressures for greater accountability along with the audience decline economic pressures and the “desire to distance ‘journalism’ from the increasingly entertainment-oriented ‘news media’” have led to the rise of transparency as a tool to preserve the journalistic authority (Singer, 2007, p. 87). It has become a truth-telling strategy, an insurance of journalistic legitimacy and jurisdiction and a tool to restore audience trust in news media (Karlsson, 2010; Mor and Reich, 2018).

Although the internet culture emphasizes the significance of transparency, it should not be placed as superior to other values. “There is no absolute hierarchy of values with transparency at the top” (Ward, 2015, p. 51). Transparency can undermine audience trust and increase social pressure that undermines journalistic autonomy (Allen, 2008).

Transparency seems to have a “higher status” among journalists and researchers rather than audiences (Karlsson and Clerwall, 2018, p. 1972). It does not have significant influence on audience’s decisions of what makes good and credible journalism. Transparency about errors and corrections, for instance, does not predict audience trust because audience believe that media should be accurate in the first place (Karlsson et al., 2017). Audience may even reject transparency at some point. For instance, when Karlsson and Clerwell (2018) examined the difference in audience perception of disclosure and participatory transparency, they found that disclosure was valued whereas participatory was “disdained” (p. 1930). They argued that transparency should not be an abstract notion “one-size-fits-all approach”, but rather it should be a situation-based assessment: “what kind of transparency will serve what kind of role for different segments of the public and other stakeholders under different circumstances” (Karlsson and Clerwell, 2018, pp. 1930, 1931).

For instance, the US-based Online News Association (ONA) offers a “DIY Ethics” tool that allows journalists to build their own ethics code (Ward, 2014). The tool starts with common principles

of truth-telling, avoiding plagiarism and correcting errors. Then, journalists choose between “traditional objective journalism” or “transparency journalism” where journalists can write from a specific perspective as long as they are upfront about it (Ibid., p. 465).

The “DIY Ethics” reflects a more relative and situation-based stance towards journalism ethics, in contrast to following traditional universal rules. Zelizer (2017) argued that universal codes restrict journalistic practice and the public’s right to know and fail to recognise the complex nature of journalistic practice with its dimensions of temporality, geography, institutions and technology. However, Ward (2014) refuted this fragmented view of journalism ethics. He called for more integrative codes, which are global and local at the same time, and allow for differences rather than imposing sharp divisions between forms of journalism.

Ward (2019) called for a notion of “pragmatic objectivity”, which exist in the middle ground between naïve absolutism and extreme post-modernism. Pragmatic objectivity rejects the extreme subjectivism that “ignores how much agreement is possible among reasonable people if they can agree on principles of fair co-operations” (Ward, 2019, p. 48). It is “objectivity with human face” that is applied in groups. Journalists should be transparent about their partialities, and sensitive to their undue influence (Ward, 2019, p.25). Journalists should be willing to submit to public scrutiny and to present their reasons which other people can accept as valid (ibid.).

Pragmatic objectivity allows the journalist to be an engaged citizen, to the extent that “journalists can be advocates” (Ward, 2019, p. 24). Objectivity and engagement are different but compatible, demonstrating the same relation between methods and goals (ibid.). A journalist can be an engaged citizen advocating a certain perspective as long as he/she is not ignoring inconvenient facts and as long as he or she adopts truthful interpretations and unbiased decisions – objective methods – to reach his or her goal.

Advocacy does not necessarily distinguish journalism from Public Relations (PR) because all works of journalism contain elements of advocacy either implicitly or explicitly (Fisher, 2016). The

“organisational, journalism production, source and personal factors” inevitably lead journalistic work to “fall on a continuum of advocacy from subtle to overt” (ibid., p. 723). Advocacy, for instance, becomes permissible in quality newspapers when there is a consensus about the importance of the cause. In such case, advocacy becomes a form of “good journalism” despite the high expectations of objectivity in quality newspapers (Wade, 2011, p. 1181).

However, journalists normally employ the “strategic ritual of objectivity” (Tuchman, 1972), where advocacy becomes subtle, and journalists can defend their professional status. For instance, when covering mega-stories like Snowden and NSA leaks, journalists play the role of “anti-heroes” – not villains but distinct actors from real heroes and whistle-blowers (Eldridge II, 2017). The journalist adopts a “near-subjectivity” stance, in which mega-stories frame the journalist as “an actor engaged in a notable revelatory work” and as “man of the people” positioned near centre, to remain distinct from the protagonist and maintain his or her professional status (Eldridge II, 2017, pp. 149, 153).

The same notion of near-subjectivity appears when journalists employ emotionality to increase audience understanding of the story (Pantti, 2010). Journalists “outsource emotional labor” to non-journalists to remain objective and professional (Wahl-Jorgensen, 2013, p. 129). Journalists refrain from describing their own feelings and describe the feelings of news actors. Journalists may use direct and indirect quotes as evidence for the description, or they may rely on their authorial position of truth-telling to describe news actors’ feelings without evidence (ibid.).

The rise of emotionality in journalism is connected to the intense competition, where journalists must “fight harder than ever for every eyeball or ear” (Beckett and Deuze, 2016). However, broadcast journalists are reluctant to acknowledge competition as the driving force. They insist that emotionality reflects the transformation of culture in late modern societies, where news sources were expected to reveal their feelings (Pantti, 2010). Journalists, in turn, had to take extra care not to provide “overflow of emotional expression”, in which journalists seek juicy but unethical interviews with traumatised victims (Pantti, 2010, p. 173). They also tried to avoid

“jazzing up” tragic incidents because “facts speak for themselves” and journalists do not need to convince the audience of the significance of the story (Boesman and Meijer, 2018, p. 1001). Emotional expressions become pointless when they are predictable, and when they do not contribute to the story. Emotional expressions are only relevant when they are unexpected or when they are collective (Pantti, 2010).

Emotions may facilitate understanding the story or add to the story, but they can never be the story itself (Pantti, 2010). And as Wahl-Jorgensen (2013) conceives emotionality as a strategic ritual in the news-making process, it becomes necessary to explore narrative journalism, a distinctive embodiment of emotionality in journalism.

4. Narrative Journalism

The return to narrative journalism can be traced to the rise of digital technology and new media. Print media found that narrative/literary journalism or “new journalism” can be the way to recapture audience interest (Van Krieken and Sanders, 2017). Digital technology has provided also tools to profoundly engage the audience, offering new venues for narrative journalism (Kormelink and Meijer, 2015, p. 168). However, the rise of literary and narrative journalism can be traced back to the 1960s and 1970s, as Tom Wolfe published in his book “The New Journalism” and labelled this genre to bring it to public consciousness (Goc, 2008).

Narrative journalism often employs literary or “fictional writing devices” such as “character development, complication, detailed description, scene setting and construction and time reconstruction” (Johnston and Graham, 2011, p. 519). The characteristics of narrative journalism style of presentation can be grouped into three main categories: viewpoint techniques, scene reconstruction and event structure (Van Krieken, 2018). Viewpoint techniques refer to telling the story from the viewpoint of the news actor or story character. Scene re-constructions refer to the detailed vivid description or visualisation of scenes. The event structure refers to the chronological order of the story events in contrast to the conventional inverted pyramid style where most important events are ordered first and are followed by less important events.

Despite the fictional and literary writing devices, narrative journalism remains a non-fiction and a factual form. Kovach and Rosenstiel (2014) argued that the narrative should always serve truth and accuracy, and it should be driven by the goal of fostering understanding and enhancing public insight.

On the surface, journalism is the “discourse of the concrete the particular and the denotative”, whereas fiction is the discourse of “the figurative, the universal, and the connotative” (Baym, 2017, p. 16). Yet on a deeper level, audiences seek out the connotative meaning of the journalistic story to reach the “ideal significance” and understand how a specific event translates into a broader context (ibid.). Both journalism and fictional discourses share emphasis on connotative meanings of stories, but journalism should accurately reflect an external event that took place at specific time and place. Journalism focuses on recent events that can easily be fact-checked rather than issue-oriented analysis to boost accuracy and factuality, but this focus often limits the ability to cover timeless broad issues (Tuchman, 1978).

Narrative journalism also attempts to reflect actual phenomena that exist in the external world (Hartsock, 1999). It has to achieve “aesthetic persuasiveness” through detailed scene re-constructions and “ethical persuasiveness” through testing those details to an external point of reference (Greenberg, 2014, p. 529).

Scene re-constructions

Scene re-constructions in narrative journalism invite doubts about facticity and accuracy. The vivid detailed scene re-construction, in which the journalist provides access to news actors’ thoughts and feelings, may leave the audience wondering how the journalist accessed these details (Lorenz, 2005). The scene-by-scene re-constructions may make the story “too good to be true”, where facts are “embellished” to provide a compelling story (Frank, 1999, p. 147). Some TV reporters, for instance, intervened in the real-life of story characters and asked them to sell their car earlier than planned to get the audience closer to the truth of debt industry in a documentary (Boesman and Meijer, 2018). For these reporters, “factuality and truthfulness are not identical ... it [is] justified to intervene in ‘reality’ to come closer to the truth” (ibid. p. 1004).

The very fact of intervening with reality and endangering the facticity of news was the main theme of debates between proponents and opponents of narrative journalism. Conventional journalists often viewed reporting facts and telling stories as “antithetical practices” (Kormelink and Meijer, 2015, p. 160).

However, facts and storytelling are not entirely opposites. Facts form the foundation of journalistic authority in democratic societies, in which journalists are informers and truth-tellers. And storytelling is part of the journalist’s daily practice, in which he/she actively frames the reality and uses balanced reporting as a narrative strategy (Kormelink and Meijer, 2018). Narrative strategies such as balanced reporting, detached description, use of quotes and references to eye-witnesses are all tools to assert the journalistic authority (Bock, 2016). Thus, narrative strategies are tools to ensure the facticity of the journalistic storytelling.

Narrative journalists who perceive themselves as storytellers and engagers are cautious about the potential overlap between facts and fiction. They pass every scene re-construction through three test levels to ensure accuracy (Lorenz, 2005). They first cross-check the scene re-construction with different news actors before publication. They respond to the editor’s questions about their methods of verifying scene details. They try to demonstrate an adequate level of transparency where they disclose their methods of getting information, and answer audience’s potential questions of how journalists knew that (ibid.).

The level of transparency in narrative journalism used to be problematic in print media. Narrative journalists were afraid that excess of attribution may slow down the reader and decrease his/her ability to engage with news (Lorenz, 2005). They “sprinkled” attribution every now and then to remind the readers of factual nature of the story (ibid.). With the advent of digital technology, the journalist could provide audio and video testimonies from the news actors to verify the re-constructions. Thus, the different modalities (audio, video and computer-generated graphics) added facticity and vividness to the textual re-constructions as in the 2012 Snow Fall story published by *The New York Times* (Van Krieken, 2018).

Despite these explicit measures to ensure the facticity of narrative journalism, Van Krieken and Sanders (2017) discovered a paradigm shift for a few narrative journalists in their sample of Dutch

proponents of narrative journalism (practitioners and lecturers). The mainstream trend among practitioners maintained that facts are sacred. However, few narrative journalists stressed the need for “flexibility”. They viewed the line between what is acceptable and what is not as “outdated”, “less relevant” and “primitive” (Van Krieken and Sanders, 2017, p. 1369). This resonates with a post-modernist stance taken by Arnon Grunberg, the Dutch novelist who covered the Middle East for NRC Handelsblad, the quality Dutch evening daily. Grunberg used “personal-ironic subjectivity” approach, in which he openly reflected on his position, his limitations and the ambiguity of reality he is covering (Harbers and Broersma, 2014). He defied “the maxims of mainstream journalism” and “was doubted immediately by both critics and readers without concrete empirical reasons” (Ibid., p. 641).

Subjectivity in Narrative Journalism

Reflecting on one’s inherent subjectivity and the ambiguous indeterminate nature of reality are the pillars of the post-modernist worldview. And from this perspective, narrative journalism conveys a truism since it rejects the abstract nature of totalised objectified unquestionable truth and embraces the subjective re-construction of specific scenes at specific time and place (Harstock, 1999). Yet this worldview contradicts the journalistic foundation that is deeply rooted in the Enlightenment ideals and the ability to represent reality accurately (Bogaerts and Carpentier, 2013). “As a producer of knowledge, journalism derives its authority from its presumed ability to provide truthful representation of the social world within a limited time frame” (Broersma, 2013, p. 31).

Objectivity provides the tool for journalists to arrive to the accurate representation of reality. It can be defined as the separation between facts and opinions, and “reporting news without commenting, slanting or shaping its formulation in any way” (Schudson, 2001, p.150). Objectivity is a “moral ideal” (Schudson, 2001, p. 149) and an unattainable one because of practical limitations and unavoidable distortions. However, the truth claim remains the *raison d’être* of journalism (Broersma, 2013). This perspective shows objectivity and truth as distinct, giving the truth claim an ultimate prominence. Broersma (2013) explained the importance of the truth claim as follows:

“Journalism speaks with an authoritative voice that leaves no space for doubt. Were journalism to admit its shortcomings and were doubts to be allowed into its discourse, its paradigm would be broken. That’s why a plea for transparency underlying reporting and admitting that reports, at best, temporarily resembles truth, subvert journalism”. (p.33)

This view completely resonates with the narrative style of Robert Fisk, the British foreign correspondent who covers the Middle East for *The Independent* and *The Times*. He uses “personal-engaged approach” in his narrative pieces (Harbers and Broersma, 2014). Fisk converges between his personal experience and the events, offering his opinion as the measure of thing as if his opinion is representative to the opinion of the majority. Fisk uses the first-person mode to reveal his personal experience, and he combines it with an “authoritative language substantiated by his credibility as an eyewitness observer” (Harbers and Broersma, 2014, p. 646). Thus, he adheres to the mainstream journalistic world view, which says that truth is out there, and that truth is identifiable not ambiguous. He uses his personal experience and views – personal subjectivity – to support the truth claim.

First-person mode of address may not destabilise the truth claim, the *raison d'être* for journalism. However, first-person mode of address distorts the conventional style of presentation and invites doubts to the journalistic practice. “The foundation of trust in journalism lies not in the objective truth of its observations but in the truthfulness of its practice” (Tulloch, 2014, p. 630). News audience tend to trust news as long as it adheres to the formal textual conventions of news presentation (Harbers and Broersma, 2014). Journalism claims audience trust and credibility by avoiding the style of presentation associated with fiction (Tuchman, 1978). Broadcast journalists, for instance, avoid cutting techniques used in fictional films, and they tend to position themselves in the video standing against events rather than being involved in them. (ibid, 110).

Narrative Voice and Viewpoint Techniques

The narrative journalist does not have to be the main narrative voice. The journalist can use an implied author, a dramatized narrator or an undramatized narrator and weigh their ethical implications (Tulloch, 2014). An implied author is inferred from the detailed scene-by-scene re-

construction which implies the existence of an invisible all-knowing storyteller. An undramatized narrator refers to a briefly identified narrator, in contrast to a dramatized narrator who forms a story character in his/her own rights. Narrative journalists may be the dramatized narrators, as in Robert Fisk's pieces (Harbers and Broersma, 2014). Narrative journalists also may "deny themselves as the storytellers" and "restrict themselves to recording other people's stories" (Boesman and Meijer, 2018, p.1002). The dramatized narrator, in this occasion, can be a story character or a news actor. Although this technique is widely adopted in fiction writing, representing a story character as a dramatized narrator may contradict the journalistic convention of objectivity as the "neutral" representation of reality (Van Krieken et al., 2015).

Narrative voice is often implied in the viewpoint techniques that represent speech, thought, feeling and observations of news actors or story characters (Van Krieken et al., 2015). Representing the inner side of the news actor or story character such as feelings and thoughts may not be an acceptable journalistic practice because it resembles fiction writing and invites doubts about the facticity of information (ibid.). However, the use of external quotes may support the veracity of represented thoughts and feelings. External quotes are utterance of news actors or story characters in an interview, for instance, describing their states during the news event (Van Krieken, 2018). Narrative journalism, thus, combines the factuality of the scenes and the subjectivity of the experience and the feelings of the news actors by using the tools of social science such as history, anthropology and sociology (Neveu, 2014). The social science tools allow the journalist to get closer to news actors thoughts and feelings.

Viewpoint techniques can be divided according to two main criteria: the mode of address (direct, indirect and free indirect) and the time of utterance (internal and external) (Van Krieken, 2018). For the time of utterance, internal quotes are uttered during the news event to help dramatize the story, whereas external quotes are uttered after the news events to help demonstrate truthfulness. For the mode of address, direct mode is the verbatim quote of the news actor; indirect mode is the paraphrased quote; free indirect mode is the mixture of journalist and news actor voices. "Oh, he felt overwhelmed right now!" is an example of free indirect mode, which is more prominent in fiction writing (Van Krieken, 2018, p. 3). Direct and free indirect modes are

more captivating and vivid than indirect modes of address (ibid.). However, they both endanger the objectivity narrative convention, employed in journalism to maintain its authority.

Plot (Event Structure)

Balancing between the intriguing and the configuring narrative functions – engaging the readers and helping them understand the story –, the journalist can use different plot structures that raise ethical questions (Vanoost, 2013). A journalist may provide temporary uncertainties to engage the audience but at the same time he/she is manipulating their emotions. For instance, a multiple episode narrative piece may provide temporary uncertainty in one episode to drive the reader to attend to the next. A good narrative journalist needs to raise questions in audience minds about characters motives, actions and the consequences of those actions (Greenberg, 2014). This form of temporary uncertainty raises the audience curiosity and engage them. The journalist may provide also permanent uncertainties that reflect the ambiguity of reality – from a post-modernist stance –, raising questions about his/her duty to the public (Vanoost, 2013). Should a journalist provide facts and let the audience make up their own minds? Should the journalist intervene to help the audience make sense of the story? And once the journalist intervenes, what should be the limit of this intervention?

Technologies and Narrative journalism

Despite constant trials of journalists to disassociate themselves from fiction writing techniques and styles, technology has further blurred the boundaries. Narrative journalists, for instance, endorsed playing with colours and sounds of the visual story to convey the feeling effectively (Boesman and Meijer, 2018). For them, playing with the presentation style is not a truth-bending activity. Instead, it is a tool to “articulate truth more truthfully” (Boesman and Meijer, 2018, 1002).

The following section discusses issues related to digital narrative journalism, including animations, re-enactment, narrow focus of multimedia stories and interactivity.

- Re-enactment and Animation

Digital journalists questioned the legitimacy of scene re-constructions during the early days of multimedia storytelling. Digital journalists asked: “Is it really journalism? Do we need different rules?” (McAdams, 2015, p. 192). Once digital journalists knew that “TV, recreations and ‘directed documentaries’ have existed for some time”, they started to think about how they can explain them to that audience so as not to confuse simulations with reality (ibid., p. 192). Transparency and over explanation, thus, become the golden rule to remain truthful to the audience and avoid tricking them. McAdams (2015) put it as follows:

“When adding animation to a depiction of a real-life event, using 3D models, scripting and directing action in video or photography, journalists cannot take it for granted that audience will understand how that simulation was produced. Journalists can certainly use these techniques to make a story clearer, but they should explicitly state how accuracy was ensured and whether any part of the simulation is, essentially, no more than an educated guess. Any re-enactment should be labelled as such. This can be done in the credits or separately in a “how we made this” section. This clarity of communication is important to carrying out the ethical duties of truth-telling and transparency”. (p.193)

Re-enactments have existed in documentaries for quite some time, as mentioned above, and have fused lots of debates about what is acceptable and what is not. Ward (2008) talked about the gap between “documentary practice” and “common sense”, and how people confuses between using re-enactments and “being duplicitous” (p.191). The documentary became recognised as a genre of journalism with the rise of cinema verité and direct cinema, in which re-enactment was viewed as cheating, although documentary filmmakers had “always made certain types of set-ups and re-enactments” in practice (Aaltonen and Kortti, 2015, p. 121). The “draconian interpretations” of re-constructions rendered “many standard practices deviant breaches of public trust” because these interpretations did not differentiate between “reconstructing scenes that actually happened, that could have happened and those that never happened” (Winston, 2000, p.23).

Re-enactments can be viewed as the “irreal”, which is not equivalent to “not real” (Sobchack, 2014, p. 258). The irreal “does not literally exist in the objective world ‘out there’ but might be said to be (hypothetically) derived from it” (Ward, 2008, p. 192). Winston (2000) categorised scene re-construction as ranging on a continuum from non-intervention to total intervention (figure 1). He defined each category along the continuum as follows (p. 104, 105):

- 1- No-relationship established between film-makers and participants prior to filming
- 2- Unfilmed interaction between film-makers and participants (the asking of permission to film, for example)
- 3- Specific unfilmed requests made to participants without prior research to repeat or delay action
- 4- Specific requests to participants to re-enact actions witnessed during the research process
- 5- Specific requests to participants to re-enact actions witnessed by participants or others in the past, which can be called filming the history that the camera missed or was prohibited from capturing originally
- 6- Specific requests to participants to re-enact actions witnessed elsewhere during the research process performed by other people of the same type as the subjects, which can be called filming the typical
- 7- Specific requests to participants to enact actions which are possible but unwitnessed, which can be called the limits of the creative treatment of actuality
- 8- Implicit or specific requests to participants to ‘act’ (that is, to perform before the camera unlikely or impossible actions at the direct behest of the filmmaker without the legitimisation of any prior witness. For example, the vogue for plonking people on desert islands to see what will happen)
- 9- Actors performing according to witnessed accounts, which may be called drama-documentary
- 10- Actors performing imagined actions, which may be called fiction

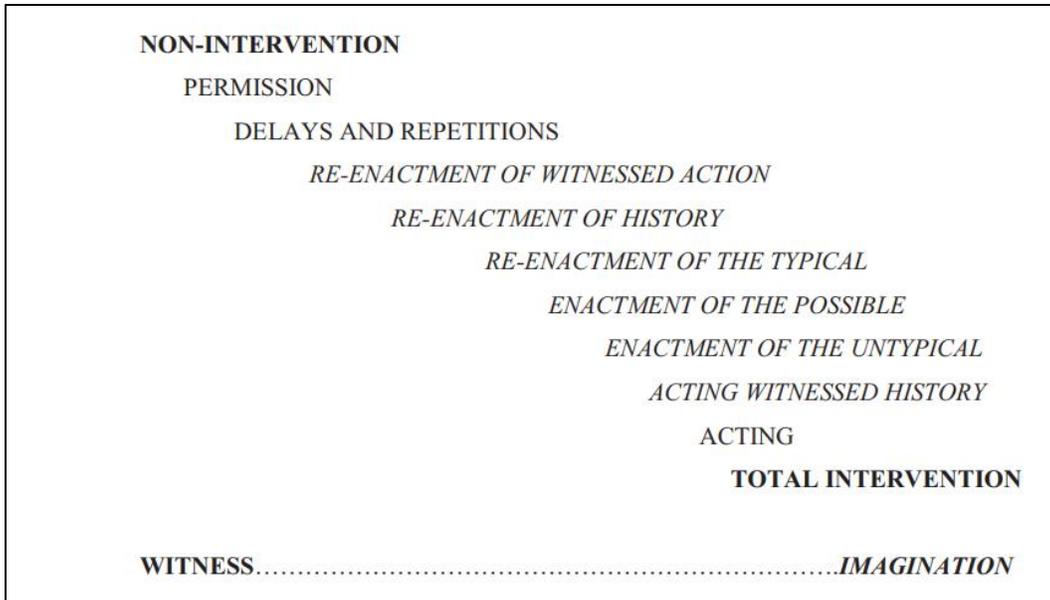


Figure 1 Re-construction continuum (Winston, 2000, p. 104)

Documentaries before its journalistic turn in 1960s and the rise of cinema verité were often perceived as creative treatment of actuality (Grierson, 1979 in Winston 2000 p. 20). Therefore, documentaries could use all forms of scene re-construction except for the last two forms. Acting witnessed history is often reserved to drama-documentary, whereas acting is complete fiction.

Scene re-constructions were an inevitable part of documentary in its early days. Many norms of Hollywood fiction films such as shot/counter-shot and continuity norms were perceived as part of the creative treatment of actuality. Re-constructions were also inevitable due to technological limitations as filming equipment was primarily designed for studio use. “By 1948, ‘sincere and justified reconstruction’ was as good as ‘factual shooting’” (Winston, 2000, p. 128).

- **Narrow Focus of Multimedia Story**

A digital story (audio, video or photo gallery) works better with a narrow focus, such as “one issue, one character and one location” (McAdams, 2015, p. 195). Jamming many opinions and nuances in a video story, for instance, may cause it to lose the point. Online news videos are, therefore, characterised by one sidedness and deviance from objectivity compared to broadcast news (Peer and Ksiazek, 2011). The lack of fairness and unbalanced sourcing techniques are the

major predictors of online news video popularity (ibid.), further blurring the lines between fiction and journalism.

A story package can overcome the one sidedness of its constituent parts and achieve comprehensiveness by ensuring that diverse perspectives are included (McAdams, 2015). The journalist, then, becomes responsible for ensuring the interconnectedness of these constituting parts through an explicit navigation structure that introduces the user to the broader story context and identify its components.

- Interactivity

Digital storytelling allows for interactivity, a new and a common element in both journalism and fiction. The permitted interactivity in journalism cannot provide users with “infinite options” (McAdams, 2015) because the high degree of interactivity requires a type of Artificial Intelligence (AI) in which a computer system responds autonomously and simultaneously to the user’s input (Klimmt et al., 2012). Instead, interactivity changes the narrative into a “roundtable structure”, a multi-story that the user can experience in a non-linear way (Sizemore and Zhu, 2011). McAdams (2015) explained the non-linear structure of interactive non-fiction as follows:

“Once the code has been written, a user’s options are set, like doors and hallways and stairs in a building made of concrete and steel. The user can follow more than one route, but usually there is no option to smash through a wall where no door exists. Options cannot be infinite, so journalists must make choices. Those choices limit what a user can do” (p. 189).

Thus, interactivity can enhance users understanding through providing a larger amount of information that could be overwhelming in traditional text, but there are always limits to what information users can learn (McAdams, 2015). Also, the non-linear nature of interactive narratives allows the authors to step outside their cultural bias, in which “they run the risk of unintentionally but unhelpfully superimposing their own systems for cultural meaning-making onto the authentic experiences of their subjects” (Harvey, 2012, p. 198).

As the technology advances, “imagination, [e]xperimentation [a]nd faith in the audience” become essential, and there appears “new kinds of narratives that can't be clearly defined by their components, or even, admittedly, described here with words” (Kovach and Rosenstiel, 2014, pp. 222, 237).

Audience becomes relocated in the centre of the journalistic process, in contrast to the 20th century professionalism ideas, in which journalists perceived themselves as “more qualified than their audience to determine the audience own interests and needs” (Tuchman, 1978, p. 108).

Digital journalism becomes “advanced sense making,” with teams of journalists, designers and developers collaborating to redesign users’ experience of news by mixing different kinds of content, design and headlines (Kovach and Rosenstiel, 2014, p.212).

Since these collaborative productions are very expensive and do not generate revenues, news organisations adopt an enterprising approach, in which they take “initiative, invest and take risks” towards digital storytelling with “an emphasis on emotionally engaging content” (Kalogeropoulos and Nielsen 2018, p. 2208). News organisations accept their loss of money because these costly productions “enhance or solidify the brand identity” (Kormelink and Meijer, 2015, p. 170).

The following section will further explore the rise of collaboration culture in news organisation in response to the digital innovations and fierce competition in media landscape.

5. Collaborative Journalism

Collaboration helps journalism remain competitive in the fast-changing media environment, through either removing barriers inside the news organisation itself, or reaching out to partners in order to develop additional competencies (Gade and Raviola, 2009).

Early attempts at collaboration and convergence involved having a single newsroom for several platforms: print, broadcast and online (Quinn and Allan, 2005). This form of collaboration required a shift towards team-based reporting, to produce better multimedia stories (Gade and Raviola, 2009). The change challenged deeply rooted ideas of professional journalistic culture (Doudaki and Spyridou, 2015), as team work clearly contradicted the journalistic notion

of “individualism that valued personal resourcefulness, skill and creativity” (Gade and Perry, 2003, p.339). In addition, online journalists were often perceived to be inferior to their print counterparts, so knowledge-sharing and professional bonding were difficult to achieve between teams (Deuze, 2008).

Paulussen et al. (2011) listed numerous factors that influence convergence and the culture of collaboration in the newsroom:

1. Organisational characteristics: Physical proximity reinforces collaboration among journalists, but the confusing hierarchy and complexity of technology can prevent journalists from embracing convergence culture.
2. Human resources: Training and reward systems can reinforce convergence culture.
3. Organisation of labour: Time considerations and the constant deadlines of online journalism are critical. Journalists sometimes refrain from performing tasks deemed important because of time restrictions, which eventually influences collaboration among them.
4. Professional attitude: Journalists are persuaded to adopt the collaboration culture when confronted by journalistic - rather than business - goals (Paulussen et al., 2011, p.8).

Today, collaboration has expanded beyond newsroom boundaries to include collaboration with the business side of the news organisation (Gade and Raviola, 2009), interactive users and other audience members (Nicey, 2013) and programmers (Lewis and Usher, 2016).

In the first type of collaboration, traditional barriers between the business and editorial sides are becoming unclear. Business sides of news organisations influence news production through topic selection and budget allocation (Boczkowski, 2004). Advertising departments may request that editorial personnel produce content types that sell (Gade and Raviola, 2009). Journalists also may

work in interdepartmental teams to identify their customers or their market, and to develop a corresponding newspaper identity (Gade and Perry, 2003). Many news organisations create Research and Development (R&D) units to deliver better content, extend their audience reach and ultimately increase advertising revenue; such activities give primacy to the business side of the organisation (Kovach and Rosenstiel, 2014).

Business and editorial sides increasingly coalesce with the advent of entrepreneurial journalism, which often use “non-traditional economic models such as foundations funding, membership subscriptions and individual donors” (Ward, 2015, p. 56). Journalists become both content creators and fundraisers (Vos and Singer, 2016), who attempt to convince potential funders (Wagemans et al., 2016). Journalists may develop pitches to “describe the type of journalism they want to produce and what is needed to reach their goals” (Hunter, 2015, p. 273). Entrepreneurial journalism, thus, may undermine journalistic autonomy and introduce potential conflict of interest (Ward, 2015).

Entrepreneurial journalists strive to keep their reporting away from the funder’s influence, yet their good intentions often face a complex reality (Hunter, 2015). Journalists find themselves responsible to deliver “what they promised in their pitches” and may become open to “funders’ feedback” – although journalists are not obliged to follow them (ibid.). Yet Mediapart, the French entrepreneurial journalism start-up, presents a “return and confirmation of an ideal-typical core of journalism”, where journalists are liberated from organisational constraints to become “pure professionals” (Wagemans et al., 2016, p.175). Transparency as well as explicit guidelines for funders role and journalistic autonomy help solve entrepreneurial journalism issues (Ward, 2015). A journalism start-up, for instance, can provide a detailed policy which discloses the funders, ensures that quality journalism is the sole driver for editorial decisions and explains the process of dealing with conflict of interest claims (ibid.).

However, entrepreneurial journalism that transforms the audience into potential content producers and funders continues to be problematic. It represents “a subtle, but important shift

from thinking about your audience, to thinking about pleasing your audience.” (Hunter, 2015, p. 283). The journalist interacts with the audience and develops sensibility to their needs and tastes, developing a news media environment where “provision of facts alone is insufficient and needs to be spiced up with affective and participatory approaches”. (Ruotsalainen and Villi, 2018, p. 87)

This brings the second form of collaboration, which puts the audience into the centre of the news process. The audiences turn into “prosumers” or “ProAm” who produce media content thanks to interactive capabilities of digital technology (Nicey, 2013). Audience interactivity in the form of direct responses or User Generated Content (UGC) can endanger journalists’ autonomy and news selection decisions because it increases the tendency to publish photos and debates that stimulate audience collaboration (Witschge and Nygren, 2009).

Journalistic standards of transparency, accuracy and source reliability also may be contested. Therefore, journalists may embrace notions of audience participation without admitting users to the reporting process (Nielsen, 2012), thus separating audience members from the “core journalistic mission” (Robinson, 2011, p.42).

Despite these drawbacks of audience collaboration, Kovach and Rosenstiel (2014) argued that it facilitates organised collaborative intelligence: Journalists bring their ability to investigate and dig deep, users provide their experiences as event observers, and technology facilitates practical steps to ensure that news is accurate (p. 32).

In the third and perhaps most recent type, journalists and programmers collaborate on data mining, newsgathering, and storytelling. Programmers can help journalists deal with data overabundance, allowing for easier ways to “know how to find what they want to find” (Gynnild, 2014, p. 719). For instance, the Knight Foundation¹ provided \$1 million to fund the PANDA Project, which tries to make research easier in the newsroom using a set of open-source, web-

¹ The Knight Foundation was founded by brothers John S. and James L. Knight, former newspaper publishers. It is a US non-profit foundation interested in journalism, arts, informed communities and technology. <http://www.knightfoundation.org/about> [Accessed 8th February 2017].

based tools designed to facilitate data use and analysis (Howard, 2014). Programmers can help develop multimedia packages in collaboration with other editorial members of the newsroom. For instance, *The New York Times* produced the "Snow Fall: The Avalanche at Tunnel Creek" multimedia package, which required synthesis of the work of designers, reporters, developers, and editors (Duenes et al., 2013). Programmers can also develop apps and tools intended to provide a service for the reader, such as another *New York Times* interactive titled "Is it better to buy or rent?" (Quealy and Tse, n.d.).

Usher (2016) used the term interactive journalism to describe the collaboration between journalists and programmers to develop new interactive journalistic products, either internal-facing – aimed at helping journalists, or outward-facing – aimed at the public.

However, journalists and programmers do not easily collaborate. Their distinctive occupational norms and values lead to different views about the nature of journalism and creative processes (Lewis and Usher, 2014).

Programmers bring new notions to journalism: build-it journalism, near/far journalism, see-it-for-yourself journalism, openness and non-linear narrative (Usher, 2016).

- Build-it journalism refers to the idea that programmers are creating tools from scratch, for journalists or the public.
- The near/far aspect indicates the ability of users to zoom in and see how a story affects them personally (near-side), or how it affects everyone involved (far-side).
- See-it-for-yourself indicates the users' ability to explore the story themselves, either through layers of an interactive story or through links provided to different articles.
- Openness refers to showing work processes to other newsrooms and the public at large, reflecting the programmers' culture of belonging to an open-source community.
- Non-linear narrative emerges as users explore the interactive elements. It differs from traditional journalistic storytelling, which explains the context of the story and why readers should continue reading it (Usher, 2016, pp. 165 - 170).

Several attempts may be carried out before a project is completed to facilitate better communication between journalists and programmers, and to familiarise each group with the occupational norms and values of the other.

Other forums for collaboration also have emerged. For instance, Hacks/Hackers, a digital community, was formed in 2009 to link hacks (journalists) and hackers (programmers) through Meetup and other social platforms. By December 2016, it included more than 75 city-based chapters around the world and nearly 55,000 members (Meetup, n.d.). Lewis and Usher (2014) studied Hacks/Hackers meetups through a series of in-depth interviews. They found that such meetings helped foster informal relationships between journalists and programmers, providing “spontaneous opportunities of learning” (p.390). Nevertheless, the lack of consistency and sustained meetings challenged the process of in-depth sharing and prevented the infusion of a shared culture.

Learning Lab, a program funded by a partnership between Mozilla and the Knight Foundation, is another opportunity to foster better collaboration between journalists and programmers (Lewis and Usher, 2016). It permits journalists and programmers to engage for one month in a virtual learning environment, focused mainly on journalism innovations and open source technology. Participants then spend a fully funded year in Al Jazeera English, Boston.com, Zeit Online, the BBC, or *The Guardian* newsrooms. Lewis and Usher (2016) concluded that the programmers’ culture of hacking, transparency and openness can help renegotiate journalistic boundaries to better accommodate a digital sensibility. They also found that the Learning Lab fostered effective communication, despite the cultural differences between journalists and programmers.

Other initiatives also have sought to create hacker journalists, who combine journalistic and programming skills.

For instance, the Medill school of journalism at Northwestern University, in partnership with the Knight Foundation, launched journalistic fellowship and scholarship programmes in 2007 for people with a background in computer programming (Silverman, 2010).

Every year, Google News Lab also offers fellowships for those who combine interests in journalism and technology. Participants spend eight weeks in reputable news organisations in the USA, UK, South Korea, Germany, Sweden, Norway, Australia, Finland, Denmark and Ireland (Google News Lab, n.d.[a]). This programme started in 2015 with 1800 candidates applying in the USA (Drake, 2016). In the UK-based Google Fellowship program for 2017, applicants can choose among 12 organisations, including BBC News Labs, the Bureau of Investigative Journalism, *The Financial Times*, Full Fact, *The Guardian*, Haymarket Media Group, *The Times* and *Sunday Times*, *The Telegraph*, and Trinity Mirror Inc. (Google News Lab, n.d.[b]).

However, Witschge and Nygren (2009) argued that the idea of having multi-skilled journalists may emphasise efficiency over creativity and may lead to a de-professionalisation of journalism. Journalists are becoming “upskilled” in terms of mastering different technologies and “deskilled” in terms of the traditional journalism requirement of “background research, fact checking, and reporting based on multiple, independent sources” (Rottwilm, 2014, p.13). Consequently, critics fear that journalists may turn their back on professional values and normative practices (Witschge and Nygren, 2009).

This chapter, thus far, has provided a refined conceptualisation of journalistic culture. It offered a general overview of journalism and the hierarchy of influence model before delving deeper into institutional roles and ethical ideologies, the basic components of journalistic culture. The chapter also has provided a close examination of objectivity, transparency, the rise of emotionality as well as narrative and collaborative journalism due to their direct relevance to VR journalism. The next chapter explains the concept Virtual Reality and its application in journalism.

Chapter IV

Virtual Reality

1. What Is Virtual Reality?

"When I think about virtual reality, I think virtual reality is like uranium: It's this really powerful thing. It can heat homes and it can destroy nations. And it's all about how we use it." - Jeremy Bailenson, the director of the Virtual Human Interaction Lab at Stanford University (Novacic, 2015)

Virtual Reality (VR) is about immersing the users in a virtual environment, cancelling the distance between them and the provided footage, permitting "presence" or the sense of being there (Lelyveld, 2015). It is "the use of computer technology to create the effect of an interactive three-dimensional world in which the objects have a sense of spatial presence" (Bryson, 2013, p.4).

Though Bryson (2013) insisted the nature of the virtual environment is computer generated (CG), Lelyveld (2015) said VR can involve either computer-generated graphics or real-life captured videos. Regardless of the nature of the virtual environment, it is the sense of presence that defines the virtual reality. Thus, virtual reality in a nutshell, involves having "the sense of concrete existence [in the virtual world] without actually having a concrete existence" (Bryson, 2013, p.5).

Presence and Immersion

Presence moves beyond being surrounded by a series of digital images, often called immersion. It elicits the actual sense of being there, in which the user becomes psychologically affected due to "a wilful denial of VR creation" (Samur, 2016, p.243). It implies a subjective and objective sense of being there. The subjective sense is the realistic feeling of being there, and the objective one is the observable behavioural phenomenon of behaving similarly in real and virtual environments (Sirkkunen et al., 2016).

Immersion, on the other hand, is defined in several ways. Sirkkunen et al. (2016) argued that it is an "objective and quantifiable description of technology" (p.4). It is the degree to which a display can deliver a rich, vivid and viable experience. Taking a different view, Ryan (2009) explained

narrative immersion in gaming as the mental involvement in “constructing and contemplating the storyworld” (p.54). She identified three types of narrative immersion: spatial, temporal and emotional. Spatial immersion is a powerful sense of place because every movement results in a corresponding one in the virtual environment. Temporal immersion is intensified by the users’ curiosity, suspense and surprise to know how the story unfolds. Emotional immersion relies on the relationship that users create with objects depicted in the displayed content, either self-directed such as the desire to succeed, or directed to others such as empathy (Ryan, 2009).

To fully grasp the relationship between immersion and presence, Nilsson et al. (2016) reviewed immersion and presence studies that were cited 100 times or more in the research literature. They concluded that presence emerges from interaction among three types of immersion: system, narrative and challenge. System immersion refers to being surrounded by the medium itself, with its different properties such as fidelity displays and tracking tools. Narrative immersion is being absorbed by, and psychologically responding to, the depiction of the virtual world spatially, temporally and emotionally. Challenge-based immersion, which can be either strategic or tactical, indicates the individual’s response to the challenges projected in the virtual environment. At the highest level of presence, Johnson (2016) claimed that “users lose their senses of gadgets and headsets, they just feel it as a real experience” (para. 13). Jeremy Bailenson, the director of the Virtual Human Interaction Lab at Stanford University, explained that such feeling is a form of intrapersonal conversation, where the user believes that the VR experience is not real, but the back of his or her brain feels it to be real (Novacic, 2015).

A powerful sense of presence is permitted through the rich visual experience, as well as accurate auditory cues. Audio is an essential part of the VR experience that can smooth the transition between different environments in the virtual world (Samur, 2016). It lets users know of everything happening around them, while looking in one direction at a time (Lelyveld, 2015). It can drive users to explore the virtual environment, enjoy their VR experience and ultimately redesign the meaning (Murphy and Pitt, 2001). This requires spatial-audio software to maintain the position of the audio source as the users move around, increasing their sense of presence (Lelyveld, 2015).

Thus, technical properties of VR technology are essential for eliciting a sense of presence in the VR experience. “The high fidelity of audiovisual and haptic feedback aligned with the users’ virtual actions” can reinforce the emotional experience of VR (Maschio, 2017, p.4). Users even can have the illusion of body transfer (Slater et al., 2010), which is the illusion of transforming one’s true identity into the virtual self (Kim, 2016). Such an illusion is intensified by movement detection and use of a hand controller use (Maschio, 2017). The visuomotor (visual/motor) correlation, in which users’ movements are translated into the virtual environment, results in transformation (Slater et al., 2010). This transformation emerges even when the real and illusory selves are of different genders. In other words, even if the virtual self is female and real self is male, there is still a chance for users to feel they are the centre of the experience, influencing the virtual world around them.

However, presence does not solely depend on technology. Presence has interactive, social and psychological dimensions (Samur, 2016). The interactive dimension refers to the exchange between user and narrative, involving user-centric and task-based interaction (Samur, 2016). User-centric interaction resembles a VR bottom-up narrative, in which the users’ behaviours and choices drive the story forward. Conversely, task-based interaction indicates a top-down narrative, where tasks are assigned that users complete by choosing from numerous predetermined forms of interaction (Ryan, 2009). From a rather technical perspective, interaction indicates that the users’ actions in the physical real world are embodied or translated into the virtual environment with varying degrees of modelling, either accurate or crude (Sirkkunen et al, 2016).

The social dimension is about the exchange between different VR users in the virtual environment (Samur, 2016). An example of this dimension can be found in the Storytelling Collaborative Virtual Environment (SCVE), where several users exist and interact in a virtual environment, such as in VR games (Perron, 2007). A web-based show called Metanomics²

² Metanomics was a web-based talk show about the potential business and social uses of virtual worlds, produced by a Canadian company called Remedy Communications. <http://www.newswire.ca/news-releases/remedy->

provided another example of social VR, as interviews were viewed online through live streaming with a synchronous presence in Second Life³ (Cruz and Fernandes, 2011, p. 6). This let the audience interact through avatars and ask questions as if they existed in the real physical location.

The potential uses of social VR increased due to Facebook's \$2 billion acquisition of Oculus VR⁴ (Dredge, 2014). In April 2017, Facebook released a VR hangout app for Oculus Rift called Spaces (Statt, 2017). The app allows Oculus users to create CG avatars and meet with up to three other people in a virtual playground where they can take selfies and watch videos together. All Facebook features are available, and other people can be invited to the VR session through Facebook messenger video call. Users can control their avatar's facial expressions to show emotions, to simulate real-life situations. This app represents a step towards Facebook CEO Mark Zuckerberg's dream of VR becoming "a part of daily life for billions of people" (Dredge, 2014, para. 19).

The third dimension of presence is psychological. Fear and anxiety sharpen users' awareness of the virtual environment and increase the irrational belief that the environment surrounding them is real (Samur, 2016). The fear and anxiety are elicited by the VR content, yet users' personalities affect their responses, so the degree of presence will vary among users for a single VR piece. Users' personal traits, preferences and intentions influence the level of immersion, which translates into presence (Shin and Biocca, 2018). The absorption level, for instance, is a psychological factor that predicts the sense of presence (Kober and Neuper, 2013). This factor

[communications-to-extend-reach-and-impact-of-metanomics-virtual-talk-show-536964061.html](https://www.researchgate.net/publication/315844446-communications-to-extend-reach-and-impact-of-metanomics-virtual-talk-show-536964061.html) [Accessed 19th May 2017].

³ Second Life is an online virtual world, where users can have their own virtual avatars and create their own communities, establish businesses, socialise with other users, express themselves and discover new experiences. <http://secondlife.com/> [Accessed 20th May 2017].

⁴ Oculus VR is a US technology company that produces Oculus Rift, a dedicated VR Head Mounted Display (HMD). It was acquired by Facebook in March 2014. <https://techcrunch.com/2014/07/21/facebooks-acquisition-of-oculus-closes-now-official/> [Accessed 21st May 2017].

identifies the degree to which individuals focus their attention on the virtual environment instead of physical real environments.

Agency, Navigation and Viability

In addition to immersion and presence, Kim (2016) highlighted agency and navigation as defining attributes for VR.

Agency refers to the users' sense of control or responsibility for their actions, to which the system responds (Kim, 2016). It has four levels: peripheral agency, hypertext agency, agency in partially programmed systems, and real-time generation. In peripheral agency, the user's action does not affect the storyline; 360° videos are an example. In hypertext agency, the user's choices induce different predetermined storylines, allowing the user to influence the sequence of pre-scripted events. In partially programmed systems, users exercise a higher level of agency. They can freely create events but are bound by a fixed storyline. At the high end of the spectrum, real-time agency allows users to actively create events in a story that constantly changes.

The third and fourth levels of agency exist in gaming. Ryan (2009) differentiates between narrative games and playable stories. Narrative games have a fixed story line, in which the participant playing the primary character's role has the freedom to create events and interact to achieve a fixed goal and win the game. Max Payne⁵ is an example of a narrative game that provides task-based interaction and the third level of agency. In playable stories, there is no fixed narrative, and no win-or-lose situations. Participants have complete freedom to play with the characters in the story world, creating their own authentic and unique story. The Sims⁶ is an example of a playable story that provides this fourth level of agency or real-time agency.

⁵ Max Payne is a digital game featuring a troubled detective who tries to avenge his murdered family. It was first released as a narrative game in 2001, and then transformed into a film in 2008. <http://www.rockstargames.com/maxpayne/> [Accessed 19th May 2017].

⁶ The Sims is a game in which players can create characters, customise their appearance, direct their life and satisfy their needs as if they live in the real world. <https://www.thesims.com/features/overview> [Accessed 13th May 2017].

However, playable stories still have some boundaries within the story world; pre-scripted events can surprise players and incite another series of events (Ryan, 2009). This resonates with the interactive dimension of presence, where interaction cannot be strictly defined as user-centric or task based, instead moving along a spectrum of variations (Samur, 2016).

Navigation structure, another defining attribute of VR, has three types: the solvable maze, the tangled rhizome, and the journey (Murray, 1997). They all represent a correlation between the problem-solving factor and degree of interactivity. In a solvable maze, the user is exposed to a story line about a problem-solving process, but the user's interactivity is limited as the story unfolds in only one way. In a tangled rhizome, the situation is directly the opposite: Users interact in several ways, but the interactions are not goal-orientated. In a journey, the VR experience combines problem solving and high levels of user interactivity as the user travels in the VR environment, facing seemingly impossible problems, with a nearly unlimited number of solutions based on user choices. These types of navigation structures in the virtual environment illustrate the difference between narrative games and playable stories explained earlier. The solvable maze navigation type represents the narrative game with a fixed goal, whereas the tangled rhizome represents the playable story.

The viability of the VR experience is influenced by the type of end-user technology utilised (Lelyveld, 2015). Watching VR directly through tablets or smartphones permits the least viable VR experience, termed a "magic window" (Watson, 2017, p. 9). It only allows the user to explore the virtual world through moving the device. Phone cases and dedicated Head Mounted Display (HMD) offer a more viable VR experience (Lelyveld, 2011). Phone cases can range from the most basic such as Google Cardboard to sets that allow for head tracking; the latter may come with user controllers to allow a more viable experience such as Google Daydream and Samsung Gear VR. Dedicated HMD such as Oculus Rift and HTC Vive result in the most viable VR experience. They facilitate "lean-in tracking", and can include hand tracking, body tracking, eye tracking, brainwave monitoring, haptic feedback, specialized controllers, and other capabilities and devices (Lelyveld, 2015, p.6).

VR and 360° Videos

Despite the importance of these technological capabilities, the degree of viability in the VR experience is often dictated by the content itself and the degree of user agency allowed. This highlights the difference between high-end VR and 360° video. In 360° video, users have peripheral agency (Kim, 2016). They become spectators of events; they can look around and watch the spherical video but they cannot interfere with the narrative. They are taken on a journey predetermined by the storyteller and have very little control over the unfolding events (Lelyveld, 2015). A 360° video experience resembles a theatrical experience where spectators can look around but do not influence the narrative. It therefore is described as a “passive spectatorship” VR experience (Samur, 2016, p. 257). The content can be real-life captured or Computer Generated (CG), as long as it is fully rendered and the user cannot influence the story as it develops (Lelyveld, 2015).

High-end VR, on the other hand, allows the user to have an active experience and to exercise higher levels of agency, such as hypertext agency, agency in a partially programmed world or a real-time generation of events (Kim, 2016). In this type of experience, users can influence the narrative by choosing forms of interaction to reach a predetermined goal. Ultimately, they can interact in endless ways, creating their own unique and authentic experience. Currently, high-end VR is CG content since in a real-life captured VR experience the end-user is locked into the camera positions. He or she “can look around, but cannot wander into the world” (Lelyveld, 2015, p. 6).

Despite this distinction between high-end VR and 360° video, 360° video is considered a type of VR because it allows elements of the video to have a spatial presence. This is a defining attribute of VR: Each element has a fixed position regardless of the user’s place or gaze direction (Bryson, 2013). A 360° video can elicit a psychological dimension of presence, for instance through generating fear and anxiety to drive the user’s curiosity. “Trafficked” is a 360° video that is carefully crafted to elicit anxiety and fear in users as they empathise with a single mother trafficked from Nicaragua to Mexico City for slavery (BBC, 2016). Most media organisations refer

to 360° video as VR (Watson, 2017), even though it is distinct from the high-end fully immersive VR experience.

A 360° video is more suited to storytelling because it does not endanger the storyteller's authorship or control over the narrative (Moody, 2017). In fictional narratives, authorship implies being responsible for the "psychological integrity" of characters and the sequencing and timing of the story (Glassner, 2001, p.53). It is incompatible with users' interactivity and agency to the extent that Aylett and Louchart (2007) described it as a narrative paradox. For instance, bottom-up user interaction, where the user can interfere with the storyline, threatens the ability to have a story ending (Ryan, 2009). Thus, when considering high-end fully immersive VR, the artefact changes from a narrative to an experience or storification - "the process through which users engage with the story" (Aylett and Louchart, 2007, p.118).

Unlike traditional storytelling that consists of a beginning, middle and end, VR generates an experience of "storyliving" (Maschio, 2017, p.10). Storyliving has three phases: initiation, exploration, and making sense. First, users embody the virtual characters depicted and experience the sense of immersion. Then they explore the virtual space freely, with a high potential of straying away from the narrative. Finally, they try to contextualise their experience and make sense of it.

Nevertheless, Moody (2017) stressed that such experience follows idealised and theoretical views about the possible level of user interaction. It neglects the fact that people seek popular entertainment fiction stories, such as cinematic films, with far fewer expectations of interactivity. A high degree of user interactivity will result in a subjective, authentic narrative experience (Aylett and Louchart, 2007). This experience is not repeatable, which Moody (2017) argues endangers the ability to reach mass audiences with a commercial product, unlike the 360° video experience, which is repeatable to a certain extent.

Though much of the previous argument about VR and storytelling was largely concerned with the fictional entertainment of films and features, it still applies to non-fictional journalistic stories. Aronson-Rath et al. (2015) maintained that journalists telling stories with VR should control the story line to produce a "satisfying compelling experience" that involves "characters, actions,

emotions, locations, and causality” (p.45). In other words, to be suitable for journalistic storytelling, VR should be a guided experience where the user’s interaction is directed by organised story elements, with a narrative introduced at arranged times (Aronson-Rath et al., 2015). Consistent visual presence of a narrator, for instance, can build trust and increase users’ engagement (Archer and Finger, 2018). However, providing such a guided experience is not an easy task. Long pieces of narration are often not remembered, and historical context in VR may cause confusion (Maschio, 2017).

Therefore, proper journalistic VR should balance - without causing confusion - between a golden path provided by the storyteller for the user to follow and places where users can freely explore elements surrounding them. It places the participants in a virtual environment, but it does not necessarily allow them the “agency of choice” (de la Peña, 2010). VR storytellers should only encourage user interaction and exploration that increase realism in the story rather than “fantasy game-like elements of VR storytelling”, since the degree of realism, not interaction, is the predictor of VR perceived trustworthiness (Sundar et al., 2017, p.13).

Much of the what is called journalistic VR actually is a 360° video using either a documentary format and lasting five to 15 minutes, or a short-forms lasting two or three minutes (Watson, 2017). This 360° VR can be either real-life captured content such as *The Economist’s* “Passport: Osaka” or CG content such as *The Guardian’s* “6x9: A Story of Solitary Confinement”.

Moving up the spectrum of agency from peripheral to hypertext would be difficult, as it requires more data, more time and more technological solutions. As a VR story has multiple levels for users to choose among, development of Artificial Intelligence (AI) may be needed to manage this enormous amount of data, and to reduce the time and money costs (Laird et al., 2017). In addition to these complexities, hypertext agency threatens the narrative coherence: A narrative is based on causality and carefully crafted sequences of events – unlike hypertext itself, which facilitates non-linear experience of a network (Ryan, 2009).

These narrative problems are not the sole reason for the increasing adoption of 360° VR in journalism compared to high-end VR. Another reason is that more people can be reached with 360° video, which does not require expensive dedicated head-mounted displays for viewing

(Watson, 2017). YouTube VR channel and Facebook 360⁰⁷ allow news organisations to experiment, publish their content and even live stream VR without the need to develop specific digital platforms. This decreases the costs of VR experimentation in journalism. Although many news organisations, such as *The Economist* and *The New York Times*, have their own VR apps, YouTube VR and Facebook 360⁰ are still influential. They enable users to easily experience free, readily available 360⁰ content through “magic windows” or web browsers (Watson, 2017, p. 8).

Though 360⁰ VR seems to be the most attainable type for news organisations, it can be time-consuming and expensive to produce high-quality content because of the technology required (Aronson-Rath et al., 2015). Issues include the number and capacity of cameras used, as well as costs and complexities of post-production software used for stitching the different audio and video streams together (Migielicz and Zacharia, 2016). The content cannot be produced quickly, potentially further limiting its utility for journalists (Aronson-Rath et al., 2015).

However, VR journalism need not be limited to 360⁰ VR. News organisation as well as journalism schools are currently experimenting with new genres and formats. The following section explores the VR journalism concept, including motivations to enter that field, challenges facing it, and the changing journalistic cultures surrounding it.

⁷ Facebook 360⁰ is a feature that allows users to share their 360⁰ VR on Facebook. <https://facebook360°.fb.com/> [Accessed 9th May 2017]

2. VR Journalism

“VR is one giant leap forward in a never-ending march of technological advances that all point in the same direction: the consumer and the creator, together at the center of the story itself” -Patrick Falconer, Executive Director at *The New York Times* (Falconer, 2017)

VR journalism is considered a form of deeply immersive journalism, which de la Peña et al. (2010) defined as crafting the news to provide first-person experiences of situations described; participants can enter the virtual world as themselves witnessing the events or as subjects in the story narrative. Major factors driving journalistic exploration of VR journalism include curiosity, a desire to be branded as an innovator and interest in potential revenue streams (Watson, 2017).

Curiosity motivated Nonny de la Peña, the award-winning journalist and documentary filmmaker, to experiment with VR to increase emotional involvement in news stories, particularly those about human suffering, at a time when the audience were believed to be desensitised by exposure to a large amount of negative news (de la Peña et al., 2010). She produced in 2010 a prototype for VR journalism stories about the Guantanamo Bay detention camp, based on the interrogation logs of Detainee 063, Mohammed Al Qahtani. “I believe the profession of journalism would be remiss if it did not begin establishing best practices for using gaming platforms to tell news stories”, she said (de la Peña, 2010, para. 3). After this prototype was realised for experimental research purposes, curiosity again drove de la Peña to start a project about hunger problems in Los Angeles trying to answer the question: “What if I can present a story that you can remember with your entire body not just your mind?” (de la Peña, 2015, 00:12).

A similar sense of curiosity around using VR as an empathic machine motivated Chris Milk, creative artist and founder of Within VR studio, to produce “Clouds over Sidra”, a 360° video about a Syrian refugee camp in Jordan (United Nations Virtual Reality, n.d.). The goal was to enable influential decision makers attending the 2015 *Davos* world economic forum to discover a remote experience that could affect their decisions and perhaps change the lives of people depicted in the VR (Milk, 2015).

Many VR content creators consider the empathic machine an exaggeration (Bosworth and Sarah, 2019). Empathy is not an objective quality for technology but rather a mediated outcome, which is influenced by user's cognition and subjectivities (Shin and Biocca, 2018). A single VR piece can have a varying influence among the VR users. Users' awareness of the story can predict higher empathy impact (Shin and Biocca, 2018), yet overfamiliarity with the story may drive users away (Archer and Finger, 2018). Still, VR content creators use the medium to provide an exclusive access to remote places, to provide a deeper understanding of the story through creating intimacy with the protagonist and to engage users through providing a level of user agency (Bosworth and Sarah, 2019).

Being branded as innovator is another noteworthy motivation for news organisations to experiment with VR (Watson, 2017). In their previous experience with digitisation, the legacy media fell behind the new players in exploiting digital technology. During that period, legacy media were occupied with protecting their position in the market rather than investing in new genres (Briggs, 2012), and innovators left these organisations because of intense "cultural rigidity" (Küng, 2015, p.96). Therefore, a head-start in experimenting with VR as a form of innovation marks a turning point. It also has provided an opportunity to be first and to have control of the market instead of competing with start-ups (Küng, 2015). "The organisations recognised a strategic opportunity to position [themselves] as expert news storytellers in a new medium", explained Paul Cheung, the director of interactives and digital news production at the Associated Press (quoted in Watson, 2017, p. 10).

Interest in a potential revenue stream also can spur investment in VR (Watson, 2017). Nevertheless, VR is still in its infancy. It has no established, stable or viable business model. VR costs a lot in terms of money, time, technology and expertise, so news organisations are searching for potential revenue streams to cover these costs (Aronson-Rath et al., 2015). *The Economist*, *The Guardian* and CNN have sought advertiser sponsorship for VR. They even have produced branded content (Davies, 2016b), using journalists and their storytelling skills to create tailored editorial content to sell products and promote advertisers' brands (Ward, 2014; Cole and Greer, 2013). Observers have expressed concern that this arrangement could threaten the

“Chinese Wall” that separates editorial and commercial parts of news organisation, a normative ideal already challenged by the ongoing digitisation of news (Küng, 2015).

Technology Partnerships

Partnership with leading technology firms has been explored as a way to fund VR content creation, though sustainability remains a challenge (Watson, 2017). Google, Samsung and Oculus were the key players to support the VR content creation either through formal partnerships or challenge funds.

Google partnered with *The Guardian* to produce content for the Google Daydream headset over 18-month period, after the success of “6x9: A Story of Solitary Confinement” (Anderson, 2017). Google also offered challenge funds that encouraged potential VR content creators to get started. Euronews, for instance, applied and received funds from Google’s Digital News Initiative (DNI) Innovation Fund, to start 360 production in 2016 (Man, 2016).

Google News Lab formed a coalition with the Knight Foundation and the US-based Online News Association (ONA), to launch journalism 360 initiative, an international network for immersive journalists to share knowledge and accelerate the use of VR tools in news (Mizgata, 2017). Part of this initiative was to launch an immersive storytelling challenge that award grants ranging from \$5000 to \$35000 to projects that advance understanding of new forms of narratives, ethics and production (Journalism 360, 2016). The first-round winners – announced in July 2017 – proposed technology focused projects (Ciobanu, 2017), whereas the second-round winners – announced in September 2018 – offered a mixture of storytelling and technology focused projects (Online News Association, n.d.)

Samsung is another key player encouraging journalistic experimentation with VR. Samsung partnered with the *Times* and Euronews to produce 360° VR (Watson, 2017). Euronews used this partnership to help integrate 360° VR into their normal news production work flows (Moore-Colyer, 2016). The *New York Times* (NYT), on the other hand, provided its journalists worldwide with Gear 360° cameras to help provide content for a 360° daily service launched in November 2016 (Lichterman, 2016). The 360° daily service was a year-long partnership that allowed the NYT to familiarize more than 200 journalists with the VR technology (Willens, 2017).

Al Jazeera also partnered with Samsung with the aim of democratising the technology and empowering people from the global south to tell their own stories (Lee, 2017). Al Jazeera equipped and trained eight filmmakers from Palestine, Jordan, Lebanon, Tunisia, Morocco, Kenya, Nigeria and South Africa. Al Jazeera also publish their stories on its platforms (ibid.).

Not necessarily focused on journalism, Oculus is the third key player to support fact-based VR content creation. Oculus is a famous Head Mounted Display (HMD) manufacturer, acquired in 2014 by Facebook (Heath, 2017). Oculus launched the VR for Good initiative in 2016 (Graham, 2017). The initiative aims at supporting VR content creation for social change and improve education (Oculus, n.d.). VR content creators from various background were equipped, trained and paired with NGOs to do VR supporting a social cause as in The Creators Lab program (ibid.)

Thus, technology partnerships encourage VR content creation providing necessary funds, equipment and training for VR enthusiasts from inside or outside media organisations. Technology companies also works hard to increase the visibility of VR content among potential users. They work with legacy media organisation to raise awareness about VR and how-to best experience it.

The New York Times (NYT), in partnership with Google, distributed one million cardboard viewers to its readers to enable them to view “The Displaced” VR piece about the people fleeing their homes due to war and persecution (Somaiya, 2015). The same procedure was followed by *The Financial Times (FT)*, which collaborated with Google to distribute 35,000 Google Cardboards among *FT* readers for viewing their VR piece about Rio de Janeiro, part of a Hidden Cities project exploring countries from different political and cultural perspectives (Davies, 2016a). And a year later, *The Guardian* gave away 97,000 Google Cardboards celebrating the launch of their VR app in October 2017 (GNM press office, 2017).

However, observers say the technological partnerships do not provide sustainable business models. They may even threaten the ability of news organisations to report objectively about their technology sector partners, so transparency about those partnerships is required (Watson, 2017). “Perhaps a harder test case would be to ask whether a news organisation might be less

inclined to run an investigative piece that involved a partner, especially when a contract is up for renewal”, said Thomas Seymat, a digital journalist at Euronews (quoted in Watson, 2017, p. 30).

A similar concern may take place about challenge funds, where VR content creators become entrepreneurs. They constantly switch between the hats of the fundraiser and the journalist as they apply for funds to carry out their VR projects. It becomes a form of entrepreneurial journalism, which blurs the boundaries between editorial and commercial sides of the news organisations and calls journalistic autonomy into question (Porlezza and Splendore, 2016).

The entrepreneurial culture in VR implies constant experimentation with business models, distribution methods and content production techniques to produce experiential VR projects. These experiential VR projects introduce normative paradoxes, in which a single VR element can emphasize a specific norm and threatens another. The following section discusses the changes in the traditional journalistic culture under two main subsections: (1) experimental culture; (2) experiential culture.

VR and Journalistic culture

- Experimental Culture

VR journalism promotes experimental culture, as media organisations constantly test with business models, distribution methods and production techniques that best fit VR.

In terms of business models, media organisations test with advertiser sponsorships, partnership with technology companies, purely branded content, or completely new models. For instance, Hooper (2017) suggested using a Subscription Video On Demand (SVOD) model, where users pay small subscription fees monthly to experience a variety of VR pieces, similar to the business model of Netflix. Such a model requires a single platform to display all VR content, regardless of its source, to permit the user choice. However, SVOD model works better with entertainment-based VR rather than journalism, where each news organisation has a separate VR app.

Despite all these attempts to monetize VR, Watson (2017) stresses that “the desire to experiment and see what works has to come before more considered attempts to calculate ROIs [Returns on Investment]” (p.32). This approach is reflected in *The Guardian’s* creation of a team of designers, project managers, editorial and commercial leaders working together to test VR (Panetta, 2016). The editorial leader of *The Guardian’s* VR team, Francesca Panetta, says appropriate questions include:

“What can this [VR] do for our journalism? And how can we make this the most compelling experience for our audience? ... Should it [the story] be a VR piece and if so how does that story translate into a virtual world?” (Panetta, 2016, para. 5).

In terms of distribution methods, media organisations need to experiment also with potential delivery tools as the distribution landscape is “fragmented”, and it poses challenges for content creators to understand and reach users (Bosworth and Sarah, 2019, p. 231).

Public understanding of VR journalism is currently limited. Ipsos MORI, a major UK market research organisation, conducted interviews with a representative sample of 1000 UK adults and found that 60% thought VR was used solely for gaming. Although 35% said they would like to learn about the VR experience in news and documentaries, only 15% thought that news organisations could be an outlet for VR content (Ipsos MORI, 2016). This lack of public understanding highlights the need for news organisations to educate their audience about VR and how it can add to news (Watson, 2017).

Audience reach is also restricted because internet connectivity is not necessarily available to users, therefore content creators must look for creative ways to overcome this problem. For instance, Now Here Media, a German-based VR studio, partnered with fashion brands, Bollywood stars, universities, gyms and big bus caravans to ensure mass reach for VR in India (Gomes, 2017). These creative ideas can cause a potential overlap between content creation and publishing, an aspect of entrepreneurial journalism (Ward, 2015).

In terms of production, VR content creation also requires “experimental DIY Hacks” who do not have a set of rules or guidelines for work flows, or even a standard kit for capturing VR (Aronson-Rath et al., 2015, para.49). They have to experiment with numbers, sizes, and types of cameras that best suit their purposes. Content creators are responsible for project-based decisions about which technological trade-offs to make, along spectrums of quality, money and time.

With the absence of VR visual grammar, VR content creators must experiment to discover the storytelling techniques (Watson, 2017). Content creators engage in “a collective process of discovery”, in which the grammar constantly shifts until both VR users and content creators become comfortable with the technology (Bosworth and Sarah, 2019, p. 197). Modes of address, for instance, vary between first-, second- or third- person mode of address, in which the user is a participant or an observer. Although the participant role may enhance empathy impact, Sarah Hill, CEO of StoryUP VR studio, argues that observer role can be “more conducive” (Bosworth and Sarah, 2019, p. 204). Eye line of the main story character provides another example for the unsettled nature of VR grammar. Direct eye contact is essential to keep the user in focus. However, Cassandra Herrman, the director of the “After Solitary” VR⁸, decided to make the protagonist tell his story in a “contemplative way” because she thought long duration of direct eye contact can make the user feel uncomfortable (ibid., p.67).

VR content creators resist developing a story bible to specify the narrative techniques for VR at this early stage. They prefer to highlight creativity, experimentation and complete freedom to explore VR’s potential for storytelling (Laird et al., 2017). They believe VR journalism should not be limited to documentaries but should test other genres, such as data visualisation or game-like VR (Aronson-Rath et al., 2015).

For instance, NBC News provided extraordinary social VR experiences about the 2016 US elections (Ciobanu, 2016). NBC reproduced virtual versions of Democracy Plaza

⁸ Explained in appendix B and analysed in the findings.

interviewing experts, analysing polls and streaming the presidential debates. Users could create personalised avatars and use their VR headsets to enter the VR space and interact with emojis, raising their hands to ask questions, taking selfies and talking. NBC partnered with a software company called Altspace VR to produce this VR experience for Oculus Rift and Samsung Gear VR, in addition to streaming videos online through the YouTube VR channel.

Data visualisation provides another genre of journalistic VR. *The Wall Street Journal* (WSJ) used VR as a tool for data visualisation, offering a roller coaster interactive tour to guide users along 21 years of the stock index NASDAQ (Bajak, 2015). Roger Kenny, the design tech lead at Dow Jones, the US publishing and financial firm that publishes the *WSJ*, announced the partnership with Google to explore the possibilities of VR news on a Daydream VR headset. Options included 360° video, immersive 3D experience or a 3D data visualization, such as a stock market hologram (Staples, 2017).

Such experimentation stresses the need for a culture of collaboration among various players to produce compelling VR content. The skills needed by these teams become more complex in CG VR; they include “reporting, producing, hardware development, software development, system design, workflow design, videography, film direction, art direction, 3D-motion graphic production ... coding, video-editing, VR-authoring, editorial, business development, project management, and marketing” (Aronson-Rath et al., 2015, para.54). The extent of this collaboration may lead to tension among the team members, as *The Guardian* discovered after receiving Google funds to support VR development (Anderson, 2017). Editorial members thought they would do all the challenging content production work, yet all money would go to the business side; business members were afraid that editorial people would produce super-expensive quality VR that would exceed available resources. Aron Pilhofer, the former executive director of digital for *The Guardian*, had to resolve these tensions, which he argued were deeply rooted in misconceptions, a culture of distrust, and a lack of communication (Anderson, 2017, p.25).

Collaboration also may expand across the journalism industry. News organisations need to act collectively as a game changer in VR development, to “drive the hardware developments, content curation, and user experience to serve the needs of news VR” (Watson, 2017, p. 32). The journalism industry should articulate its needs clearly, so developers and manufacturers can work to meet them; otherwise, VR product development will be driven by other fields such as gaming (Aronson-Rath et al., 2015).

- **Experiential Culture:**

VR emphasises an experiential culture in which stories become a storyliving experience rather than mere information (Maschio, 2017). A well-crafted VR experience generates a sense of “duality of presence”, or the feeling of being present in both real and virtual worlds (Doyle et al., 2016, p.27). This sense makes users feel they are experiencing VR events first-hand (de la Peña, 2015), generating powerful emotions such as empathy.

For example, the “Hunger in LA” VR piece provided remarkable evidence of empathy: “People [were] down on the ground trying to comfort the seizure victim, trying to whisper something into his ear or in some way help him” (de la Peña, 2015, 04:01). Such a powerful psychological experience can have a measurable impact; for example, the “Born into Exile” 360° VR about Syrian refugee led to significant financial support when shown in the US Congress (Watts, 2016). These extraordinary reactions led Chris Milk to describe VR:

“It's not a video game peripheral. It connects humans to other humans in a profound way that I've never seen before in any other form of media. And it can change people's perception of each other. And that's how I think virtual reality has the potential to actually change the world” (Milk, 2015).

However, these powerful reactions to VR can be “exaggerated” due to the novelty of technology as what happened during the first cinematic film projection in 1895 (Longhi, 2017, p.20). Once

the technology is normalised, people may not be wowed anymore. Repetitive exposure to VR pieces may desensitise the audience and lead to indifference, as with news coverage in general. Charlotte Mikkelsen, a former BBC foreign correspondent who worked on “Born into Exile” VR, expressed her concern that people may experience “compassion fatigue” (Watts, 2016, para. 24).

The powerful impact of VR thus must be considered carefully in the current early phase of VR experimentation. The VR headset produces a lasting memory, which may produce a negative psychological impact when coupled with intense images of immersive stories (Marconi and Nakagawa, 2017). VR can induce “social hallucinations” and unexpected psychological risks if the “illusion of embodiment is misused or used recklessly” (Madary and Metzinger, 2016, p.5). In her experimental study, de la Peña et al. (2010) warned VR users that they might encounter an “unpleasant experience and they should stop whenever felt the need” (p. 296). The BBC, for similar reasons, rated its 360° CG VR “Trafficked” as suitable only for those over 18 years old (BBC, 2016).

In addition to psychological harm, VR can become manipulative. Madary and Metzinger (2016) explained:

“The comprehensive character of VR plus the potential for the global control of experiential content introduces opportunities for new and especially powerful forms of both mental and behavioral manipulation, especially when commercial, political, religious, or governmental interests are behind the creation and maintenance of the virtual worlds.” (p.5)

VR journalism users are vulnerable to manipulation (Maschio, 2017), more than entertainment VR users due to prior expectations. VR impact relies on immersion, which is determined by users and their tendency to “cognitively absorb” the content (Shin and Biocca, 2018, p. 2812). When the VR confirms users’ expectations, users “internalize” the projected qualities (ibid., p. 2812). Unlike popular entertainment, people expect and believe journalism conveys reality, not fiction, so VR journalism with its powerful psychological impact can manipulate users. The perceived

credibility of journalism increases the manipulative potential for VR journalism compared to entertainment.

Among the various journalistic formats, the perceived credibility of VR is higher than normal text and picture stories about the same event (Sunar et al.,2017). The degree of realism – the way VR resembles reality – increases the VR perceived trustworthiness (ibid.). However, Kang et al. (2018) compared between VR journalism and traditional journalistic 2D videos and found that their degree of credibility is not significantly different. Thus, credibility of the stories is not solely determined by the technological properties but rather the journalistic norms and principles. VR journalism must follow principles of truthfulness, accuracy, balance, objectivity, autonomy and transparency (Migielicz and Zacharia, 2016). These core principles help maintain credibility and guard against manipulative threats of the medium. However, VR contains inherent normative paradoxes (Aitamurto, 2019) which may require further scrutiny to maintain journalistic ideals.

Truthfulness and facticity are said to be amplified by VR, especially in live-action 360° VR, as users can freely look around without being limited to a direct frame. Migielicz and Zacharia (2016) argued that shooting notable events in 360° will allow users to rediscover more truths each time they experience VR. However, VR users can easily miss significant moments of the experience while navigating the 360° environment, rendering the overall experience incomplete and introducing a normative paradox (Aitamurto, 2019).

User agency also may seem to increase objectivity level since the user's field of view is not strictly controlled by the content creators anymore. VR marks considerable shift from "absolute control" held in photojournalism, in which photojournalists were "the first and last decisionmakers over what to frame with their cameras" (Reis and Coelho, 2018). However, VR experience is influenced by user-mediated subjectivities, becoming "an individually composed take of the story, instead of 'the full picture' the journalist intended to mediate" (Aitamurto, 2019, p.7). The VR experience is a "sense-making process", in which users assign meaning to the experienced piece depending

on their interiorities (Shin and Biocca, 2018, p. 2812), blurring “the lines between user subjectivity and external objectivity” (ibid., p. 2813).

Still, user-mediated subjectivities do not fully replace journalist-mediated subjectivities in VR. Content creators cannot achieve complete realism (Fuchs and Guitton, 2011). They selectively emphasize certain aspects of the experience to guide users using subtle techniques, including lighting, varying resolutions of different elements of the scene and audio cues (Lelyveld, 2015). These methods help content creators “ensure the desired message is conveyed” (Aitamurto, 2019, p.10). For instance, Cassandra Hermann, the director of *After Solitary* VR piece, explained how she added audio cues of bird sound to ensure users will not miss a significant part of the story (Bosworth and Sarah, 2019). These methods provide an “induced edit” that content creators intend (ibid., p. 107) but collide with journalistic norms of fairness, balance (Migielicz and Zacharia, 2016) and the degree of accuracy.

Although Fairness is an essential professional journalistic norm, it is also the least valued predictor of VR journalism credibility from the VR user’s perspective, when compared to other norms (Kang et al., 2018). Users tend to prefer guided experiences with a single protagonist with which they identify (Archer and Finger, 2018), rendering the VR experience too subjective (Culver, 2015).

VR journalism is not the first form to be labelled subjective (Culver, 2015). Journalism never provides an unmediated reality (Ward, 2019). Journalists typically decide what to include and how to include to provide simple and compelling narratives. Such simplification process often raises concerns about journalistic objectivity because simplifying the issue may lead to misrepresentations and potentially misleading content (Sambrook, 2012, p.13). Today, calls for objectivity and impartiality tend to relax, to the extent that Kovach and Rosenstiel (2014) described objectivity as a mere device to persuade people of the accuracy of news.

However, the powerful psychological impact of VR intensifies the dangers of subjectivity. As a potential manipulative tool (Maschio, 2017), VR can powerfully inject certain viewpoints, claimed to be the full truth, in the users' minds, encouraging them to take sides in the story (Aronson-Rath et al., 2015). This manipulative power contradicts with ideal norms of objectivity and balance of providing a complete account of the story and letting the audiences exercise their own judgement. However, VR users are not equally susceptible to such manipulative power. People who were familiar and positively oriented towards the issues of the VR story empathise with content "more easily" than "those who did not" (Shin and Biocca, 2018, p. 1813).

VR content creators may use the powerful impact of VR to perform advocacy roles, in which people are persuaded to take a determined stance towards a noble cause. VR users are more likely to report "a desire to take a social or political action" than readers of text-only article (Archer and Finger, 2018, para.4). For instance, Tom Standage, deputy editor of *The Economist*, described the advocacy mission in Recover Mosul 360° VR, saying users were encouraged to preserve cultural heritage and help build a better world (Stuart et al., 2017). Also, de la Peña (2013) described doing VR as "being a civic partner", offering audiences ways to act (para. 4). This viewpoint agrees with research findings indicating that VR and 360° videos are more powerful than traditional news stories (text with pictures) in encouraging prosocial behaviour such as donating money (Sundar et al., 2017). Thus, VR creators are becoming more interventionist journalists, who "advocate, participate or promote change" (Hanitzsch, 2007, p. 373). This interventionist role requires transparency about VR production processes and their intended impact (Kent, n.d.).

VR content creators uphold transparency about the production processes and accountability to the audience to maintain journalistic ethical code in VR (Aitmurto, 2018). However, Al-Tompkins, the senior faculty member at the Poynter Institute for media studies in the US, stressed that transparency is not "a sanitizer for all problems" and that avoiding "the loss of context" is much more important (Nakagwa, 2017, p. 47).

Hypertext agency, for instance, can help the VR become more comprehensive and balanced. With hypertext agency, there are multiple storylines, representing different perspectives, and users can choose among them (Kim, 2016). Thus, users are not forced to adopt a single perspective; they can have a holistic understanding of certain issues (Maschio, 2017). VR becomes a dynamic storytelling process, in which the users actively navigate different story paths, achieving a profound experience (Marconi and Nakagawa, 2017). VR, thus, creates a knowledgeable citizen, capable of taking well-informed decisions in a democratic society (Kovach and Rosenstiel, 2014).

The journalist's absence also may increase the "illusion of objectivity and accuracy", in which the journalist remains an observer rather than an "active participant of the scene" (Aitamurto, 2019, p.13). Authenticity requires a seamless and engaging user experience, and journalists potentially can intrude on a users' "feeling of independent discovery" distracting them from the feeling of presence (Migielicz and Zacharia, 2016, para. 30).

To ensure the absence of the journalist, the camera may be left alone in the setting. This can imply stronger sense of realism when story characters forget the camera and act normally (Migielicz and Zacharia, 2018). Or, it can imply staging to ensure capturing the required footage, introducing a normative paradox (Aitamurto, 2019).

VR journalism may turn into a film where every scene is scripted in advance (Kent, n.d.). Hugo Ward, a virtual reality director who worked on producing the "Passport Osaka" 360° VR for *The Economist*, expressed his concerns that contributors may become performers, resulting in a partially staged rather than completely authentic VR piece (Stuart et al., 2017). He described how his team asked a Japanese person to perform as a guide for VR users. This technique removed the need for journalists to be in the "Passport Osaka" VR, either in the scene or in the narration. It created an illusion of accuracy and objectivity, in which content creators "dramatize events and hide inconvenient elements so as to heighten the impact of the imagery, thus creating space for unlimited 'as ifs' in the visual" (Aitamurto, 2019, p.17).

Concerns about truthfulness and accuracy of content can be escalated further in Computer Generated (CG) VR. Fuchs and Guitton (2011) argued that “It is completely absurd to naïvely expect, if possible, that the behaviour of the virtual world would be identical to that of the real world. If we want to create a *virtual* reality, modifying the aspects of the *real* reality is well within its purpose” (p.6). The modification can take the form of removing danger from the experience, so users experience human suffering in war zones without threatening their safety.

Aside from such a philosophical debate about reality and truth in abstract form, de la Peña et al. (2010) asserted that when VR is done right, following core ethical principles of journalistic integrity, it can be more of a “faithful duplication of real events” than traditional journalism, which provides a “low resolution, sampled, duplicate of reality” (p. 299). As an example of ensuring that all measures are taken to protect the integrity and accuracy of a VR piece, de la Peña (2015) cited the “One Dark Night” 360° VR, about a 17-year-old boy from Miami who was shot dead by a watchman. In that VR, an architectural drawing of the exact location was used so it could be built accurately; recorded 911 calls to the police also were incorporated. Maintaining accuracy in CG VR is, thus, challenging. It requires more diligence with information gathering and verifying techniques and a detailed explanation of these methods to the users (Nakagawa, 2017).

CG VR provokes greater ethical concerns when used to recreate hypothetical events. Robert Hernandez, a digital professor at the University of Southern California (USC) Annenberg School for Communication and Journalism, led a VR project with his students to raise awareness about inevitable storms in Houston, Texas (Scott, 2016). He used computer graphics to recreate footage of a 30-foot wave approaching a house, as a kind of immersive infographic featuring a predicted scenario. His premise was that VR would be more effective than were local newspaper predictions of damage ahead of Hurricane Katrina. He chose to stick to journalistic ethics of accuracy and refused to use VR to envisage the horrific experience of being in a house ripped apart by a storm. He wanted to avoid misinformation about what would happen, saying the VR was journalism, not a Hollywood movie. He stressed that journalism ethics “don't go away with a new piece of technology like VR” (Scott, 2016, para. 12).

Despite this distinction between VR journalism and Hollywood movies, there are cases where VR becomes completely fictional and imaginative stories inspired by real events. Here, news organisations argue that the goal is to engage audience and create a storyliving experience rather than relaying truthful and accurate real stories. This was explicit in *The Guardian's* Sea Prayer 360° VR¹⁵. Francesca Panetta, the former editorial leader of *The Guardian's* VR team, stressed that fictional nature of Sea Prayer 360° VR led them to use animated illustrations rather than real-life footage (Scott, 2017). She argued:

“There's real journalism at the heart of the story [...] The media can get quite tired reporting on the same subject over time [...] so finding other ways to tell that story and get people to engage with it is really important” (Scott, 2017, para. 6,7).

This chapter, thus far, has explained the concept of VR and its application in journalism. The researcher established the difference between 360° videos and high-end VR before going deeper into the recent experimentations in VR journalism. She then traced the implications of VR on journalistic culture through explaining partnerships, the experiential nature of the medium and the experimental nature of work. The next chapter explains the research design, listing the research questions and detailing the methods and sampling techniques.

Chapter V

Methodology

1. Research Questions

Drawing on the problems and developments highlighted so far, this study attempts to understand VR technology as an actor in the practice of journalism and factual storytelling. The study traces the changes in the journalistic practices and their potential influence on the journalistic culture, a concept that combines the journalist's roles and ethical ideologies (Hanitzsch, 2007).

The study uses Actor Network Theory (ANT) to identify every actor involved in fact-based VR content creation. Technology and content creators – regardless of their background – are examined carefully, to trace their interrelationships and identify their influence on the journalist's ethical ideologies and professional roles.

To unpack the ethical ideologies, the researcher looked deeply at norms of facticity, accuracy, objectivity, detachment and transparency as perceived by content creators and as demonstrated in the VR content. She tried to identify whether the dramatic changes in practice reflect a similar change in normative understandings of journalism.

To address the professional roles, the researcher examined the emerging cultures of work in VR content creation, including collaborative and experimental cultures. She tried to trace the changes in journalist's role and their subsequent implications on the journalist's personal characteristics.

The study, thus, aims to position VR journalism within the long continuum of development in journalism that includes narrative, interactive data-driven and entrepreneurial journalism. The study addresses the following research questions:

(RQ1) How does VR journalism interact with norms of accuracy and facticity?

(RQ2) How does VR journalism interact with norms of objectivity and detachment?

(RQ3) How does VR journalism demonstrate transparency?

(RQ4) What is the nature of collaborative and experimental work in VR journalism?

2. Research Design

This research is an exploratory empirical study that aims to analyse VR journalism and how it sits within the broad spectrum of journalistic culture. It tries to provide a holistic understanding of VR through examining the content itself and the content creators.

Using a method triangulation approach, the researcher conducted semi-structured interviews with content creators, followed by social semiotic analysis of a purposive sample of VR content.

As an exploratory study, this research is characterised by “flexibility in looking for data and open mindedness about where to find it” (Stebbins, 2001, p.6). Although the exploratory study rarely provides definitive conclusions about the researched phenomenon (Babbie et al., 2016), it perfectly suits VR journalism, which is still in the experimental phase. The flexible nature of exploratory study, also, supports an Actor Network Theory (ANT) approach to examine phenomena because ANT removes the differences between far/near, inside/outside, human/non-human entities (Latour, 2005). Every entity in the studied phenomenon becomes an actor as long as it causes a traceable difference.

Based on ANT, this study directly examines two of the key actors in VR journalism, technology and content creators, and indirectly consider a third, the VR user. It then examines their interrelationships in creating a journalistic VR culture. Questions about journalistic norms in VR are inferred from the combination of semi-structured interviews and social semiotic analysis of VR content. The research question about the nature of collaborative and experimental work in VR is examined only through semi-structured interviews.

Scholarship applying ANT within journalism studies suggests ethnography is the most-used method of data collection. It facilitates observing the associations between humans and non-humans (Primo and Zago, 2015) and permits thick descriptions of phenomena (Anderson and Kreiss, 2013). Some researchers use surveys (Spyridou et al., 2013); however, Domingo et al. (2015) stressed that ANT studies should not depend on surveys solely. They said:

“Surveys in which journalists are asked to check how much they agree with a set of ideals and news articles that are scrutinised to assess balance

and accuracy are not innocent investigations but are informed by and are part of the normativity that might be better traced as a node or actant in the news network.” (p.63)

Other methods in the ANT literature include big data analysis, discourse analysis of news products, user media diaries (Domingo et al., 2015) and in-depth interviews (Kumar and Haneef, 2016).

Despite the prominence of ethnography in ANT research, this study uses alternative research methods. Ethnography requires intensive engagement with people’s lives over extended period of time (Forsey, 2010), which is not feasible for my research purposes. VR production is not confined to a single work place; it can be inside the news organisation or in external production houses. Thus, comprehensive participant observation would be logistically challenging and perhaps not viable, creating a risk of incorrect interpretation based on incomplete data.

Ethnography’s power lies in observation of people’s behaviours, rather than potentially misleading self-reports (Jerolmack and Khan, 2014; Crang and Cook, 2007). However, Forsey (2010) found that much of ethnographic research is based on verbal accounts rather than observation, becoming an “act of engaged listening” (p.66). Forsey even argued that interviews can produce similar accounts in Western settings, where interviews characterise social interactions of everyday life, and where relationships are bound by time slots allocated for a phone or email contact (ibid.).

Therefore, this study draws on in-depth interviews with a variety of actors engaged in creation of journalistic VR content, combined with a social semiotic analysis of that content. This methodological triangulation approach provides rigor, richness and comprehensiveness needed to expand and deepen our understanding of VR journalism (Flick, 2007; Watkins and Gioia, 2015). It helps the researcher compose a “complete picture” that relies on collecting information from a variety of data sources (Denscombe, 2008, p. 271).

Method triangulation is about examining an issue of interest from at least two viewpoints (Flick, 2007). It can be either a convergent or a holistic triangulation (Turner et al., 2017). Convergent triangulation is aimed at validating results, whereas holistic triangulation attempts to capture the full picture through looking at different angles of the same picture or issue of interest (ibid.).

This study adopts the holistic triangulation approach, combining two qualitative methods, semi-structured interviews and social semiotic analysis of VR content. The study avoids a problem inherent in traditional mixed-method research, that of combining the relativist paradigm of qualitative approaches with the positivist paradigm of quantitative methods (Denzin, 2012).

However, the study raises other practical issues. Triangulating different qualitative methods complicates the processes of analysing the data in a consistent manner, without claiming superiority of one set of data over the other (Flick, 2007). One way to address this issue is to “follow a thread”: a researcher selects an analytic question and uses it to guide his/her analysis of one dataset, then in the same manner goes through the second data set (Moran-Ellis et al., 2006, p.54).

Triangulation also raises practical issues for the researcher related to time, effort and the mastery of diverse skills. These are explained further in the reflexive section at the end of the methods chapter.

3. Preliminary Interviews

The researcher conducted preliminary interviews to acquire background information before the primary study was undertaken.

The researcher conducted five semi-structured interviews with knowledgeable people about the use of VR in factual storytelling and journalism, including: a VR documentary filmmaker, a VR technologist in a journalistic institution, a journalism trade press contributor, a media innovation expert and a journalist who founded of a VR studio.

Interviewee	Affiliation
1 Ainsley Sutherland	2015-2016 fellow in BuzzFeed's Open Lab for Journalism, Technology, and the Arts. She is a media technologist specialising in immersive computing and experience designs.
2 Caroline Scott	Video Editor at Journalism.co.uk
3 Jodie Hopperton	Media Executive Advisor on innovations and technology
4 Ricardo Laganaro	Visual Effect Artist and VR content creator. He created "Step to the Line," which was part of VR for Good ⁹ .
5 Sarah Hill	CEO of Story UP, a VR studio with a team of filmmakers, psychologists, and technologists. They aim to create VR that can influence users' psychology. She was formerly a journalist and TV anchor.

Table 1: Participants of Preliminary Interviews

Preliminary interviews often help to refine the wording of interview questions and to uncover effective dimensions that were not noticeable to the researcher during the initial review of literature (Guest et al. 2012).

Data from the preliminary interviews provided the researcher with useful insights that guided construction of the research instruments. For instance, several respondents in the preliminary interviews were very sensitive to talk about VR ethics, especially those who came from a journalistic background. Therefore, extra care was given to formulating ethics questions that could foster deeper insights instead of short and defensive answers.

Participants' answers showed the heterogeneity of VR content creators, with each person giving a unique response to a question about the cultural aspects of VR. This diversity prompted the researcher to include a variety of VR content creators in her research sample to capture a wide range of opinions.

A selection of themes from these interviews illustrates this diversity of viewpoints: empathy; objectivity and completeness; ethical standards; and the iterative nature of the production processes.

⁹ VR for Good is an initiative made by Oculus for using VR content to inspire social change, through giving non-profit organizations the opportunity to use a VR toolkit and funds to produce content. VR for Good also has an education initiative, which enables high school students to work with VR professionals and tools to produce 360-degree video pieces. See: <https://www.vrfocus.com/2016/05/oculus-launches-vr-for-good-education-initiative/> [Accessed 18/06/2018].

The media technologist stressed that VR does not always produce empathy, and that most of journalistic content that claims empathy does not really achieve it. She maintained that empathy is not inherent in technology but rather contingent on the story. Users feel empathy when the story encourages them to think and decipher the level of ambiguity conveyed in the experience. This understanding of empathy contradicted what other participants were implying. They perceived empathy as an inherent capacity of technology regardless of the story.

The media technologist endorsed the idea that a VR content creator will never know the whole the story because the creator is not the story subject or main character; the VR experience is consequently an incomplete picture of the real event. In contrast, the journalist CEO of Story Up – a VR studio – talked about objectivity as something a good journalist can attain, relating it to truthfulness; she said VR provides a complete unfiltered story. The researcher noted that these seemingly opposing viewpoints may hold true at the same time for different situations. When a journalist is conveying the past experience of someone else, it is never the exact story. And when a journalist is simply covering an unfolding event in front of the camera, VR may provide an unfiltered complete picture.

For ethical standards, the media technologist refused any kind of rules or guidelines because they are made to be broken. In contrast, the journalist CEO of the VR studio stressed the need for those rules and guidelines.

All participants agreed that VR and 360° videos are somehow iterative and experimental. They require testing with different production techniques, especially when the content is being created for the first time: An established VR grammar does not yet exist. The participants also agreed that technology adoption rate is important to enable VR to spread; the media technologist even predicted a VR slow-down in favor of Augmented Reality (AR). AR can be watched directly through smart phones without the need for sophisticated headsets. The media executive advisor maintained that adoption was the first issue raised by media executives when considering expanding their work to the realm of VR. She even stressed that sponsorship is mandatory for media organisations wishing to produce VR content, using *The New York Times Daily 360* as an example. This daily service provided by *The New York Times* stopped in early 2018.

The conceptualization of VR and 360° videos also seemed to differ among the respondents. The technologist was convinced that no real VR experience can be found in the context of journalism, unlike the filmmaker who was convinced that his 360° documentary can be considered VR. Therefore, the researcher had to be clear about what she meant by VR and 360° videos in her questions.

The time limit of the interviews also prompted the researcher to tailor the questions to the respondent's background to be most productive. A VR director or producer would be asked about the dynamics of VR field production and its challenges; a technologist would be asked about his or her role in the team; a media strategist would be asked about how VR might be integrated within the workflow. However, whenever possible, the researcher extended her questions beyond participants' area of focus. That way, the study would capture the diversity of opinions.

4. Research Methods and Sampling

The following section explores the rationale for each research method used and its corresponding samples.

(a) Content creation:

To collect the data about VR content creation, the researcher employed a semi-structured interview research method. It allowed for answering the four main research questions that deal with the journalistic norms and the nature of experimental and collaborative work in VR.

- Sampling technique:

In order to select the content creators for the semi-structured interviews, the researcher identified a sampling universe that represents the population of the study, based on clear inclusion and exclusion criteria (Robinson, 2014). This sampling universe consisted primarily of VR used for factual storytelling and/or journalism, excluding branded (advertising) content and clearly labelled opinion content. An example of excluded opinionated content is *The New York Times* (NYT) VR labelled Op-Docs. Op-Docs stands for opinion documentaries produced by independent artist and filmmakers and published on the NYT¹⁰.

VR creators of this sampling universe reflected a great deal of heterogeneity. They came from variety of backgrounds: journalism, creative art, game developing, and even sound engineering. They included independent content creators, VR creators affiliated with VR studios and VR creators affiliated with established media outlets. These established media outlets were also heterogeneous. Some were commercial – depending on advertising as one revenue stream – and others were non-commercial. Some were legacy print outlets, and others were broadcast. Some had a dedicated in-house VR team, and others did not.

Two purposive sampling techniques were used to identify the actual sample of VR content creators, based on Teddlie and Yu's (2007) typology: a purposive technique to achieve comparability, and a sequential technique.

For comparability, the researcher sought maximum variation sampling (MVS) (Etikan et al., 2016), where the units of analysis vary according to the heterogeneous elements described earlier. To identify research participants, the researcher read trade press reports, monitored the YouTube VR channel, and attended public events about VR with speakers who addressed journalism issues. The researcher then purposively targeted content creators from the BBC, *The Guardian*, Al Jazeera, CNN, *The New York Times* and the Frontline series on Public Broadcasting Service (PBS), the American public broadcasting TV network. They were among the most active media

¹⁰ <https://www.nytimes.com/video/op-docs> [Accessed 21st March 2018].

organisations experimenting with VR during the time of study. The researcher also targeted members of the Journalism 360 initiative – a partnership among Google, the Knight Foundation and the Online News Association (ONA) to popularise the use of VR in journalism. Other content creators were also spotted at VR conferences and asked to participate in the study.

After purposively selecting the initial media organisations, the sequential technique of snowball sampling (Teddlie and Yu, 2007) was used. Snowball sampling involves the selection of cases that have been proposed by other cases (Howitt and Cramer, 2011). This technique facilitated tracking different actors involved in producing VR journalism inside news organisations. It also facilitated identifying external players since media outlets often commission external VR studios to create content (Stuart et al., 2017).

The sampling technique for this research also involves elements of convenience sampling, in which recruitment of participants depends on their availability and their willingness to take part in the study (Onwuegbuzie and Collins, 2007).

The composition of VR-focused staff in these organisations is fluid, and their numbers are limited. The researcher exerted her utmost effort to convince VR creators to participate in the study and maintain the principles of Maximum Variation Sampling (MVS) technique. She sent three rounds of invitation requests to potential participants via emails and LinkedIn, leaving a three-week period between every two rounds. She approached professors at the journalism department to put her in touch with anyone inside the sampled news organisations. She then asked the contact person to connect her with VR teams. She contacted trade press contributors who are interested in covering news about journalism innovations to connect her with potential participants. She also tried to attend talks, conferences and public events hosting potential participants in London during the time of study. This procedure yielded a final sample of 30 participants (N=30). The following table indicates the research participant and the organisations for which he or she works:

	Date	Interviewee	Organisation
1	7/11/2017	Taylor Nakagawa	Associated Press (AP)
2	16/11/2017	KC McGinnis	Former USA Today intern and <i>The New York Times</i> freelancer
3	26/11/2017	Marc Ellison	Freelancer for Al Jazeera and the BBC
4	26/11/2017	Zahraa Rasool	Al Jazeera (Contrast VR)
5	29/11/2017	Benjamin Ross	Co-Reality (VR studio)
6	1/12/2017	Louis Jebbs	Immersiv.ly (VR studio) – Journalism 360
7	4/12/2017	Kevin Tsukii	Emblematic (VR studio)
8	6/12/2017	Laura Hertzfeld	Journalism 360
9	7/12/2017	Joi Lee	Al Jazeera (Contrast VR)
10	7/12/2017	Jenna Pirog	National Geographic and formerly in <i>The New York Times</i>
11	8/12/2017	Gayatri Parameswaran	Now Here (VR studio)
12	9/12/2017	Viktorija Mickute	Al Jazeera (Contrast VR)
13	22/12/2017	Maria Fernanda	Al Jazeera (Contrast VR)
14	15/1/2018	Thomas Seymat	Euronews – Journalism 360
15	17/1/2018	Charlotte Mikkellborg	This Production (VR studio)
16	17/1/2018	Jason Farkas	CNN
17	18/1/2018	Bronte Lord	CNN
18	18/1/2018	Cassandra Herman	Freelancer for Emblematic studio
19	19/1/2018	Lauren Mucciolo	Freelancer for Frontline at PBS
20	24/1/2018	Nicole Jackson	<i>The Guardian</i> – the then VR team
21	24/1/2018	Federico Fasce	<i>The Guardian</i> – the then VR team
22	24/1/2018	Lisa Golden	<i>The Guardian</i> – the then VR team
23	24/1/2018	Anetta Jones	<i>The Guardian</i> – the then VR team
24	5/2/2018	Lakshmi Sarah	Freelancer for <i>The New York Times</i> – founder of Tiny this Productions (studio) – Journalism 360
25	14/2/2018	Charlie Newland	The BBC
26	2/3/2018	Dinah Lammiman	The BBC
27	16/3/2018	Carla Borrás	Frontline at PBS
28	16/3/2018	Raney Aronson-Rath	Frontline at PBS
29	6/4/2018	Alastair Leithead	The BBC
30	23/4/2018	Zillah Watson	The BBC

Table 2: The Interviewees' list

As is apparent in the list, the researcher was not focused on UK-based content creators. Instead, she tried to include VR content creators in the USA, the Middle East (Qatar), and other European countries such as France and Germany. That way, the researcher gained a broader perspective of VR and captured a greater variety of opinions, adding richness to the research findings.

Appendix A provides more details about each interviewee's job title, the date and duration of the interview, and the method of communication.

As seen in the appendix list, interviewees have diverse job titles. The professional labelling terrain in VR journalism seems fluid, similar to Hermida and Young's (2017) findings in computational journalism. Many of the interviewees are labelled as VR producers and documentary filmmakers. Only a few of them have the word "journalist" in their job titles. The researcher used "content creators" as a generic term to refer to everyone involved in VR content creation, regardless of his or her actual job title and background.

The sample was not confined to legacy media organisations alone. It expanded to include freelancers and those working in VR studios, who identified themselves as filmmakers rather than journalists. The ANT approach, applied in this study, meant that the researcher needed to stick to what actors say about themselves rather than imposing an external framework on them. Use of the label of 'VR content creator' allowed the researcher to emphasise what they have in common (VR content creation) without suppressing their diverse nature. Also, use of the content creator label is not unique to this study. Watson (2017) used the same label in her pioneer study exploring the use of VR for news.

The content creator's label enabled the researcher to use a purposive sampling technique that seeks maximum variation without distorting the findings. The researcher reported interviewees' diverse self-perceptions without moulding them into traditional classifications. Yet purposive technique was not entirely controlled by the researcher. The technique involved an element of convenience. The recruitment of interviewees depended on their willingness to participate in the study.

The use of purposive sampling technique with an element of convenience does not provide a representative sample or generalisable findings over the whole population of fact-based content creators. Still, the technique works well for qualitative studies that seek rich and deep understanding of phenomena (Watkins and Gioia, 2015), instead of generalisations.

The choice of purposive sampling technique with its limitations is part of ANT-inspired research design. ANT cannot build a theoretical framework to explain journalism in the digital age (Wu et al., 2019). It rejects generalisations outside any studied network, a limitation that does not

reduce the study's value since VR journalism has not reached any point of stability that permits theorising or generalising.

- Semi-structured interviews:

Semi-structured interviews were used to collect data from the previously defined participants. Interviews are a qualitative data collection method that facilitates rich and deep understanding in a way that is not permitted via quantitative data (Watkins and Gioia, 2015). Such interviews are systematic: Interviewers use a list of key questions and prompts as an aid for moving the interview forward while keeping track of time (Olsen, 2014).

The semi-structured interview is a form of managed conversation (Cachia and Millward, 2011). Interviews can be face-to-face or mediated, for instance conducted by telephone or online. Research literature holds face-to-face interviews as the optimal option because they allow for immediate feedback and physical presence (Cachia and Millward, 2011; Irvine, 2013). However, a few research papers advocate telephone (Irvine, 2013) and synchronous online interviews in certain cases (Hanna, 2012). Telephone interviews are less demanding: It is easier to arrange for a telephone call than a face-to-face interview on a busy workday (Cachia and Millward, 2011). They are also more suitable for sensitive issues (Irvine, 2013). Synchronous online interviews such as Skype calls, on the other hand, can be more logistically convenient (Hanna, 2012). They help reduce costs since the interviewer can work from home, saving time, money and effort. Their advantages are furthered in the case of video calls, permitting virtual physical presence and establishing proximity between the interviewer and the interviewee regardless of their actual location (*ibid.*). However, such physical presence is often limited to the face and the upper part of the body. Therefore, the interviewer is less able to read the full body language cues in online interviews when compared to face-to-face in-person interviews (Seitz, 2016).

The researcher conducted the interviews between November 2017 and April 2018. Most of the interviews were synchronous online video interviews, allowing for instant feedback and virtual physical presence. This helped to reduce the potential for misunderstanding caused by the dissimilar cultural backgrounds of the researcher and participants. However, telephone

interviews were used in two London-based cases, where the participants preferred the phone over Skype. Face-to-face interviews were used in the case of *The Guardian* and the BBC VR commissioning hub. The researcher was permitted three hours in *The Guardian* VR team workplace, where she conducted interviews with team members. She was also permitted two hours in the BBC VR hub to conduct an interview with its commissioning editor and view some VR pieces.

The method of communication was chosen upon interviewees' preferences, and generally was made for logistical reasons. Synchronous online video interviews seemed most convenient in many cases where interviewees were not in London. Skype video calls were used most of the time, though some interviewees preferred Google Hangouts. Although online interviews can limit the sampling pool because proficiency levels are uneven across the general population, the research focus and type of interviews pursued here made this concern irrelevant. VR personnel in media organisations, the interviewees targeted here, were likely to have technological competence and previous experience with online video calls.

Prior to every interview, the researcher obtained an informed consent from the participants to audio record the conversation and identify them with name in the research report. She first sent an invitation email to explain her research purpose with an attached soft copy for the consent form to be filled and signed. Participants who agreed on a phone or an online interview sent a soft copy of their consent forms. In contrast, participants who agreed on face-to-face interviews returned a signed hard copy.

The researcher typically started every interview with explaining the process and the participants' rights. She reminded participants that the interviews are recorded, and their identities are disclosed. She explained to the participants their right to withdraw whenever they want without the need for prior explanation. Fortunately, all the interviews passed smoothly, and all interviewees consented on research terms-and-conditions.

After reminding the participants of their rights, she allowed participants to ask questions before the interview began. This technique helped the researcher put interviewees at ease and establish

rapport. She then asked an ice-breaking question: “Could you tell me a little bit about yourself and how you got into VR?” Afterwards, she proceeded with the list of questions, which were continually rearranged and reordered based on the interviewee’s role and answers to prior questions. Appendix B provides the basic interview guide. The researcher also occasionally took notes during the interviews, and she checked at the end of each interview that the recording was audible

- Analyzing the interview material:

- 1- Transcribing Interviews:

To systematically analyse the interview material and extract “fresh knowledge” from it (Olsen, 2014, p.38), the researcher first transcribed word by word each interview in its entirety.

No assistant was recruited to help in this research study. The researcher transcribed all the interview material herself. This helped retain confidentiality of interview materials, an option offered via the consent form, although all interviewees in this study agreed to be identified by name.

Avoiding external transcribers also helps maintain the accuracy of transcription material. External transcribers may introduce mistakes because they were not present for the original interview. For instance, they may misinterpret pauses and silences, wrongfully adding punctuation marks that alter the meaning (Poland, 2001).

There are several types of transcriptions. Some are verbatim transcriptions; others document non-verbal observations including facial expressions and body language. McLellan et al. (2003) described the transcription process as “the first step of data reduction” (p. 66): The researcher decides whether to include background noise, pauses, silences, emotions, and other non-verbal cues in addition to the spoken words. However, the level of depth in the transcription depends on the goals of analysis (McLellan et al., 2003; Oliver et al. 2005). The more insights the researcher needs about values, beliefs and individual experiences, the more depth is needed for the transcription.

In this research, the researcher followed a word-by-word transcription, yet it cannot be called a verbatim transcription. Verbatim transcription entails documenting the non-verbal cues indicated above, along with involuntary responses (e.g. laughing, sneezing, or crying) and response tokens (e.g. “OK”, “Ah”, or “Yeah”) (McLellan et al. 2003). The word-by-word transcription was determined to be more suitable for the research purpose here as well as for the thematic analysis that followed.

2- Thematic Analysis and Procedures:

The researcher used the thematic analysis approach to “identify, analyse and report patterns (themes) within the data” (Braun and Clarke, 2006, p.79). Thematic analysis helps delineate the key attributes of the researched topic, pointing out the similarities and differences in data and thus providing rich insights (Nowell et al., 2017). Text is segmented into thematic categories and subcategories represented in full units of meaning regardless of their length in words, sentences or paragraphs (Kuckartz, 2014).

Thematic analysis offers several advantages for qualitative researchers. It is a flexible method and relatively easy to perform compared to other types of qualitative analysis such as discourse analysis (Braun and Clarke, 2006). It can involve inductive/data-driven analysis or deductive/theoretically grounded analysis (ibid.). This categorization is a spectrum rather than an “either-or” dichotomy, and most research falls in the middle (Kuckartz, 2014). For instance, Fereday and Muir-Cochrane (2006) inductively identified data-driven categories to capture the richness of the data, and they also used a deductive codebook based on research questions and theoretical framework.

In this study, the researcher used a combination of deductive and inductive approaches to identify categories. She immersed herself in the transcribed interview data and inductively generated categories intended to capture the full richness of this material. The researcher postponed deductive analysis until after she felt she had thoroughly engaged with the material as transcribed, as over-reliance on existing literature can limit a scholar’s scope and obstruct identification of important themes within the data (Braun and Clarke, 2006). Once she was

confident that she had done justice to her original interview data, she then revisited the literature to ensure identification of any additional concepts related to the study's theoretical underpinnings.

Not many studies provide practical steps for conducting thematic analysis (Nowell et al., 2017; Braun and Clarke, 2006). They convey a little agreement about the exact steps to follow or in what order. Some guidelines start the coding process with general themes and work toward specific subthemes, whereas others move the other way around. Guest et al. (2012) moved from segmenting text, to identifying general themes and decomposing them, to identifying and decomposing subthemes, and finally to synthesising them and pointing out their relationships. In contrast, Braun and Clarke (2006) advised coding text into as many subcategories as possible, and then merging those categories together into overarching themes.

Still, the research literature agrees on the iterative nature of thematic analysis: It is a non-linear process, where the researcher moves back and forth to define and redefine themes and interpret their relationships (Fereday and Muir-Cochrane, 2006; Guest et al., 2012). A codebook is often used to clearly define and then refine the used themes and subthemes (Gavin, 2008), which is especially valuable when multiple coders are involved in systematic coding (Guest et al., 2012). It is also useful if the researcher is the only coder, however. Guest et al. (2012) advise qualitative researchers: "Once you stop coding, you will not remember anything that seemed obvious while you were deeply buried in the text" (p. 77).

Braun and Clarke (2006) take an opposite approach. They see defining and naming the themes as the final step before actually writing the report. In contrast to the general-to-specific approach described above, they recommend a specific-to-general approach, merging subcategories into themes before eventually defining them.

As they go about the thematic analysis, qualitative researchers must demonstrate that their work is trustworthy, by systematically and accurately documenting their analytical process so that others can assess credibility (Nowell et al., 2017).

For this study, the researcher started the analytical process by coding the data – the word-by-word transcribed interviews – herself. As indicated above, being the sole coder allowed her to ensure the confidentiality of interview materials; although participants did consent to be identified in the research report, the actual interviews (audio and text versions) were confidential.

The researcher familiarised herself with the data, first by reading the text and highlighting the interesting units of meaning. She followed Braun and Clarke (2006) to initially define as many subcategories as possible, as it is easier to merge those subcategories rather to devise new ones and apply them to the whole data set repeatedly. She used Nvivo, the Qualitative Data Analysis (QDA) software, to code the interview transcripts, generating as many subthemes as possible.

The process of excerpting text can lead to decontextualization of the data, which carries the risk of altering the meaning (Guest et al., 2012). To remain truthful to the account provided by each interviewee, the researcher added notes to preserve the context as needed. She put the notes in theme descriptions in Nvivo, so as not to interfere with the actual transcripts.

Reading the text excerpts again, as well as revisiting the whole data set, the researcher started to generate themes. The decision about what constitutes themes relied on both the importance of the theme from the participant's perspective and its relevance to research questions. The researcher used Nvivo technique of merging themes, to combine subcategories and form a more general theme.

Despite adopting a qualitative approach, the researcher aimed at identifying the prevalent themes based on their instances within the interviewees' accounts. This helped define the important themes from the participants' view, but also provided a framework for reporting contradictory themes in order to capture the breadth of data. It is rare to find 100% consistency within interview data (Guest et al., 2012).

As the coding continued, the researcher kept refining and improving the codebook to become self-explaining and comprehensive. The researcher went through the whole data set to make sure that captured codes are accurate, and to interpret the emerging patterns of meaning.

The researcher then added additional themes to thoroughly reflect the theoretical concepts of ANT (Actor-Network Theory) and research questions. The researcher chose excerpts of text that effectively illustrate these themes. She tried to organise the excerpts in a coherent and meaningful way. The researcher made sure that the findings' narrative identified the roles of every actor in VR journalism with a direct focus on technology and content creators. However, she did not include specific subsections about the role of technology or content creators since those roles are evident in every theme.

The deductive approach was thus implicit in the findings section. The approach was brought back to light in the discussion section, where the researcher synthesized the findings of interviews and social semiotic analysis of VR content to address the research questions. The researcher organised the whole data under the four themes of research questions, including accuracy, objectivity, transparency and experimental collaborative nature of work. She headed back to the literature and tried to situate the findings within the published research, exploring the connection between narrative, entrepreneurial, interactive and VR journalism.

(b) VR content

In addition to the interviews, the researcher used a social semiotic approach to analyse a purposive sample of VR content produced by established media outlets. This approach enabled her to investigate the cultural aspects in VR content, further addressing the research questions about accuracy, objectivity and transparency.

- Sampling Technique

The researcher selected a purposive sample of VR content produced by five leading media outlets: *The Guardian*, the BBC, Al Jazeera, *The New York Times* and Frontline (PBS). These outlets were selected because they represent world pioneers in exploring the potential of VR journalism.

They are also elite and arguably exemplary news organisations, which over time have sought to build a reputation for seeking to uphold journalistic principles and ideals. In the contemporary “post-truth” environment, they thus have tried to position themselves in the eyes of the public as bastions against the spread of populist post-modernism (Singer, forthcoming).

However, numerous fact-based VR pieces are produced by organisations that do not hold the same reputation for seeking to adhere to high journalistic ideals. Therefore, a larger sample of fact-based VR content may have yielded different results. That said, the five sampled media organisations added a great value to this study. Their reputation for high-quality journalism in line with occupational goals and norms provided a fruitful basis for understanding how such ideals are negotiated in VR work. The researcher could identify how VR content demonstrates the journalistic principles upon which the reputation of the sampled media organisations is founded.

The Guardian produced its first VR piece in April 2016 and received a remarkable feedback, which encouraged its partnership with Google to establish an in-house VR team in October 2016 (Anderson, 2017).

The BBC was among the first media outlets to experiment with VR. In 2014, it launched BBC Reality Labs as part of BBC R&D, to experiment with VR and test its storytelling potential¹¹. In early 2018, the BBC launched VR hub and a Gear VR app enabling users to experience their ground-breaking VR content¹².

Al Jazeera is the first Middle Eastern media outlet to produce VR content. Al Jazeera officially launched Contrast VR, its in-house VR team, in 2017. Since then, it has produced many VR pieces that have attracted worldwide interest.

Frontline’s journey with VR began in 2015, when they partnered with Columbia University’s Tow Center to develop a 360° piece about Ebola accompanied by a research report about lessons learned from that experience (Aronson-Rath, 2015). In December 2015, The Knight Foundation

¹¹ <http://www.bbc.co.uk/rd/projects/360-video-virtual-reality> [Accessed 21st March 2018].

¹² <http://www.bbc.co.uk/mediacentre/latestnews/2018/damming-the-nile> [Accessed 21st March 2018].

announced funding for a partnership between Frontline and Emblematic VR studio to produce cutting-edge VR pieces and to identify best practices for VR in journalism (ibid.).

The New York Times was a pioneer in partnering with Google and distributing one million Google Cardboard viewers among its readers in November 2015, enabling them to experience The Displaced VR piece. Since then, the *Times* has continued to push the limits in its experiments with VR. Their ambitious experiment of producing a daily 360° service (Willens, 2017) ran for almost a year until it stopped at the end of 2017.

To select the purposive sample of VR content from this sampling universe, the researcher employed an extreme or deviant sampling technique, which focuses on unusual cases (Teddlie and Yu, 2007; Etikan et al., 2016). She used several criteria to determine these unusual cases. First, she selected award-winning VR: “Sea Prayer”, “6×9” and “First Impressions” (by *The Guardian*), “Spacewalk” (by the BBC), “After Solitary” (by Frontline) and “Fight for Falluja” (by *The New York Times*). Second, she included VR content that had pushed the limits of the medium without winning a prize: “Crime Scene” (by *The Guardian*), “BBC Earth: Life in VR” and “Damming the Nile” (by the BBC). Although “Damming the Nile” did not emphasize higher levels of user agency, it is among the first episodic VR documentary pieces.

The third selection criterion was VR shown in international documentary and film festivals, including “Trafficked”, “I am Rohingya”, “Oil in our Creeks”, “Greenland Melting” and “Seeking Pluto’s Frigid Heart”. “Trafficked” was shown at the 2017 Sheffield documentary festival; it was selected to be among other nine VR pieces joining the Alternate Realities exhibition tour in Latin America¹³. Both “I am Rohingya” and “Oil in Our Creeks” were exhibited at the Vancouver International Film Festival and at RioMarket/Rio International Film Festival. “I am Rohingya” caught the attention of Amnesty International, which asked for an earlier release for the film to coincide with the escalating Rohingya crisis by the end of 2017¹⁴. “Greenland Melting” was shown

¹³ <http://i-docs.org/2017/06/12/alternate-realities-latin-america-other-dispatches-sheffield-docfest-17/> [Accessed 21st March 2018].

¹⁴ <https://medium.com/contrastvr/how-we-partnered-to-share-the-story-of-the-rohingya-to-over-30-million-people-aa07e0c64a40> [Accessed 21st March 2018].

at the 2017 Venice¹⁵ Film Festival and the 2018 South by Southwest (SXSW) festival.¹⁶ “Seeking Pluto’s Frigid Heart” was shown at the 2017 Tribeca Film Festival¹⁷.

While viewing the selected VR content for analysis, the researcher added two more pieces: “Crossing the Sky” and “Bloodhound”. Together with “Damming the Nile”, they represented the only 360° pieces that were available on BBC Gear VR app as of May 2018, when the content sample was finalised. The researcher wanted to identify why they merited being a part of the app instead of other BBC 360° pieces. The following table illustrates the VR pieces included in the sample; Appendix C also provides a full list:

¹⁵ <https://www.pbs.org/wgbh/frontline/announcement/vr-film-greenland-melting-to-compete-at-venice-film-festival/> [Accessed 21st March 2018].

¹⁶ <https://arstechnica.com/gaming/2018/03/vr-headsets-have-become-the-new-arthouse-the-best-of-sxsws-fantastic-vr-festival/> [Accessed 21st March 2018].

¹⁷ <https://www.tribecafilm.com/filmguide/archive/seeking-plutos-frigid-heart-2016> [Accessed 21st March 2018].

The Guardian	BBC	Al Jazeera	Frontline (PBS)	The New York Times
Sea Prayer ¹⁸	Trafficked	I am Rohingya	Greenland Melting	Fight for Falluja ¹⁹
6x9 ²⁰	Damming the Nile	Oil in Our Creeks	After solitary ²¹	Seeking Pluto's Frigid Heart
First Impressions ²²	Crossing the Sky			
	Bloodhound			
	Spacewalk ²³			
Crime Scene	BBC Earth: Life in VR			

Table 3: The VR content sample

As seen in appendix C, the sampled sixteen VR pieces are diverse in terms of content, users' roles and content creators' roles. They permit different levels of interactivity and reflect the diversity of VR-journalism content that was available at the time of study. However, the researcher deliberately excluded the fast turn-around 360° videos that do not have a narrative element, such as *The New York Times's* daily 360° videos. These short 360° videos may outweigh the long 360° videos and interactive VR in quantity. Yet they did not garner an outstanding response by general publics or expert committees. The researcher relied on deviant sampling techniques,

¹⁸ Sea Prayer won the 2017 SIMA (Social Impact Media Agency) award as the best VR experience. See: <https://www.theguardian.com/gnm-press-office/2018/feb/08/guardian-wins-three-prizes-at-the-sima-awards> [Accessed 21st March 2018].

¹⁹ Fight for Falluja won the Online Journalism Award (OJA) for excellence in immersive storytelling and was shown in six film festivals. <https://awards.journalists.org/entries/fight-for-falluja/> [Accessed 21st March 2018].

²⁰ 6x9 won the 2016 British Journalism award for digital innovation and the British Arrow Craft gold award. See: <https://www.theguardian.com/gnm-press-office/2016/dec/07/guardian-wins-three-british-journalism-awards> & <https://www.theguardian.com/gnm-press-office/2016/dec/01/guardian-wins-british-arrows-craft-award> [Accessed 21st March 2018].

²¹ After Solitary was awarded the 2017 Grand Jury Prize at SXSW (South by Southwest) for best room-scale VR and top prize for world VR forum. See: <https://futureofstorytelling.org/project/after-solitary> [Accessed 21 March 2018].

²² First Impressions won the 2017 best documentary VR experience award in the Raindance film festival. See: <https://www.theguardian.com/gnm-press-office/2017/oct/03/guardian-wins-raindance-film-festival-award> [Accessed 21st March 2018].

²³ Walk in Space won the Lion Cannes award and was shown in various film festivals around the world. See: <http://www.bbc.co.uk/mediacentre/latestnews/2017/vr-spacewalk> [Accessed 21st March 2018].

which look for the unusual cases (Teddlie and Yu, 2007). She selected VR pieces that pushed the limits or participated in international festivals, in addition to award-winning pieces.

Although the exclusion of short 360° videos is a research limitation, it does not reduce the value of this study. Three of the five sampled media organisations do not produce short 360° videos. *The Guardian* and PBS made a strategic decision to focus on labour-intensive projects that push the limits, whereas *The New York Times* stopped its daily 360 service by the end of 2017. The shift away from short 360° videos towards grand VR projects marks a general trend in VR journalism, as indicated by interviewed content creators. For instance, Thomas Seymat, Euronews VR editor, explained how Euronews started the second phase of experimentation, shifting the focus from quantity to quality VR productions.

- Social Semiotic Analysis

Social semiotic theory provides descriptive and analytical tools to study any communication phenomenon (Kress, 2015). Communication phenomena could be textual, visual, or multimodal.

Social semiotics theory is concerned with “the processes of production, reproduction, reception and circulation of meanings” among human agents (Hodge and Kress, 1988). It investigates meaning and the meaning-making process through identifying the semiotic resources employed and their potential significance (van Leeuwen, 2004), while adhering to the fact that meaning assigned by sign makers is not necessarily identical to the one interpreted by the audience (Kress, 2015).

The potential difference of meaning between the sign-maker or the communication initiator and the audience is the main difference between structural semiotics and social semiotics (Jewitt and Oyama, 2004; Vannini, 2007). Structural semiotics perceives signs and their meanings as rules and codes; once agreed upon, those codes and rules become static and unchangeable (ibid.). This approach sees the communication message as a “system of signs” with abstract and static meanings regarded as a “social fact” (Hodge and Kress, 1988, p. 6).

However, social semiotics regard a communication message as “text”, whose meaning is initially designed by the sign-maker but is constantly redesigned and reinterpreted by other social agents

engaging with it – that is, the audience (Kress, 2015). Social semiotic theorists are reluctant to use the term “audience,” however, as those interacting with a text are regarded as having a high degree of agency in constantly redesigning and reinterpreting the text (ibid.). For the same reason, the concept of “codes” in structural semiotics is replaced with “semiotic resources,” a concept incorporating an understanding that relationships between forms and their meanings are not arbitrary (Jewitt and Oyama, 2004) but rather depend on the interests and motivations of the communication participants (Kress and van Leeuwen, 1996).

The social semiotic researcher also is a social agent, who like other such agents engages in constant redesign and reinterpretation of text. The researcher’s analysis is influenced by his or her backgrounds. Iedema (2004) evokes this understanding in describing his work doing social semiotic analysis of a telefilm documentary:

“I make no truth claims for the results of my analysis, but I do claim to be able to support my claims with systematic evidence and base my political arguments on them” (p. 187).

Previous research has applied a social semiotics approach to analyse still images (Kress and van Leeuwen, 1996; Jewitt and Oyama, 2004; van Leeuwen, 2004), telefilms and documentaries (Iedema, 2004), multi-modal discourses (Kress and van Leeuwen, 2001; Kress, 2015), cinematic films (Tseng, 2013) and even video games (Pérez-Latorre et al., 2007). Since Virtual Reality (VR) in journalism combines features of multimodal discourses, documentaries, films and video games, social semiotics appear to be a suitable approach to analyse the VR content.

This social semiotic analysis of VR content aims to unravel the ethical issues, journalistic roles and audience/user roles as conveyed through the content. It is different from mainstream approaches to media analysis, which employ either quantitative methods of content analysis, or qualitative methods of textual, discourse and social semiotic analysis. These mainstream trends seek to analyse how the media represent and frame a certain issue in society. In contrast, this study seeks to examine the relationship between VR content and journalistic culture by analysing semiotic resources found in VR content regardless of its topic.

Among the few studies that have deviated from the mainstream trend, Butchart (2013) examined what he called, “the visual mode of address” as a semiotic resource. He used the term to refer to the relationship between technology that captures the film (the camera), the video it captured and the audience perception of the content. In other words, “the visual mode of address” is the way the camera addresses the subject and how viewers make sense of the resulting video. Butchart explained how such an understanding can be used to reflect transparency and ultimately solve many of the ethical issues surrounding documentary films.

Bock (2016) examined the narrative structures, styles and formats of online videos on newspapers and TV websites. She inferred the news practices and institutional traditions from these semiotic resources. Although she relied on quantitative content analysis augmented with qualitative reading of the content, her categories are very useful for studying VR.

Few research studies have analysed the journalistic VR content so far. One study published in 2017 analysed twelve 360° videos. In this study, Jones (2017) indicated two major coding categories: the duration and the narrative style (either character-led, or journalist-led).

However, based on social semiotic research in visual communication and video games (Jewitt and Oyama, 2004; Pérez-Latorre et al., 2007), as well as the two content analyses cited above (Bock, 2016; Jones, 2017), the researcher identified a potential set of descriptive analytical categories of VR semiotic resources, as shown in table 4.

This classification reflects the foundations of social semiotics where every “text”– any communication message, not necessarily written language – should serve three communicational “metafunctions” (Kress and van Leeuwen, 1996, p.40). The first is an ideational metafunction, where semiotic resources and their interrelations on the micro level of the “text” represent a meaning; this is often called the representational meaning (Jewitt and Oyama, 2004). The second is an interpersonal metafunction, where the sign-maker interacts with the audience or users; it is often called the interactive meaning (ibid.). The third is a textual metafunction, where the semiotic resources relate to one another, providing an internally coherent “text” on the macro-level; it is often called the compositional meaning (ibid.).

Descriptive Analytical Categories	Metafunction
1 st Dimension: Audio-Visual Narrative / story side	
- Narrative (Characters – presentations)	Representational + Compositional
- Orientation (Contact – Distance – Point of View – Modality)	Interactive
2 nd Dimension: VR design / gaming side	
- Ludo-Narrative	Representational
- System gameplay	Compositional

Table 4: Descriptive Analytical categories for VR semiotic resources

1st Dimension: Audio-Visual Narrative

(a) Narrative Structure

The narrative structure analytical category in VR can present both representational and compositional meaning.

To understand the representational meaning, the researcher must look for visual, verbal and audio cues (Iedema, 2004). Analysis of a character’s interactional processes may also reveal part of the representational meaning.

Tseng (2013) identified two types of processes in films, “dynamic narrative” or “static conceptual” in films (p. 595). These processes occur between all types of narrative elements/semiotic resources of the films, including characters/humans and objects/non-humans.

For the dynamic narrative representations, Tseng (2013) identified four types of processes. The first relates to the presence or absence of a goal, involving either transactional action (when the actor does something in relation to the goal) or non-transactional action (when there is no goal). The second is the transactional reaction; it occurs when the reactor looks at a scene or a phenomenon. Third are mental processes, which mainly are evident in monologues when a character or sensor – is making sense of a phenomenon. And fourth are verbal processes, when a character is verbally addressing a narrative element.

Static conceptual representations, on the other hand, are used when there is no prominent action portrayed in the scene. For instance, Tseng (2013) used it to analyse film posters as part of the overall semiotic analysis of films. In this case, a semiotic resource or carrier is perceived to

have an attribute through a relationship to other resources. A carrier also can be made salient through focus, or by being made darker, lighter or lightening or larger in relation to other narrative elements (Jewitt and Oyama, 2004). And a carrier can be represented as having a superordinate or subordinate relation with other semiotic resources in the scene (Tseng, 2013).

For the purpose of this study, the researcher identified the verbal, visual and audio cues of each VR piece and their representational meanings. She also focused on the interrelations among specific characters in the VR story: the journalist character, the user character and the main character in the piece. The researcher examined the dynamics among them and how those dynamics reveal meanings about the role of journalists in the story. For instance, did the journalist have an interventionist role or a passive one?

Inspired by Bock's (2016) work, the researcher formulated the following questions to guide her analysis:

- Does the journalist appear on camera?
- What is the journalist's mode of address: first person, second person or third person?
- Does the journalist use verbal statements or visuals that reveal the news processes?
- Who is the primary character in the story, in terms of narrative and time? Is the primary character the same according to those criteria?
- Are there any actors in the story (either voice actors or on-camera actors)?
- Is there a narrative voice? If so, to whom it belongs?
- Is there music or special effects? If so, do they convey emotions?
- How much natural sound is used in comparison to music?
- Is there computer-generated content?
- Is there any written contextual information within the VR piece?
- Is the context of the story given in the VR piece? If so, how is this done?

For the compositional meaning, the researcher looked for the arrangement of semiotic resources on the macro-level and how they served to convey a meaning (Kress and van Leeuwen, 1996). In the case of a documentary, the rhythm— "beginning, middle and ending; problem-solving; argument in-favour and argument against"— can represent the compositional meaning (Iedema,

2004, p. 193). In visual analysis, considerations of compositional meaning focus on salience and framing techniques (Jewitt and Oyama, 2004).

To analyse the VR's compositional meaning, the researcher looked at the overall rhythm of each piece and examined how it interacted with the ethics of journalism including objectivity, impartiality and preventing harm, as outlined in the literature chapter.

(b) Orientation

The orientation deals with the position of the audience from the "text" (Iedema, 2004). In visual texts, orientation can reveal interactive meaning through contact, point of view, distance and modality (Jewitt and Oyama, 2004).

First, contact is concerned with the way "textual" semiotic resources – particularly human characters – address the audience/users (Kress and van Leeuwen, 1996). Contact can be a demand or an offer. In the demand mode, the semiotic resource can convey a demand of deference or of pity; it can make the viewer feel at ease or unsettled (Jewitt and Oyama, 2004). In the offer mode, the semiotic resource does not address the audience who observe the message in a detached way. The semiotic resource is thus an offer of information.

Second, point of view deals with attitudinal meanings conveyed through audience position from the textual semiotic resources – both characters and objects – on vertical and horizontal levels (Kress and van Leeuwen, 1996). On the vertical level, the audience's position is identified through camera angles. High, low and eye-level camera angles convey attitudinal meanings of power and equality (Kress and van Leeuwen, 1996; Jewitt and Oyama, 2004). On the horizontal level, audiences can exist on the sidelines or in front of the textual semiotic resource. Sidelines position conveys an attitude of detachment, whereas frontal placement conveys involvement and engagement (ibid.).

Kress and van Leeuwen (1996) explained point of view or perspective as conveying an attitudinal meaning of objectivity or subjectivity. Objective images, they proposed, exist when the visual text represents "what we know," regardless of "what we actually see in reality." They gave an

example of a drawn frontal-isometric cube, which violates “the natural law”: in real life a viewer will never see the top or the side of the cube (p.137).

Kress and van Leeuwen (1996) indicated that subjective images have appeared since the Renaissance era, when artists began to use frames to separate represented objects from the physical world, expressing their naturalistic view of the world. Before this time, visual frames were objective; they were used on walls and domed roofs of churches, where the viewer perspective was dictated by physical surroundings not imposed by the artist. With Renaissance painting, frames instead came to represent the subjective perspective of “what they see,” rather than “what they know”. This emerging tendency towards subjective visual “text” was accelerated by the scientific revolution, which foregrounded observation and empirical evidence as the only routes to knowledge, destroying the hegemony of external orders (ibid.). In some sense, people in modern societies, embraced their own subjectivity and defied even the naturalistic view, shifting between different perspectives in the same film, for example.

Third, distance is about the social distance between the audience and the text (Kress and van Leeuwen, 1996). In visual text, frames and shot sizes represent social distances, varying between close up, medium and long shots (Jewitt and Oyama, 2004; Kress and van Leeuwen, 1996). In documentary analysis, Iedema (2004) added audio cues as another distance determining element.

Fourth, modality is the truth value of semiotic resources in the text (Kress and van Leeuwen, 1996). The social semiotics approach in this regard is not concerned with whether the text is absolute truth or untruth; rather, it is concerned with whether the text is represented as truth or not. The “linguistic modality” of visual text measures the degree of credibility of the text using such markers as auxiliary verbs, adjectives and whether information is revealed as facts or opinions (ibid.)

Visual modality can be naturalistic, scientific or sensory (Jewitt and Oyama, 2004). Naturalistic modality demands a high degree of correspondence between the visual text and what we see in reality. Scientific modality is based on high degree of abstraction, representing “what we know”

without necessarily seeing it. Sensory modality stresses on subjective feelings and emotions as forming our conception of what is real (ibid.).

There is no right or wrong modality yet determining the appropriate modality type depends on context (Kress and van Leeuwen, 1996). Scientific modality requires a degree of cultural training; naturalistic modality seems inappropriate in cultures whose art does not recognise subjective perspectives (ibid.). Technological conventions seem to favour naturalistic modality, but the separation point between low and high modality is constantly evolving (Kress and van Leeuwen, 1996). Black-and-white photos at one time represented high modality; today, they represent low modality in relation to the colour photography (ibid.).

For the purpose of VR analysis, the researcher adapted and applied these criteria (contact, point of view, distance and modality) to help her identify and the users’ and the journalists’ roles, as well as the truth value of the VR content. In considering truth value, she focused on whether the VR content is represented as truth, rather than establishing the absolute truth of the representations. Social semioticians take the epistemological perspective that reality is socially constructed (Kress and van Leeuwen, 1996, p.159). This approach also aligns with propositions of the main theoretical foundation of this research, Actor Network Theory, which suggests that reality is socially constructed and even constantly changing based on translation processes within actor networks (Latour, 2005).

To construct the VR tools of analysis, the researcher combined contact, point of view and distance semiotic resources. She drew on Donald and Paret’s (2016) model, which defines users’ roles along two continuums: existence and influence (Table 5).

	Existence	
Influence	Participant Active	Observer Active
	Participant Passive	Observer Passive

Table 5: Existence - Influence Classification of User’s Role

At one end of the continuum of existence, the user can be a participant around whom events revolve (Donald and Paret, 2016). The distance between the user and the main story character is

diminished since the user embodies the main character. At the other end, the user can be an observer who is witnessing the events from a nearby position as “a fly on the wall”. In relation to influence, a user can be active, engaging in actions and choices that affect the progress of events, or passive, with no influence over the story (ibid.).

Adding the element of involvement, the researcher can introduce additional categories of users on the continuum of influence. Passive users can be involved or non-involved based on the mode of contact: demand or offer. Involved passive users would experience main story characters directly addressing them, either visually (looking at them) or verbally (talking to them). Non-involved passive users are like “a fly on the wall”, whose existence is never acknowledged by the main story characters.

However, active users are involved by default through their deliberate choices and actions. Participant users are involved by default even if they are passive. A passive participant who is the main story character, for example, does not control the story but may be directly addressed by other story characters.

In the line with these ideas, the researcher developed an updated version of Donald and Paret’s (2016) model, creating classifications reflecting existence, influence and involvement, as shown in table 6.

	Existence	
Influence/Involvement	Active Involved Participant	Active Involved Observer
	Passive Involved Participant	Passive Involved Observer
		Passive Non-involved Observer

Table 6: Existence – Influence/Involvement Classification of User’s Roles

Since point of view conveys an attitudinal meaning of objectivity (Kress and van Leeuwen 1996), the VR user agency in determining his or her point of view influences objectivity. VR resembles – to some extent – the objective pre-Renaissance frescoes, where the viewer’s perspective was bound by their physical positions in relation to the painting, and the “world in the picture was experienced as a direct continuation of the observer’s own space” (Arnheim, 1974 cited in Kress and van Leeuwen, 1996). Similarly, “the [VR] consumer essentially operates as a natural extension of the creator’s environment” (Donald and Paret, 2016, para. 8). However, VR

experience is often guided by audio and visual cues, which direct the user's perspective within the 360° spherical environment.

As for distance, the researcher analysed the position of the user in relation to the main story character. The user could be either embodying the main story character, becoming a participant. Or, the user could be witnessing the main story characters from a distance, becoming an observer. The researcher found it very difficult to determine whether the user is a far or near observer since shot sizes do not apply on VR. Also, the VR walk-around pieces included in this analysis presented an interesting case where the social distance is not determined by the content creator.

The researcher also looked at the type of modality employed in each VR piece: naturalistic or sensory modality. She determined the degree of modality based on the markers found in the VR content. Both visual and linguistic modality of the VR were analysed to provide comprehensive understanding of the truth value of the VR piece.

The researcher explained, thus far, the first dimension or group of descriptive analytical categories used to identify the social semiotic resources in VR and their meanings. The first dimension focuses on the story side of the VR, including: the narrative and orientation components. The narrative components convey representational and compositional meanings through characters, their interactional processes, the audio-visual cues and the rhythm. The orientation components convey interactive meanings through contact, distance, point of view and modality.

The following section examines the second dimension or group of descriptive analytical categories. This dimension focuses on the gaming side of the VR. It examines the representational meanings of the ludo-narrative elements and the compositional meaning of the overall system gameplay.

2nd Dimension: VR Design

(a) Ludo-Narrative

Ludo-narrative is a semiotic category adapted from video game analysis. It examines how game design elements represent a meaning in the overall narrative of the game (Pérez-Latorre et al., 2017).

The researcher adopted number of semiotic resources that suit the research purposes of analysing VR. These semiotic resources and their potential representational meanings included:

- Action rules: the full repository of possible user actions in the experience. These rules could help present the meaning of actions and of the overall virtual world.
- Game mechanics: the main theme in the experience, which could indicate several meanings about both the actions and the virtual world. For instance, puzzle game mechanics encourage thinking and contemplation.
- Spatiotemporal design: The space-time dimension of the experience, which could have a direct implication on patterns of actions permitted.
- Non-user characters: the other characters represented in the VR; their behaviours and representations may convey meanings about the activities and virtual environment.
- Pattern of actions: Represent how important users' actions in shaping the narrative when examined in relation to the main purpose of the experience. Patterns of actions may reveal a sense of flexibility, creativity and unpredictability on the one hand, or a sense of strict, rigid and monotonous form of action on the other. These meanings can be revealed when analysing patterns of action in terms of their "redundancy and variability."

(Pérez-Latorre et al., 2017, pp. 592,593)

The VR content, included in this research, displayed different levels of interactivity starting from the 360° video to the highly interactive VR. The action rules, game mechanics and action patterns did not seem very relevant to the 360° videos, instead the non-user characters conveyed important meanings. The researcher tried to identify whether the experience voiced a single character or multiple characters to see the degree of balance or comprehensiveness in the story. The interactive VR pieces, on the other hand, had more elements to analyse in this category. However, the researcher noticed the strict pattern of actions permitted, which explicitly separated interactive journalistic VR from games.

(b) System gameplay

System gameplay is another semiotic category adapted from video game analysis. It provides opportunities for interpretive analysis, exploring how semiotic resources convey meaning in abstract fashion outside the narrative (Pérez-Latorre et al., 2017). This interpretive analysis looks for a kind of dissonance between the intended meaning inside the text and the abstract meaning of the semiotic resources. For instance, a user performs a set of redundant and monotonous activities to become a hero, in contrast to the conventional thinking that a hero should be intelligent and skilful character (ibid.).

The system gameplay category does not apply to the 360° videos because it does not permit users any form of action in the virtual environment except for looking around. However, the researcher could easily identify the meanings of system gameplay in the interactive VR. She tried to identify the relation between the afforded action patterns in the VR experience and the corresponding reality. The analysis allowed the researcher to assess the degree of realism achieved in the VR experience and how such a degree influences journalistic mission.

- Issues arising from analysing the VR content

Examining the sampled VR content required the use of a variety of technological devices. 360° videos required a Gear VR headset and a Samsung Galaxy smart phone. Some highly interactive VR required an Oculus Rift headset; another required Google Daydream and a Pixel phone. These diverse types of hardware were too expensive to purchase, so the researcher had to look for

places to book the equipment for free or at affordable rates. Moreover, because no single inexpensive location providing all types of gears could be identified, she had to make use of different labs.

On 14th May 2018, the researcher booked the Interaction Lab at City, University of London, with the help of lab manager Stuart Scott. She used the Oculus Rift headset there to analyse “Spacewalk” experience produced by the BBC.

The researcher then booked UCL’s immersive VR lab on the 17th, 18th, 21th and 23th of May 2018. This lab provided Gear VR headset, on which the majority of sampled VR content can be experienced.

On the 4th of June 2018, the researcher borrowed a Gear VR headset from the Learning, Enhancement and Development (LEaD) department at City, University of London. Over a one-week period, she used the Gear to re-examine the VR content that she had previously analysed in the UCL immersive VR lab.

On 22nd June 2018, the researcher booked the immersive lab at Digital Catapult organisation in London in order to experience the VR content on Google Daydream.

Also, the researcher intended to analyse “After Solitary” and “Greenland Melting” the walk-around VR pieces produced by Frontline using an Oculus Rift VR headset. However, she realised that the walk-around pieces were not on Frontline Oculus app, the walkaround pieces were intended for South by South West (SXSW) film festival in Texas. Therefore, she analysed their 360° version, using a Gear VR headset.

5. Ethical Issues

The researcher sought ethical approval for conducting the semi-structured interviews from the Department of Journalism Research Ethics Committee at City, University of London. The approval was granted in June 2017. It stipulated that each participant should be informed about the research process and sign a consent form to participate in the interviews.

All research participants agreed to have their interviews audio recorded and to be identified with their names and affiliations in the research. The whole research interview sample provided

signed consent forms in person or via email depending on the method of communication. The researcher ensured that every participant had enough time to read the information sheet and consent form before signing them. She sent soft copies of both documents in the invitation email, days before the actual interview took place. At the beginning of every interview, she reminded the participants that the audio was being recorded and that they had agreed to be identified. She also reminded them of their right to withdraw from the research at any point, ensuring they were kept informed and felt much more involved in the process.

No ethical issues were involved in viewing the VR content, as the sampled VR pieces were readily available for free online and no external viewers were involved in this research. The researcher applied general notions of health and safety when using the VR headset, including taking precautionary measures to avoid potential nausea. She removed the headset and took a break every thirty minutes.

The researcher, thus far, has outlined the research design and methods applied to study VR journalism. She started with identifying the research problem and questions before explaining the research design and methodological triangulation approach. The researcher then detailed sampling techniques and procedures used to conduct the semi-structured interviews and social semiotic analysis. The following chapter organises the interview findings under five themes, including re-constructed reality, curation element, experiential medium, collaborative work and experiential culture.

Chapter VI

Interviews

Diverse Interviewees

The research sample contained a diverse group of interviewees (see Appendix A). Some had formal journalistic experiences and others did not. They demonstrated different conceptualisations about VR as a journalistic medium and the degree of VR resemblance to creative art. Even respondents who shared seemingly similar backgrounds conveyed different views. A consensus on characteristics of a journalistic VR was hard to find. The label itself seemed problematic. Is it “non-fiction VR” or “journalistic VR”? The researcher chose fact-based VR as a generic term that can overcome differences.

Take an example of one intra-group difference: Content creators with formal journalistic experience expressed diverse views about the nature of fact-based VR. Their views ranged on a long continuum between journalism and creative art.

At one end of the continuum, VR content creators are seen not as journalists but as creative artists. VR is like a “movie theatre” experience, where users “are in there” but they may miss something, according to freelance documentary and VR creator Cassandra Herrman, who has a degree in documentary filmmaking and journalism. VR creators become “artists” adding creative audiovisual cues to guide users, she said. Joi Lee, a VR producer in Contrast VR at Al Jazeera, thought that VR is “not just journalism” but an experiential storytelling medium. “It’s a creative format at the end of the day that is used to convey journalistic information,” she said. “There is this new world of journalism that is entrenched in storytelling”.

Despite these aspects of creative art, it still counts as a “very good journalism”, said Lisa Golden, the then VR producer at *The Guardian* VR. The content creator just has to “think differently” about audio while applying the same “rigors of fact-checking”, she said. Fact-based VR – particularly the 360° video – shares similarities with 2D flat documentaries. Set-up shots, for instance, are prevalent in both 360° and flat videos but they are just “a bit more” in 360°,

according to Charlotte Mikkelsen, a former BBC foreign correspondent and the founder of Picture This studio.

The slight difference between VR and 2D flat documentaries is often restricted to real-life captured 360°. The more advanced the VR is, the more questions people will have about VR journalistic validity. The content creator has to “go further” with methods of fact-checking and verification in a Computer Generated (CG) piece to prove it is a form of journalism, according to Kevin Tsukii from Emblematic studio²⁴. Tsukii defines himself as an “immersive journalist²⁵”. He said:

“In some ways if you are going to claim that your work in [interactive] VR is journalistic, you have to be more scrupulous with your methods. It’s simple with 360 videos because you can shoot it. People understand what happened was there. I mean there are some ethical consideration for staging and stuff like that, but that is not different from a traditional documentary”.

Individual differences among VR content creators determine whether they think a piece is a journalistic one or not. “Just as in any other medium, artists, creators, storytellers and journalists adopt different ways of doing things because of our personal influences as well,” said Gayatri Parameswaran, a former journalist and the founder of Now Here Media VR studio. Journalists differ among themselves in their degree of understanding journalistic principles. Experienced journalists should be able to create journalistic VR due to their “strong ethical understanding”, according to Zillah Watson, BBC VR hub commissioning editor. “The danger comes with inexperienced people playing and doing in terms of major ethical breaches,” she said.

At the other end of the continuum, some interviews feel VR may not be suitable for creative art, especially when it comes to live-captured 360° videos. VR limits control over content creation, making the role of the director less relevant, according to CNN VR producer Bronte Lord. The 360° camera comes to be in the middle of event, making it hard for creators to choose which side

²⁴ Emblematic studio is a VR studio founded in 2007 by Nonny de la Peña. <http://emblematicgroup.com/about/> [accessed 20th September 2018].

²⁵ <http://kevintzukii.com/> [Accessed 3rd November 2018].

to include and which side to discard. “I think a lot of tools for filmmakers and creative artists are just not available in VR,” she said.

This was a single example of the different views of content creators regarding the general notion of whether fact-based VR is journalism or creative art. To explain these general notions, the researcher will go further into several problematic aspects of VR, which make journalistic boundaries grey and fuzzy.

Re-constructed Reality

Re-construction of events may take the form of rearranging, removing or adding elements that do not exist. Content creators sometimes rearrange, add or remove elements for aesthetic purposes. They may use CG content, scripted talks and acting to tell stories. These practices call notions of accuracy and truthfulness into question.

VR technology introduces “new complications” to the ethical understanding of journalism that may not have an answer, according to Laura Hertzfeld, the program director of the 360 Journalism initiative. The complexity results from “the nature of how you shoot it [360° video], and you know that you don’t want the camera in the shot”, she said.

In this situation, the content creator has one of two possible ways to remove himself/herself from the scene. Each choice involves an aspect of reality re-construction. Content creators may hide from the camera or edit themselves out in post-production.

Experienced post-production editors can “plat out” the content creators from the scene, yet the process is time-consuming and “a bit more” expensive, according to Mikkelborg of Picture This Productions. “It’s not the traditional edit that you would do in a 360 film,” she said.

Set-up shots become a more viable option. The content creator is hiding from the camera while the right content is captured at a viewable quality. Set-up shots can take the form of rearranged scene elements or staged content. Both aspects yield diverse views about the degree of their journalistic validity.

Take rearranging the scene elements as an example. Content creators are moving the elements in terms of “their position relative to the camera” to produce viewable footage, according to Benjamin Ross, co-producer at CoReality VR studio. He said:

“[We] didn’t cross any ethical or journalistic line because we weren’t changing what was physically happening there. We were just changing its position relative to the camera to allow the viewer to see it and experience it. It’s a kind of balance of not overplaying or orchestrating but also making sure that you have got the shot”.

Although elements of the scene can be rearranged for aesthetic purposes, it can trigger discussion about how accurate and truthful a VR is. “It’s like moving something from the environment, and that is not the reality of the situation,” said Lakshmi Sarah, an ambassador of the Journalism 360 initiative. The same argument applies to adding elements, even if the story remains unchanged. In a joint research interview, the Frontline executive producer Raney Aronson-Rath and the director of digital video Carla Borrás explained how they managed to maintain a great level of accuracy throughout a 360° piece. They refused the work of the graphic designer and post-production editor, who added a number of birds to the footage to give a sense of heights and natural landscape. Although these added elements would not influence the narrative, Aronson-Rath and Borrás removed the birds to maintain journalistic rigor in the piece.

However, adding elements to the story can be pivotal to guide users and increase VR credibility. VR content creators should be “very specific” about “sounds, shadows, light and music”, according to Lauren Mucciolo, the freelance co-director of the “After Solitary” VR piece. “We were putting cues to help guide the focus of the user”, she said. Freelancer Herrman explained how adding 2D flat videos to CG VR acted as a reality check, boosting the “journalistic veracity”.

Adding elements of interactivity to the VR can help engage the users. Users have a role to play. They are more invested in the story in interactive VR compared to 360° videos. In the “Crime Scene” VR, users become forensic scientists, who have to “find the forensic evidence, pick it up, examine it and decide whether or not to select it”, said Nicole Jackson, the then deputy editor of *The Guardian* VR. Interactivity can make the user an actor in a story. The very fact of the user’s

existence in the story does not reflect reality. “The user wasn’t physically present when that was recorded, so reconstructing that or adding that interactivity,” said freelancer Ross, “would fundamentally change what was being documented”.

Adding, removing or rearranging elements of VR is only one aspect of reality re-construction. A critical aspect is recreating events through CG content, retaking a real-life action or enacting a scene using actors.

CG VR can be a form of reality re-construction, which raises concerns about the degree of accuracy and truthfulness. Real-life captured footage brings “a lot more strength” and “a lot more believability and honesty” to the VR, according to Alastair Leithead, a BBC journalist, radio anchor and VR content creator. “If we have to use CG in VR, we’ve got to be cautious about how much we endanger news for the sake of interactivity,” he said.

However, the inverse relationship between CG VR and credibility is not absolute. The technology does not necessarily predict users’ perceptions of VR content. Zahra Rasool, the editorial lead in contrast VR at Al Jazeera, said she did not know “whether people who are watching it are perceiving it as less truthful”. The journalistic rigor behind the story is more important. The creation of certain scenes must be based on video and photo evidence, according to Taylor Nakagawa, the then emerging media fellow at the Associated Press (AP). “If you’re doing a story that’s very difficult to recreate in VR [...] it’s possible to lose credibility,” he said. Content creators have to find “photographic evidence” to build a “journalistically sound piece”, according to Jenna Pirog, the then senior producer of immersive journalism at *The New York Times*. She said that when they made “The Modern Games” piece in 2016, the producers

“wanted to recreate photographs from past Olympic ceremonies, like before VR in the 1960s [...] A Hollywood production company that is used to working on narrative pieces would say: ‘What? It would be so much better if we can just put the person over here instead of over there.’ And we are like, no you can’t do that [...] We are creating history, and it has to be accurate. Otherwise, our audience members might say: ‘Hey, that’s not accurate? What else is *The New York Times* not accurate about?’”.

VR content creators must be more “diligent” about accuracy because creative techniques make it easy to “slip away”, according to freelancer Herrman. “The criteria are whether the piece is absolutely journalistically accurate,” she said. Absolute journalistic accuracy is not the same as absolute photorealism. Photorealism, the highest naturalistic modality, means the CG environment and reality are identical. Complete photorealism is very expensive. Content creators should make a “trade-off” between cost and quality of CG, according to Thomas Seyamt, the VR editor in Euronews. “Journalists and broadcasters are not working with gametype budgets, which would allow content makers to create a greater sense of realism,” said Dinah Lammiman, a VR producer at BBC VR hub. Apart from the inherent high costs of photorealistic CG, it is still problematic. “You have to do it [CG VR] seriously because it’s news. If you are realistic, you have to go to the end where they [3D models] look real, and it’s really weird because they aren’t really human,” Euronews’ Seymat said.

Absolute reality is inapplicable for VR – as in any other medium. Content creators “will never have access to all details”; instead, they are trying to be “as accurate as possible”, according to the BBC’s Watson. VR “is a reconstruction based on the information you have available rather than the truth”, she said. Low polygon count characters, who have low-naturalistic-modality, can prevent people from being tricked to believe that the VR depicts the “absolute reality”, she added. The sensory modality becomes more important. Content creators try to convey what an experience feels like rather than how it looks in reality. “Animation has been very useful because realism in VR is very hard and expensive to achieve. And as soon as it’s broken the audience becomes less engaged,” the BBC’s Lammiman said. The BBC’s “Trafficked” is one example of a CG VR that was produced on a relatively low budget of around £5000, its aim was to achieve sensory modality instead of naturalistic modality or photorealism, according to Charlie Newland, a senior innovation producer at the BBC World Service. Content creators relied on journalistic work and interviews, then they tried to capture “not just words but sensations and details” about how the place would feel, he said.

Access problems may drive VR content creators to use CG content. Animation is recreation, without which users “will miss important parts of the story”, according to Al Jazeera’s Rasool. For example, low-naturalistic-modality animation was the only way to visualise the torture scenes

described in the “I am Rohingya” VR piece because Al Jazeera had no access to Myanmar, she said. “Some people would argue that animation is not journalistic [but] I would say that it is an important part of the story,” she said. The animated scenes of torture also may help reduce potentially harmful impact on VR users. The BBC’s Lammiman explained:

“It is something to do with the distance that can be created between the audience and the animation. [Such a distance] strangely makes the audience empathise with the story more deeply [...] [When] it is animated, it is very moving and very affecting without being so difficult to view [...] Animating the characters helps people engage with a quite difficult topic”.

VR content creators should reject the “conservative view of journalism” that problematises the use of CG content and restricts the available options, according to Now Here VR studio founder Parameswaran. “I don’t see the need to pose more restrictions rather than to make it more open [...] allowing the stories that are relevant and important in whichever [form they can be]”, she said. CG VR shouldn’t be problematic, if the content creator is taking “reference photos” and getting people to “corroborate what a scene looks like”, according to Marc Ellison, a freelance VR content creator.

Acting and staging content is another form of reality re-construction in VR. When content creators choose to hide from the camera’s field of view, they may ask story subjects to do or say something in front of the camera. Journalistic boundaries become blurry. KC McGinnis, photojournalist and freelance 360 content creator, explained the need for collaboration with story subjects. Content creators place the camera and run away from it, then asks the subjects to do something. “There is an understanding that there is some staging going on”, he said. “It’s not all the time but a lot of time”. The ethical line becomes “a grey area” because it depends on “what we mean by reality and veracity”, according to freelancer Ellison. “I wouldn’t ask somebody to do something that [is] not part of their daily routine,” he said. “We tell them to repeat what they have already said,” Al Jazeera’s Rasool added. “We will not change our ethics, but there are certain things that we have to take into consideration because the medium is different”.

Hiding from the scene may add an element of spontaneity and truthfulness to the VR. Subjects forget about the camera, and it becomes “an interesting way to see how people interact with the camera when there is no one there,” according to CNN’s Lord. Hiding from the camera also helps ensure detachment from what is being filmed and prevent difficult situations for content creators. They “try to blend in” but “never pretend to be a part” of the event if they decided to remain on camera, CNN’s Lord said. The BBC’s Leithead, for instance, appeared in the “Damming the Nile” VR piece to guide users along their VR journey. “That’s my job. I take audiences along journeys [and] I guide them through the stories,” he said.

Regardless of whether the content creators appear on camera or not, VR interviews and talking heads are problematic. Journalists, ideally, do long interviews and choose excerpts to include in their story. Asking people to say specific things “leans towards entertainment” rather than “straight journalism”, according to the Journalism 360 ambassador Sarah. Yet editing is “crazy” in VR because the conventional way of 2D cutaways “doesn’t work”, the BBC’s Leithead said. Cutaway is a conventional edit for long interviews, where viewers move from the speaker to look at something else and then get back to the speaker. VR content creators are constantly looking for creative ways to avoid cutaways and do seamless edit, without resorting to fully scripted talks. “We had to be careful with the grammar of VR and the processes involved,” Leithead said.

Talking heads and interviews in VR are also problematic when story subjects do not speak English. VR content creators can either use subtitles or voice actors. Voice actors may “disconnect” users from the story, which becomes “crafted in a certain way” and “less authentic”, according to Ross of CoReality Studio. “The power comes from authenticity of it [VR], and that’s impossible to fake,” he said. Still, voice acting is more desirable as long as creators are transparent and users “get the point” that it is “someone’s else voice”, according to the BBC’s Leithead. “Voice acting gives the user the chance to look around and experience, and decreases part of the information overload,” he said. Voice acting is a technological imperative because VR subtitles can be “really frustrating”; the text is “hovering in the air” and shown in front and behind, to the left and to the right of the user, *The Guardian’s* Golden said. “Head-tracked subtitles” may ensure that subtitles are in the user’s field of view without the need to show subtitles in all directions, according to Mikkelborg

of Picture This Productions. However, head-tracked subtitles require a custom add-on and a configured app, which are very expensive, she said. The use of voice acting “is case by case”, Golden said. “We are trying to deal with it sensitively”.

Famous voice actors “can bring people to the medium, people who haven’t tried it before”, Golden said. This technique was used in “Sea Prayer”, a VR piece about refugees. The VR piece was written by the novelist Khaled Hussein and narrated by the award-winning actor Adeel Akhtar²⁶. It was inspired by Alan Kurdi’s story: a child found dead on the Turkish shores after his family’s failed attempt to cross the Mediterranean Sea. This VR piece resembled fiction because it was not telling a single definite story rooted in reality; instead, it was inspired by a real event. “I think, even though the piece itself is fictional, it’s grounded in really rigorous journalism,” *The Guardian’s* Jackson said. “Fiction has always played a role in journalism”. *The Guardian* tried to make sure that the VR piece is based on facts and felt authentic, through working with the UNHCR refugee agency, she said.

Fiction must be “based on truth” to be valid for journalism, according to Anetta Jones, the then VR producer at *The Guardian*. Fiction is intended for entertaining and engaging users rather than deceiving or providing false information. “It’s a question that we are always asking ourselves: how do we make our pieces journalistic but also creative, entertaining and engaging,” she said.

Fiction can go beyond scripted read voice actors in CG VR, to include professional actors performing on camera. Acting can be a response to technological imperatives. Some types of 360° cameras tend to overheat quickly, and they are not easily portable and require huge storage capacity for footage, according to *The Guardian’s* Jackson. With acting, VR creators can “completely control” the environment, “making certain things happen at certain points of time”, she said. Scientific facts can form a “crescendo” and become a compelling narrative, she added.

The use of professional actors is a case-by-case decision, Jackson said. However, some content creators opposed the use of professional actors in fact-based VR stories. “I am an old-school journalist. I don’t believe in faking. Ahh okay! I won’t call it faking. I don’t believe in scripting,”

²⁶ <https://www.theguardian.com/gnm-press-office/2017/sep/01/the-guardian-launches-sea-prayer-a-new-virtual-reality-experience-written-by-acclaimed-author-khaled-hosseini> [Accessed 23rd of September 2018].

freelancer Herrman said. Other content creators also were troubled with the idea of acting but declined to offer a categorical statement. “I think that actors could be used but generally it doesn’t make sense to use actors to me,” 360 Journalism ambassador Sarah said.

Acting can follow a precise course of action that actually took place in the past. Nonny de la Peña used actual audio recording of an event, talked to the main story subjects before she enacted the scenes in the “Out of Exile” VR story, according to AP’s Nakagawa. De la Peña reduced the naturalistic modality of the enacted scene, converting it into a CG environment with 3D models²⁷, to avoid deceiving the audience to think it is real. “We aren’t trying to fabricate anything. All we are trying to do is giving you an experience that brings you closer to the story,” AP’s Nakagawa explained. Questions about whether re-constructed reality – acted or CG content – is journalistic may remain unanswered, but “the story has to be authentic”, according to Viktorija Mickute, VR producer in Contrast VR at Al Jazeera. Content creators should check with experts and local people and have them decide whether the VR piece is the “correct recreation for what they feel”, she said.

However, not all acted VR pieces follow a precise event in the past. For instance, some pieces explain abstract scientific facts using a creative acted narrative such as *The Guardian’s* “First Impressions” piece about the development of the newborn’s visual ability. Decoupling acting from scripted dialogue made the piece “feel as realistic as possible”, according to Jackson. “We didn’t give them [actors] any dialogue, and that was one way to make it not feel as acted,” she said.

Transparency is the golden rule for any form of reality re-construction in VR, interviewees said. Acted or CG content must be “over explained and over labelled” because users are not sophisticated enough to recognise a recreation, according to Louis Jebbs, the CEO of Immersiv.ly VR studio. “If somebody comes to it in doubt and thinks of it as real, then you have invaded their autonomy”, he said. “You have failed”. Content creators must be transparent. There is “nothing

²⁷ <http://emblematicgroup.com/experiences/out-of-exile/> [Accessed 5th November 2018].

wrong” with doing recreations but “there must be a way for the audience to know,” freelancer Herrman said. Instead of asking whether they are making it for journalism or for creative fiction, content creators question their own intentions: “Are we selling it as being real?”, according to *The Guardian’s* Jones. Users should not be tricked into believing that something is real when it is not, interviewees agreed. Content creators must provide full disclosure, and “be upfront” about “recreated scenarios”, according to freelancer McGinnis. He gave an example of a journalist creating a VR piece about autism:

“I think the autism series could have been released by a hospital [...] it could have been almost exactly the same. But I think the hospital wouldn’t have the burden, I guess, of explaining to the viewer what’s happening”.

An Element of Curation

VR is an interactive medium that offers users different levels of agency, depending on its type – a 360° video or high-end VR. The different levels of user agency influence the narrative structure, the user’s role and the content creator’s role. These changing roles might affect how much context is provided, and how balanced the story is.

The 360° video, the most basic VR, allows users to surf around the spherical view, choosing which parts to focus on or discard. Content creators cannot “frame and compose” a scene as they used to do with “normal cameras”, according to Al Jazeera’s Lee. “The viewers kind of decide their understanding of the story,” she said. Many journalists when first introduced to 360° videos were “a little bit scared, worried, anxious or a little bit hesitant” because they felt they lost “some editorial control”, according to Euronews’ Seymat. “You don’t have that much control, but you still have your role,” he said. Content creators are becoming “friendly guides” rather than “professors”, according to CNN’s Lord. Content creators are not “authoritative” anymore, she said, but they provide the chance for users to “see for themselves”.

VR becomes the “truth-revealing” tool, through which users get a better sense of “what is going on”, according to BBC’s Watson. However, “you are not completely handing over control to the audience”, she said. “There is just more scope to look around”. “The story will be the same, but your visual experience might be a little bit different every time,” Al Jazeera’s Mickute added. Users may choose to focus on a different part every time they watch the VR, but the content creators are the ones who select where to put the camera. VR users can be the directors of their own experience, but content creators retain “an element of curation”, according to the BBC’s Leithead. “It’s a balance between how much freedom you want to give them [users] and how much you want to focus them,” freelancer Mucciolo said.

This balance allows content creators to provide guided but truthful experiences. Content creators offer guidance to avoid confusing users while permitting users’ agency and freedom to explore and become “invested and involved”, according to Al Jazeera’s Lee. Content creators should give up a part of their control to permit a level of user agency, yet the balance between the journalist’s control and user agency is not easy to achieve. There is always a question. “It’s about ethically how would you present a story that is truthful but is also guided,” Al Jazeera’s Lee said. Many content creators produce forced-perspective VR. They want to protect VR users from getting FOMO [Fear of Missing Out] by enforcing the correct way for users to view the piece, according to freelancer McGinnis. But this type of content creation misses the chance to involve and invest users in the experience. “Maybe they [content creators] are not ready for VR,” he said. “The point of VR is to provide the viewer with agency and autonomy to look where he [or she] wants”.

Some interviewees felt that 360° video provides a visual context that does not need to be spelled out in written text or spoken words. “There are a lot of stuff that you can leave out because you can see it,” said the BBC’s Leithead. “VR is a really valuable tool, and context is one of those things that you build in the storytelling process”. The visual context reveals truths about events being covered, and the journalistic profession. Users can “focus on the experience of journalists who were telling the story”, CNN’s Lord said. “It’s an interesting way to pull back the veil of the journalism itself”.

However, the visual context in VR also forces the creators to leave out information, to avoid either repetition or information overload. VR content creators construct an “open-ended experience” with a sort of “spaciousness” so as not to overwhelm the users, according to Ross of CoReality. Creators want to communicate the “feeling of an experience”, which is a “very subjective” thing compared to “statistics and numbers”, he said. VR is thus a subjective experience. Users may have additional agency and more time to construct their own understanding of the story, according to Jebbs of Immersive.ly studio. VR lets users “see for themselves”, but it does not work for complex stories that require “long interview” with different people, according to the BBC’s Watson. She said:

“I think understanding the possibilities and the limitations of VR for news storytelling is crucial to avoid the danger of misleading people in the story because it was just too complicated to tell in VR”.

Character-led stories becomes the prevalent type of VR. The user may embody the main character of the story, first-person perspective; alternatively, the user can be an addressed observer or a fly on the wall, third-person perspective.

Character-led stories in VR can be more impactful, particularly if the user is embodying the main character of the story in a first-person VR experience. The user is “not a ghost” but a participant in the experience, according *The Guardian’s* Jackson. “It is the strongest way to tell the story”, she said. “You feel you have a purpose there”.

However, objectivity becomes harder to achieve because the user is adopting a single-character perspective. In the BBC’s “Trafficked” VR, for example, the user embodies a single mother trafficked from Nicaragua to Mexico. Trafficked VR “depends on the subjective personal feelings of what it feels like to be in the situation,” BBC’s Newland said. “People in some way came out of the experience sympathising with the victim”.

“I think a lot of VR experiments are social activism rather than journalism”, said Jason Farkas, the vice president and general president of CNN money. The CNN VR unit focuses on big events instead of character-led and first-person perspective VR. “I don’t think it [first-person VR] will be

very important to cover news, which is kind of CNN's promise," CNN's Lord said. In contrast, *The Guardian* VR team exempted themselves from the news promise. "*The Guardian* pieces are bit longer in their turnaround," *The Guardian's* Golden said. "The VR team is not running like a live newsroom".

Character-led feature-type stories are not new to journalism. They are similar to "profile" stories that long existed in newspapers, according to Journalism 360 director Hertzfeld. People are sufficiently trained to differentiate between individual views and group reality. "You've been trained to sort of understand what one person's story looks like, and you sort of understand that their opinion is not necessarily representative for everyone around them," she said.

Content creators address the inherent subjectivity of character-led VR by providing context and transparency, interviewees said. They add context through embedding archival flat videos, written text or interactivity. They can use interactivity and add pre-scripted scenarios to inform users about different aspects of the story. Content creators then use transparency to disclose their intention behind telling the character-led story and to differentiate between journalistic and advocacy VR, interviewees suggested.

Context can balance the subjectivity of character-led stories. The context can tap stories into wider issues, according to freelancer Mucciolo. "Objective story is entered into through subjective experience," she said. "The play between those two ideas, I think, is where journalism gets very interesting and much more relatable to the user". The subjective nature of character-led stories helps engage audiences and connect them to the story. "There must be a certain level of [subjectivity], you know, that can only be used as a vessel to tell a larger story," Al Jazeera's Lee said. The larger context for the VR story can prevent it from becoming a tool for "blind manipulation of emotions," she said.

A flat video embedded in VR adds context that is "easily absorbed" because people are watching rather than reading, freelancer Herrman said. Creators also can embed written text to "substantiate the story" and go from an individual story to a "wider and grander" context, freelancer Mucciolo said. Yet this is not an easy task even if the story is not complicated. Creators need to look for ways to tell stories that do not "feel subjective" and that "live within the larger

context”, she said. And no matter how condensed the text is, there is no guarantee that users will see – or read – it. “What you have to think about is: What if they missed all the text? Will they still have the experience?” freelancer Herrman said. Therefore, additional content is produced with the VR story to provide context and allow people to understand the story, *The Guardian’s* Jackson said. People can read more to understand, and if they “can’t access VR or don’t like to watch 360° videos”, they still can get something, she said.

Interactive VR also can add context to character-led stories as numerous scenarios can inform users about different aspects of the story. However, content creators tend to “simplify” or “boil down” information in each scenario to avoid potential confusion, according to *The Guardian’s* Jackson. The interactive VR experience becomes effective if the user can remember only one or two things at the end of it, she said.

The degree of interactivity permitted in the VR also raises numerous questions about the journalistic validity of the experience. The more interactive the VR piece is, the more influence the user has over the narrative. Users may trigger different story-paths based on their actions and choices.

The BBC’s Watson said it was “entirely possible to give user significant agency and “still be true to journalistic principles”. She expressed her support for the games designed to let the user understands what it is like to be journalist. However, other VR content creators believed the branched narrative can be the most convenient form of interactivity in journalism. The branched narrative is similar to “choose-your-own-adventure-game books”, where the user chooses between different pre-determined story-paths, according to freelancer Ellison. This level of interactivity “empowers” and “immerses” the viewer in the experience, but leaves content creators “in control”, according to Emblematic studio’s Tsukki. “It is not an infinite world”, he said. “You have to follow the direction of the experience in order to move forward”.

Each user action or choice triggers a pre-scripted story-path. Content creators are responsible for researching and verifying each story-path. The journalistic work can be doubled or tripled, depending on the number of story-paths included in the VR experience. “It’s difficult. You have to judge each scenario,” BBC’s Watson said. “You have to show that each scenario you are enabling users to use was well-researched”.

Content creators provide numerous options for users in interactive VR to boost users’ feelings of autonomy and engage them in the interactive piece. Users “feel they have a choice” and they “feel they are interacting with a real environment”, according to *The New York Times’s* Pirog. “That is really intriguing, but it’s very complicated and tricky because it is essentially building a video game,” she said. Content creators need extensive resources of money, time and skills to produce a journalistically valid interactive experience, where every scenario is properly researched and verified.

Interactivity can engage users, but it also can overwhelm and confuse them. Users may feel uncomfortable with interactive video-game-like experiences. “I don’t find these kinds of projects very intuitive,” Journalism 360 director Hertzfeld said. “I still feel stupid when I do it, and it doesn’t really reflect the story”. Highly interactive stories require effort from the user to actively navigate through the experience, and users may not be ready.

Transparency is, thus, important to address the inherent subjectivity of character-led VR stories, which stems from the challenging process of adding context, as explained above. “VR is a form of manipulation”, Jebbs of Immersiv.ly studio said. “It’s all about transparency and intention”. VR is a form of emotional manipulation, where content creators intend to influence people’s feeling about a certain issue. VR content creators must be upfront about their intentions rather than “pretending objectivity”, according to Jebbs. He said:

“[It’s about] being transparent about how you want to manipulate people [...] You are playing with their emotions [...] And to pretend that somehow there’s a way of delivering things in an objective way is nonsense. It’s going back to the original

thing. It's like pretending you are some sort of God handing down tablets saying that this is the story [...] and you [as the content creator] can go to bed and sleep, forgetting how people can get terrified about the realities of somebody else's life".

Experiential medium

VR is an experiential medium that conveys feelings of an experience rather than mere information. These feelings form a better understanding of not just the news event itself but the context of it. Users can make sense of what is behind the scene, including physically present eyewitnesses, journalists, equipment and journalistic processes involved. However, the deeper understanding gained does not necessarily transform personal opinions, particularly if they are strongly held. VR just elicits conversation about covered events. VR reconnects people to the news, by evoking their emotions. And such a psychological impact is arguably powerful. Some research interviewees see it as stronger than traditional media effects. Others see it as much exaggerated. Research interviewees called for formal research to understand the psychological impact as well as usage habits of VR. Still, the experiential capacity of VR attracts the attention of NGOs that tries to use VR to advocate certain causes.

VR allows the user to "step into the reality" of someone else and to "feel what it is like to be there," according to Al Jazeera's Mickute. It is a sense-making tool that allows people to understand remote experiences. Instead of abstract numbers and statistics, users can make sense of meanings behind these numbers. VR is "an education-forming tool" in journalism, 360 Journalism ambassador Sarah said. VR's educational capacity is about experiences rather than mere information. This educational capacity increases in interactive VR, where users have agency to explore and make different choices. For instance, "USS Eisenhower" VR piece done by USA Today – one of the main US national daily newspapers – allowed users to learn and develop greater understanding of what it is to be like on an aircraft carrier, according to AP's Nakagawa.

VR increases the user's understanding of events through uncovering processes behind the scene. Users are put in the shoes of field reporters or physically present eyewitnesses, who can actively scan the surrounding visual context. Covering political rallies in VR, for instance, enables users to see the crowd around the politician. "You just realise that there are too many reporters," *The*

Guardian's Golden said. "You can look at people's faces and realise how they are engaged, taking the politician seriously". Users start to see the wider picture and make sense of the story. They can see what is "behind the scene", and they can freely select what they want to focus on and "which character they want to look at", according to Al Jazeera's Mickute. Users may get the chance to see the challenges journalists face to get their job done. CNN, for instance, shot a 360° video in North Korea, where journalists had "emissaries" from the Korean government telling them "what they can shoot", according to CNN's Lord. "When they [emissaries] are in the scene, we point them out and say: that man standing over there was the person who is watching over us", she said. VR can show actual production processes that are hidden normally in conventional 2D videos. Users from all over the world could feel they were in the studio, when Al Jazeera did a 360° live streaming on Facebook for their TV show "The Stream". The Stream is an innovative show that uses social media as a real-time means of communication with the audience. The 360° streaming increased audiences' feeling of being part of the conversation. They were "virtually included" in the studio, according to Al Jazeera's Mickute.

The increased user understanding caused by interactivity or visual context does not necessarily imply a change in people's opinions. VR cannot "trump" users' "cognitive bias", according to Euronews' Seymat. Users come to VR with a mindset, which is hard to influence regardless of how powerful the VR is. VR, instead, "can strike your nerve", freelancer Ellison said. VR can elicit conversations and infuse people's curiosity to learn about a given issue. Unlike over-exposure to news that can drive people to become disinterested and desensitized, VR helps to reconnect users to the news. It forces users to "rethink their relationship to the news", Jebbs of Immersiv.ly studio said, "put[ting] them at the heart of it". Users start to experience the news in a profound way.

VR facilitates this rethinking by building emotional and empathetic connections with the story. VR is far better in conveying feeling than traditional 2D flat videos. "In VR when you are really in that experience, you feel and think and emote and empathise in a much different way," freelancer Mucciolo said. It is that sense of presence that makes the massive difference. "VR is brilliant. You are not only trying to show people, but you are taking them there," the BBC's Leithead added. VR "gives a deeper sense of emotion, a larger sense of presence in the world,"

said Now Here studio founder Parameswaran. “That registers in your brain as an experience you had in your memory”.

VR is more impactful than traditional news media. However, the powerful impact may not be inherent in technology but rather contingent on its novelty. “I feel it’s a wow effect,” Mikkelborg of Picture This Productions said. People are amazed by the technology because they have not experienced it before. The wow effect “cannot be confirmed” because VR is still in its infancy, she said. The immersive technology should evolve, and VR should establish its own grammar before such an effect can be confirmed or refuted.

Whether because of a novelty impact or not, it is undeniable that VR psychologically and emotionally influences the users. The VR impact raises “completely new” ethical issues, according to BBC’s Watson. The ethical issues revolve around potentially harmful content, and whether watching the same thing is more disturbing in VR than in traditional media. “Judging what is most suitable content for adults or what might be a disturbing scene to picture in VR”, she said, “are things we don’t know about”.

The lack of significant audience research data makes it very hard to identify the nature of VR impact and to delineate the boundaries for potentially disturbing materials. Most research interviewees talked about an impact while acknowledging the lack of scientific data. “I don’t have data to back that up,” Euronews’ Seymat said. “I don’t know that because I haven’t done any audience research to know”, Al Jazeera’s Rasool said. Instead, interviews provided anecdotal evidence when discussing VR’s impact on users. “I did really informal research interviews with the audience,” Now Here studio’s Parameswaran said. She said VR has higher impact because no matter how users look away, they are still inside the experience unless they take off the headset. VR users may choose to look at a different direction to avoid watching a specific event but still they are immersed inside the experience unless they remove the headset.

“There is a possibility of producing trauma there,” freelancer Herrman said. VR is a visceral medium. Content creators must be careful to produce the content in a minimally traumatic way and prepare the audience for what they are going to experience. Parameswaran explained the responsibilities of VR content creators:

“You have a greater responsibility in the sense of making them feel safe and secure and not uncomfortable in what you are showing. So the ethics of journalism, storytelling and documentary filmmaking apply to the medium [but] the risk is kind of higher. You have to be a little bit more careful while applying the same techniques in VR”.

Being mindful about the VR impact on the audience is essential. Content creators meet their responsibility to VR users through experimentation and discussion with colleagues and veteran journalist about the ethical issues of disturbing materials. They prefer such discussions to prior assumptions about what should and should not be done because prior assumptions restrict experimentation. Describing the ethical decisions in the “Fight for Falluja” VR piece, about Iraqi forces fighting Daesh, *The New York Times*’ Pirog cited many discussions with newspaper standard editor Phil Corbette.

“He is the one in *The New York Times* that anyone can call at any time to say: Phil is this appropriate? [...] Is it important there? Is it part of the story? Do we put a warning on it? or Do we leave it? So he helps us make these decisions [...] We had a long discussion with him about: Is it appropriate to bring a VR camera into a war situation? And the answer was: Of course, I mean all we are going to be doing is giving the audience more information about what it’s like to be in war, not restricting it or making it any less informative. We are just showing them everything now instead of one thing. So it is appropriate. But there were a few shots [...] [where] you might ask: is there a reason for this violence to be shown in the piece? Does it have a real purpose? [...] Or, is it just violence for the sake of violence? And it’s just a discussion. There isn’t, you know, strict policies [...] When you have a question, you have to ask a number of editors who have done that before and get lots of opinions and then make a decision, rather than, you know, wondering or just assuming you can’t, or you shouldn’t [...] So yeah, again, it’s always the discussion about what is the purpose of it? Is it serving the audience? Is it ensuring the protection of the subjects?”

The “Fight for Falluja” VR was less traumatising than still photos accompanying the same story, according to freelancer McGinnis. It showed that trauma is not an inherent technological feature; instead, traumatic effect depends on the way VR content creators handle the story. “I’ll put it this way, the still photos were more likely to give you PTSD [Post Traumatic Stress Disorder] than the 360° video that went with that feature,” he said. “The still photography and videos are perfectly capable of crossing these lines too”.

VR can be upsetting without being traumatising. *The Guardian* VR team was mindful and cautious about the potential upsetting effect when doing the “6×9” VR piece. They put warnings at the beginning, according to *The Guardian’s* Jackson. “I think it is very powerful and people should be aware of that before they experience certain pieces,” she said.

Impact is not the only aspect of VR that would benefit from formal audience research. Understanding the usage habits is of equal importance, according to the interviewees. The BBC adopts an integrated research approach for VR content creation, running research projects alongside the creation of VR output. “Our audience research department is looking into user habits and consumption patterns, asking which bits of contents are noted”, the BBC’s Lammiman said. Audience research helps the BBC to understand the VR audience and what leads them to “put on headsets”, the BBC’s Watson added. That research approach helped the BBC to shift the focus from “grim” toward “balanced” VR experiences, she said. For instance, the “Damming the Nile” VR interspersed enjoyable scenes of being in a hot air balloon or riding a felucca in the Nile. “If you have five minutes to spare, most people would choose something enjoyable,” Watson said.

With the lack of significant audience research about usage habits, other content creators said they rely on their personal experience, intuition and anecdotes to predict how users will experience a VR piece. There are no “evidence-based figures” to determine “if what they are doing is right”, according to Euronews’s Seymat. Content creators struggle to identify the best storytelling strategy that taps into users’ senses. “We really wanted to figure out a way to make the medium serve the story”, freelancer Mucciolo said. “It was really funny thinking about new storytelling strategies”.

Despite the uncertainty about the most engaging storytelling strategy, the experiential capacity of VR drives many NGOs to do VR projects supporting a specific cause. NGOs also may fund or provide access to information sources. However, “it is very problematic”, freelancer Herrman said. “If you are passing it as news but it really has the agenda and the creative backing of an NGO”. Content creators must be transparent about receiving support – financial or creative – from an external organisation. Such support may move a VR piece away from “pure journalism” because news organisations should be independent rather than propagating the point of view of its backers, she added.

Transparency, thus, addresses the problem of potential audience deception. VR users become clear about the nature of the content whether its news or advocacy. Yet editorial independence continues to be a problem when working with NGOs. “It’s a case-by-case basis”, freelancer Herrman said. Working with the UN, for instance, is not a problem because the UN tackles universal issues. “You can work with the UN and have a story that is journalistically possible,” Herrman said. The UN is very “hands-off” the narrative, according to Mikkelborg of Picture This Productions. The UN is “savvy and intelligent enough to know that communications of any description – whether journalistic or otherwise – that feels like not having an objective hand [...] aren’t effective”, she said. The UN offers funding and access to sources and places, yet they do not influence the editorial process. Thus, working with the UN is valid, she said. “I consider it journalistic, but I am not saying that everybody would,” she added. *The Guardian* worked with the United Nations High Commissioner for Refugees (UNHCR) in a “semi-formal capacity” to create the “Sea Prayer” VR, according to *The Guardian’s* Jackson. She said:

“We don’t tend to work [with NGOs]. We worked with UNHCR in “Sea Prayer” 360 film because Khaled [Hosseini] was their ambassador so he wrote this beautiful story. I met them [UNHCR] like a year ago. I said: we were moving to VR and, at some point, it would be great to work with you and so if you have any suggestions [...] the [UNCHR representative] sent me a story a year later and said: Khaled wrote this beautiful story. Do you think it could be a VR piece? When I read it, I mean the writing was so beautiful, I was just so excited, and I immediately could

imagine how we can create something for it [...] That wasn't a sort of financial partnership. They provided Khaled and his talent, and then we provided our resources. We worked together, I think, because we found it an important thing to be involved in. And I think that was the only organisation we worked with in a sort of semi-formal capacity”.

Collaborative Work in VR

Working with the UN is not the only form of collaboration in VR. The content creation process is often complex and expensive. Multi-disciplinary teams of content creators are formed as either in-house teams or outsourced ones. Media organisations partner with production studios or hire talents on a freelance basis. Content creators closely collaborate with story subjects, who become co-creators of the VR projects.

The high cost of the collaborative content creation process drives VR creators to look for funding resources. Content creators may seek sponsorships or partner with technology giants for funds and equipment.

Sponsors, technology giants, story subjects and multi-disciplinary teams becomes actors in the collaborative content creation process. Each actor constitutes a new culture of work. Content creators develop new skills to adapt to these new working conditions, calling the editorial independence into question. The following sections examine each of the previously mentioned actors and trace their implications on journalism, as perceived by content creators.

(a) Collaboration for funding

- Sponsors

Looking for funding opportunities is as important for established media organisation as for freelancers and small production studios. CNN VR unit, for instance, collaborated with its branded content studio Courageous, to bring a sponsor to fund their 360° live streaming of the 2017 solar eclipse. “It couldn't really be possible without the work of a sponsor because it was just an expensive undertaking,” CNN Lord said.

Content creators must make it very clear to users which content is sponsored, as transparency is a safeguard against potential deception. “We took great care to delineate the branded content from the unbranded content,” Lord said. “Everywhere you look in the scene, you get to see a disclaimer saying that this is sponsored”.

In addition to preventing audience deception, content creators must ensure their editorial independence. Creators should select a sponsor who is “pretty objectively sponsoring” the story, according to AP’s Nakagawa. Sponsors should not have any interest in the story topic. “What they are buying to is really the audience,” he said. Content creators may need to collaborate with marketing teams to get sponsors and to make the “products profitable,” according to Euronews’ Seymat. “We can pitch them to clients,” he said. “Because you are doing news, you can have a little bit of sponsored or branded content on air”. Content creators may produce branded content for sponsors and use the revenues to fund other VR projects. Emblematic studio, for instance, uses revenue streams from branded content to fund editorially independent-fact-based VR, according to freelancer Herrman. Sponsors’ money is spent on different pieces about which sponsors know nothing and therefore cannot influence.

However, convincing the sponsors to invest in VR is challenging, interviewees said. VR technology has not reached the point of mass adoption. Sponsors lack data about how users experience VR, and they are unsure whether VR can be a useful medium for reaching their target audience. “The inability right now to track engagement, like if you’re watching it on a headset or if you’re watching it through a phone”, AP’s Nakagawa said, “is holding it [VR] back”.

- Technology Giants

As sponsors are very hard to get, content creators also seek collaboration with technology giants such as Google, Facebook and Samsung. Technology giants support VR content creation because “it’s in their interests for this innovation to thrive,” according to Jebbs of Immersiv.ly studio. In order to have content to show on their technology, they provide funding and equipment to encourage content creators to experiment with VR. For example, AP’s Nakagawa said Samsung “just wants to get stories for their [Gear]”.

Oculus, the technology company that was acquired by Facebook in 2014, launched an initiative called VR for Good²⁸ for the same reason. The initiative gave storytellers the opportunity to do fact-based 360° content advancing social change. Oculus wanted to propagate VR use for narrative content, according to CoReality studio co-producer Ross. He said:

“I think they have a strong objective of seeing the medium used for good and of [having] content [to show on their headset]. For just if you looked at Oculus history, it’s primarily a game-oriented platform. I think showing the narrative side of things was an important strategic goal for them”.

Technology companies help create “straight-up genuine stuff” to create good publicity not to manipulate the audience or interfere with the editorial independence, according to Jebbs of Immersiv.ly studio. For instance, he said that Google DNI project does

“straight-up backing for innovation, as part of their deal with the European Union [...] It’s part of good publicity for that [...] They want this [innovation] to succeed. And they are very good partners. They try to control nothing. They simply want the process to be good [...] It’s all very well to have a lovely piece of tech, but if they don’t have a business, what’s the point? It [Google] is not supplying journalism”.

Content creators insisted that technology companies do not influence the stories. They “are really fantastic partners”, *The Guardian’s* Jackson said of Google, with whom *The Guardian* partnered to do twelve VR pieces in an eighteen-month period. They used a range of formats, including 360°, CG and interactive VR. The partnership forced *The Guardian* to “experiment and innovate” while maintaining “editorial independence”, Jackson said. Technology companies are very hand-offs with the content. They did not interfere with the editorial process, Al Jazeera’s Rasool said. Euronews’ Seymat explained his experience with Google and Samsung:

“With Google, they don’t really care about what is produced. They just care if we achieved the milestones that we set. There is no control or even discussions about

²⁸ <https://www.oculus.com/vr-for-good/> [accessed 8th November 2018].

what's being done. There was no difference in the Samsung partnership. It was about achieving specific number of visits or views. They didn't really care about our topics".

Other content creators, however, perceived these financial partnerships as potentially problematic. "I don't know if it's crossing the line or not. I am not sure," freelancer McGinnis said. The exact nature of the partnership becomes critical at the time of contract or grant renewal, particularly if media organisations want to renegotiate the deal, according to the BBC's Watson. She said most parties are "adamant" that partnerships are just about technology but said struggling news organisations facing an expiration date for their funding arrangement might feel pressure about the stories they were reporting. She also said such arrangements might raise audience concerns about trustworthiness of news. "I think people need to be very careful about just the way it looks apart from anything else," Watson said. "There is no evidence of interference but ...".

Also, grants from technology companies are not a long-term solution because they are not sustainable, interviewees suggested. Eventually they will end, and news and media organisations will have to look for alternative sources of funding. *The New York Times*, for instance, ended its daily 360° service after a one-year project funded by Samsung. Zillah Watson, the BBC VR hub commissioning editor, described the end of the *Times* daily 360° service as "a great shame" because the project was not long enough to familiarize the journalists with it. Grants also may be "biased" towards VR technology development projects instead of storytelling, according to Now Here studio founder Parameswaran. "Funding normally goes to start-ups that work with technology rather than storytelling", she said.

Content creators may receive grants from Journalism 360 initiative, a collaboration between Google, the Knight Foundation and Online News Association (ONA) that aims at advancing immersive storytelling in journalism²⁹. Applicants compete for grants, which become a good way

²⁹ <https://journalists.org/programs/journalism-360/challenge/> [Accessed 8th November 2018].

to get the word out about VR, according to Journalism 360 director Hertzfeld. “When there is money involved, everyone wants to know why,” she said.

Journalism 360 is a global network of storytellers, that aims at “evangelizing” VR, according to Hertzfeld. She said a goal for 2018 was to help editors understand where VR is going and why it is important for them. Journalism 360 also tries to pair journalists who are less enthusiastic with those who are passionate about VR. The initiative wants to make sure that journalists “understand how to talk about it and how to reach people who can help them”, she said.

Journalism 360 also includes the Medium blog, which fosters knowledge-sharing among VR content creators around the world regardless of their affiliations. “Everybody is connected somehow, which is in a sense good because you can collaborate more, and then you can build more friendships and sort of trustworthy collaborations,” Al Jazeera’s Mickute said. Content creators’ passion about sharing knowledge and best practices in VR surpasses the sense of competition that journalists normally feel. Competition “might happen in the future, but right now we are just working and thinking,” Al Jazeera’s Rasool said. The knowledge-sharing aspect is often encouraged by the technology companies’ grant schemes, according to Immersiv.ly founder Jebbs. “Euronews is very open because they got backing from DNI [Digital News Initiative], and they naturally publish what they have done to show how they have done it,” he said.

(b) Collaboration with Story Subjects:

The collaborative work in VR often extends to story subjects. Content creators closely collaborate with story subjects to tell their own stories. The subjects become co-creators involved in the decision-making process, so the content creator’s voice is not the only one in the story, according to CoReality co-producer Ross. “All [story subjects] get to sign the narrative of the film before it is released,” he said.

A crucial element of co-creation is allowing people to “reflect” on themselves: “what they are doing or how they are going to react to the issue,” according to Now Here studio founder

Parameswaran. Content creators must involve the local people who are affected and whose story is told, according to Al Jazeera's Mickute. Local people "must have the final say whether this is good or not. You just cannot impose something on them," she said.

Collaborating with story subjects becomes a necessity in stories about human suffering, interviewees said. Content creators must give "voice and power" to these story subjects, according to freelancer Lakshmi Sarah. This empowerment comes from close collaboration. Freelancer Mucciolo explained her experience with Kenny, a former prison inmate who was the main character of *After Solitary VR*. Mucciolo's team had to bring Kenny to a studio to shoot the story. "We know how sensitive it can be ... taking them out of their comfort zone," she said. Mucciolo's team involved Kenny in the production process as a co-creator, enabling him to see different production stages that might not be directly relevant to his role. Kenny's role was to tell his story while being in a studio, a green environment where he is volumetrically captured and then inserted to computer-generated environment. Mucciolo's team not only involved Kenny in the shooting but also showed him the computer-generated duplicate of his cell. They wanted to show him how his footage will be inserted over the CG environment, empowering him and making sure the VR piece will not trigger any unexpected psychological effect. "We showed him the photogrammetry environment we created of the cell; we didn't want him to tap in anything difficult for him," Mucciolo said.

Co-creation empowers people, giving them a voice in their stories and production processes. That voice ranges from overseeing to actively participating in producing content, a form of VR democratisation. Al Jazeera's Mickute explained how a boy from the local community worked as an audio assistant while producing the "I am Rohingya" VR in Bangladesh. "We try to include those people. We try not just to shoot them from far away," she said.

VR democratisation also implies expanding VR content creation and usage outside the West, to provide people in remote areas with access to the technology needed to produce and experience VR. Technology giants and media organisations can help reduce access barriers and train

storytellers around the world to tell their own stories by enabling story characters to co-create VR and participate in the decision-making process.

One example is Al Jazeera's partnership with Samsung to launch its "My People Our Stories" initiative. Samsung provided free cameras, and the broadcaster trained people to be content creators, said Al Jazeera's Rasool. Al Jazeera aims to create a global network so that VR is "not just something for use in Europe or in [the] US", Al Jazeera's Mickute added. She said she trained an Indonesian journalist how to use VR to tell a story that she wanted to do. "She was just so excited," Mickute said. She said:

"Maybe she would establish a 360° studio; maybe somebody else would. So that's how we started, step by step, and how people started to know [...] They started from one story, and they kept doing it. They got excited. They told [their] friends".

VR studios also participate in efforts to democratise the VR medium. Emblematic studio helped Nuba report – a network of journalists from the Nuba mountains in Sudan by providing cameras and training, according to *The New York Times's* Pirog. The studio enabled Nubian journalists to use VR to tell their own stories, helping an "underreported story" get to the world through distribution partners such as Al Jazeera online (AJ+) and *The New York Times*, she said. The VR piece, titled "We Who Remain", was about the conflict between the Sudanese government and Nuba rebels.

The collaborative work in the "We Who Remain" VR was challenging because of the numerous players involved. "We had many different editors working on it and lots of people from different organisations involved," Emblematic's Tsukii said. "We wanted to bring new energy to the conflict [story] and bring new perspectives and ways of covering it, and I think that kind of united everyone across the different teams together".

Emblematic's Tsukii worked as a bridge between the partners, co-ordinating work that competing media companies were uncomfortable about calling collaboration. "It wasn't necessarily a collaboration between us and AJ+. It was Emblematic finding the right distribution

for that piece,” *The New York Times’s* Pirog said. She acknowledged, however, the *Times’s* collaboration with Nuba Reports and Emblematic studio.

(c) Collaboration in multi-disciplinary teams

VR is a creative experience that becomes more successful, “when you have more people to collaborate with,” Al Jazeera’s Lee said. Even within the media organisation, VR content creation is not confined to a single person or team. A VR content creator works with the necessary people across different departments. The Euronews’ Seymat said that editorial, technical, administrative, marketing and communications departments work together in VR projects. “There are six floors in Euronews’ building. It’s really not a figure of speech, but each floor is bringing something to the table,” he said. VR content creators do not operate as an independent “desk,” *The New York Times’s* Pirog said. Instead, VR operations take place among “people interested in technology from all around the company”.

VR teams organise sessions to raise awareness of the medium across various departments of the media organisation. BBC VR hub, for instance, “hold[s] regular demonstrations of VR” to raise awareness about the hub and its mission, the BBC’s Lammiman said. VR production within media organisation involves constant collaboration, in which VR teams “try to include as many people as possible into this work, whoever wants to do it and whoever we think should be doing this because the story is extremely important,” Al Jazeera’s Mickute said. Journalists “sign up” for training sessions to learn about the medium and propose ideas, she said. However, ideas do not always come from journalists, who sign up; sometimes the VR team gives 360° cameras to correspondents and propose possible story ideas, she added.

Collaborative ongoing discussions take place among VR teams and other members of the media organisation to decide on the best story to tell in VR. Al Jazeera’s Contrast VR team “get[s] pitches all the time,” and the discussions go back and forth to find best ways to convey the story in VR, Al Jazeera’s Lee said. The BBC’s Leithhead had to pitch several ideas to the BBC VR hub over an

eighteen-month period, until the BBC VR hub accepted one of them. The process involves many discussions about what is and is not be a suitable story for VR.

Once the VR team settles on the story idea and its treatment, the team starts to think of the type of skills needed. Media organisations try to do as much as they can in house, but they may outsource due to time constraints and skill availability. VR content creation may involve graphic or video departments depending on the type of the VR experience, either a 3D environment or a real-life captured 360° documentary, *The New York Times'* Pirog said. The people supervising VR operations in the media organisation are responsible for avoiding any disruption for the main workflow in the organisation. "I had to adapt to their workflow," Euronews' Seymat said. "I didn't come and completely rewrite what they were working just for me".

The problem is not only about coordinating work but also is about "working with people who come from different backgrounds and might speak different languages," freelancer Mucciolo said. Content creators from journalistic and gaming background collaborate in high-end VR, and they use different languages of communication. "Probably I have been in an environment where people know very little about how a game is made and what is behind it," said Federico Fasce, the then media technologist at *The Guardian VR*.

Despite these different languages, content creators "work through it" and find ways to "bridge those gaps," though it takes time, according to Freelancer Mucciolo. "You have to keep listening and keep trying to get what you are saying across," she added. Working in multi-disciplinary teams is a learning experience. *The Guardian's* Golden explained her experience with technologists in the VR team:

"If we can't describe what we want, we can print them [the shots] all out. I think we are all catching up. I think initially we were like make it done. We didn't understand Unity [a game engine that is used for both games and virtual reality]. We didn't understand the program. But obviously the more we worked with it, the

more we knew what it can do and what it cannot do. And then, we learnt the words to use to explain what we wanted from creative technologists”.

Working with Unity – the game engine – means that everything is done in code and everything is timed out. “You can’t see everything in real time,” freelancer Herrman said. Unlike the documentary style where the filmmaker can see it as it unravels, working with Unity in walkaround VR is much “more methodical and technical” because it requires learning new vocabulary and “how to communicate what you want to accomplish,” she said.

Content creators from a gaming background also pass through the same learning experience. “I just have to explain and train my language in a way to make everything understandable for everyone,” *The Guardian’s* Fasce said. Regardless of how challenging the process is, it is a “happy” and rewarding experience that allows for “an incredibly rich film,” freelancer Mucciolo said. The receptive attitude of VR content creators towards collaboration is partially because collaborators are united in their goal and “interested in journalism,” *The Guardian’s* Golden said. “I have always been more interested in how games can be used to tell stories, rather than the usual commercial kind of power, fantasy and stuff. I have always been interested in experimental games that have [a] sort of meaning,” *The Guardian’s* Fasce said.

Collaboration becomes a fun experience when journalists do not feel threatened by technologists. “I don’t think that anybody thinks that VR is gonna replace their jobs at all,” AP’s Nakagawa explained. Technologists and storytellers in VR complement each other rather than compete. Collaboration becomes “less intimidating” because people from gaming backgrounds “don’t shoot 360° a lot” and “they just take my work for it,” freelancer McGinnis said.

Technologists working on VR work not only on designing the interactive experience but also the apps and players for the VR pieces. They are responsible for “the quality level and issues of the app”, and they are developing “the back-end systems to make the work as easy as possible,” *The New York Times’* Pirog said. As there is no hierarchy between technical and non-technical staff -

editors, producers and camera people, the “next frontier is going to be engineers and developers,” CNN’s Lord said. She explained:

“I want to see the people who can create augmented reality apps and VR experiences to be let into the editorial and to become kind of full collaborators in journalism. I want to see journalists willing to think in that technical way as well. I think the products are going to get better if we break down all these barriers”.

Technologists and other VR content creators in the “ideal scenario” should “start working from scratch,” according to Now Here studio founder Parameswaran. “It’s much better to have experts’ input before you make up your mind, especially in such a technical field where you don’t have all the technical knowledge,” she said. *The Guardian’s* Fasce explained how he took part in the discussion of VR production from the beginning not just as a tech person. “Everyone just put out certain ideas, and then we try to connect them together and see if something good can stem from them,” he said.

Collaborators in VR experiences are not just technologists. People come from sound designing as well as drama and theatre backgrounds. They create “a whole beautiful world of sound design and understand controlling the space and lighting,” according to *The Guardian’s* Golden. “It was all those artists painting the world in 360 for us. We can just learn from everyone else,” she said. *The New York Times* also worked with production studios in their early VR experimentations. The production studios “taught us everything we know about VR production” and *Times’* journalists brought “sensibility and ethics of journalism to the production process,” *The New York Times’* Pirog said. She explained:

“It might be a little bit bewildering sometimes with these production companies, but it is also sort of fun for them. They would like to know how journalism works, and we would like to learn how Hollywood works”.

VR can be a combination of documentary filmmaking, audio editing, game design and immersive theatre at once. The collaborative process is an active learning experience in which the workflow has “zero precedent”, according to *The Guardian’s* Jones. She said:

“Everything was crazy and messy [...] Things really took time and there were a million and one discussions. Things had to be really iterative. You go three steps forward then four steps back [...] We make each project in a completely different way [...] Our processes kind of fall very loosely between brainstorming the idea, researching it, pre-production, production and post production, but the actual facets within that are very different [...] because none of the teams has ever done it before completely, it is not one thing where you say our workflow is going to be this and this. We make it up as we go along”.

Experimental Culture in VR: A new type of content creator

Media organisations embrace the iterative nature of VR content creation. “Creating as much content as possible is the key to train your eyes to catch mistakes, to improve your work and to open up your mind to more innovative ideas,” said Maria Fernanda, a VR producer in Contrast VR at Al Jazeera. A trial-and-error approach allows media organisations and journalists prepare and grow confidence in using the VR technology, according to AP’s Nakagawa. The BBC, for instance, experimented with quality VR at an early stage to be “well-placed” should VR becomes mainstream and to assess user interest, according to the BBC’s Lammiman. The BBC used the trial-and-error approach to learn about VR content creation practices as well as users’ tastes. Euronews started a similar experimental approach but with shorter turnaround 360° videos rather than high quality VR content. It was a strategy to learn what works and which journalists can be trusted to shoot important 360° videos, according to Euronews’s Seymat. As the goals changed, “the rhythm of publication” slowed down, he added.

In these experimentations, interviewees said making mistakes is not an issue. The goal is to learn. When Al Jazeera did its first 360° live streaming, “there were many things that could have been

better,” according to Al Jazeera’s Mickute. “It shows that we, as a company, want to move forward. We are forward thinkers, in a sense, we want to test new things and we aren’t afraid to do that,” she said. Al Jazeera’s Rosool explained how Contrast VR is a kind of “testing lab” to see whether technology in the market is effective for the news industry. “It’s okay to mess things up,” Euronews’ Seymat agreed. Experimenting and failing are essential for any learning experience.

The experimental nature of VR work requires openness to discussion and trying new things. The BBC’s Newland said he had to work as “3D artists, journalists and sound engineers” to create “Trafficked” 360° video about women trafficking in Mexico.

Working in VR can become “very frustrating” since it involves many things creators “don’t know”, according to the BBC’s Leithead. “I became more obsessed with that, and therefore I gave myself more time and brought in a whole team to work on it, and by doing so I took the pressure a little bit off,” he said. Composing teams to work on VR is often an opportunity to learn, pointing to the collaborative nature of the VR work. In her attempt to win the UN tender to produce VR stories, Mikkelborg of Picture This Productions said: “I thought I will never win the tender unless I can gather a really great team [because] I have never done that before”.

VR work is about ambition, curiosity and risk-taking. “You need to be curious, willing to experiment and learn from your mistakes,” Al Jazeera’s Fernanda said. As VR content creators explore, they get outside their comfort zone and stop being “risk adverse,” Euronews’ Seymat said. VR content creators should not be “freaking out” in unexpected situations but have an “adaptive mindset,” according to Al Jazeera’s Mickute. She said:

“You will always have situations where you have no answers [...] And you have to find answers. You cannot be afraid of technology or [afraid] that something is going wrong [...] [You need] the mindset to adjust to technology [...] It changes every day. You can’t just be like: Oh! That’s what I used to be doing. No, it doesn’t matter. I mean, tomorrow you might have to get used to other things [...] You can’t get stuck”.

Risk-taking might be the only difference between VR content creators and traditional documentary filmmakers, interviewees suggested. “A good producer is a good producer” regardless of working on a TV piece or a VR piece, according to CNN’s Lord. What matters more for a VR content creator is to “try to push the boundaries of what seems conventional because there are no conventions in VR”, she said. Rules of VR are not written, and creators have a lot of freedom to write the grammar of storytelling, making it “the most exciting medium”, according to Parameswaran of Now Here studio. VR has no “complete language”; VR content creators are “a little bit undecided about” narrative strategies, 360 Journalism ambassador Sarah said. For instance, a “talking head” directly addressing the viewer may contradict the sense of “cinéma vérité”, she said. Yet “breaking the fourth wall” – an invisible wall separating between story subjects and the viewer – may provide a better sense of what is happening, she added. The BBC’s Leithead broke the fourth wall and produced a journalist-led VR documentary, a “more traditional documentary” style that is “quite unusual” thing in the field of VR, he said. Leithead acknowledged the presence of the user, who was imagined to be in the place of the camera. He addressed the user directly, whereas other story characters did not acknowledge the user’s presence. The VR user was visible to the content creator but invisible to all other story characters. The BBC’s Leithead was trying this technique without being sure of users’ reactions. He said:

“We gave the camera a virtual name. We called it Marvin [...] It’s just a silly little name that we joked about, but it actually had quite a valuable role, by making the camera part of the crew [...] We gave Marvin a seat on the table to listen and look over [...] We gave him a chair and I joked by pouring a glass of water, which wasn’t planned [...] By being on the chair sitting on the table, I think people [VR users] were in on the joke of it”.

There may be “a growing number of enthusiasts” about VR in media organisations, according to the BBC’s Watson. “But most TV news journalists wouldn’t experiment with it because the audience they can get is so much less,” she said. VR is “not a natural fit” to the TV journalists’ work, so there are many uninterested people as opposed to one “advocate for exploration and innovation”, Al Jazeera’s Lee said. “It’s naturally counter-intuitive to do a 360° video when you spent long time doing TV pieces and you are able to shoot a TV report with your eyes closed,”

Euronews' Seymat said. The BBC's Leithead explained how one 2D camera man "hated" working with the 360° camera. "He likes what he does, which is shooting for TV news. At some point I felt as if he was going to knock over Marvin [the camera] with an elbow," he said.

The 360° camera placement is tricky and iterative. Placing the camera to "convey the scene" is an "acquired skill", according to CNN's Lord. "The thing was to select an ordinary place where a person would be and then put Marvin [the camera] in that place," the BBC's Leithead said, describing the production of the "Damming the Nile" VR. Deciding on camera placement is based on trial and error, where things may be learnt the "hardest way" when the captured footage must be left out because of its low quality, according to freelancer Ellison.

VR content creators are self-starters, teaching themselves by experimenting with the medium. They experience VR pieces, develop interest in the medium and then take the initiative to experiment with it. "You teach yourself everything," freelancer Ellison said. Unfamiliar with VR, freelancer McGinnis was a photojournalist. He "made some investments" to buy the 360° camera. 360 Journalism ambassador Sarah had a different experience as a student in UC Berkeley School of Journalism. "My colleague at that time and I asked our professor to experiment with it and ended up doing a nine-part series," she said. Full-time journalists in media organisation are also self-starters. "It became a really big personal interest of mine," said Euronews' Seymat. "I applied for the first round of the Digital News Initiative, a Google Fund, with an ambitious project to make Euronews the first international media to have in-house 360 video production flow". Seymat suggested creating "VR archives" to sell and producing "branded VR content" as potential ways to sustain 360° production in Euronews.

VR content creators are "ambitious journalists", who have the appetite to fully explore "lessons from games and theatres", the BBC's Lammiman said. For example, designers of CNN live streaming VR of the 2017 solar eclipse "dreamed up for a whole new paradigm for how TV graphics would look in VR", CNN's Lord said. "We went through so many iterations how we can borrow from TV but also don't look like pasting a TV screen to the 360° world". Journalists need

to collaborate with game developers who have spent a lot more time experimenting with the technology, according to 360 journalism program director Hertzfeld. “[It’s about] what we can learn from other types of content creators who have been experimenting with it [VR] for longer time,” she said. Al Jazeera’s Lee acknowledged that no one is a “full expert” about everything. As a result, VR content creators rely on artists or animators and tap into their “creative juice”, she said. From artists, content creators can learn ways to focus attention, tell stories and create a narrative arc, according to freelancer Mucciolo.

“VR is a great additional tool to push you to learn something new and challenge yourself,” freelancer Herrman said. For instance, VR post-production is “very tedious”, watching the same video over and over again looking for previously missed mistakes, according to Al Jazeera’s Fernanda. “VR post-production takes a lot of creativity to create a masterpiece that is interesting, informative and beautiful at the same time,” she said.

The researcher, thus far, examined the role of VR actors, including technologies, content creators and users. The interviewees discussed the significant changes in the journalistic practice, highlighting the emerging cultures of work and the characteristics that VR content creators need to adapt. The interviewees also explained the implications of these changes on the narrative, becoming an experiential story with an element of curation and a level of scene re-construction. Their discussion raised issues of facticity, accuracy, objectivity, detachment, transparency and editorial independence in VR. The following chapter examines VR content through a social semiotic analysis that scrutinizes VR components, including the audio-visual narrative and the interactive design. The analysis provides a closer look into the role of content creators and users as portrayed in the experience, enabling the researcher to further examine the issues of accuracy, objectivity and transparency. Such triangulation allows for a holistic understanding of VR culture, including role perceptions and ethical ideologies, which demonstrates how content creators creatively deal with the ethical issues, arising from the significant change in the journalistic practice.

Chapter VII

Social Semiotic Analysis

Social semiotic theory provides descriptive and analytical tools to study any communication phenomenon (Kress, 2015). The theory investigates the meanings and meaning-making process, through identifying semiotic resources and their potential significance (van Leeuwen, 2004) while acknowledging that the meaning intended by communicators is not identical to the one perceived by audiences (Kress, 2015).

Social semiotic theory decomposes the communication message into its basic elements, described as semiotic resources, and investigates their meanings. The theory enabled the researcher to examine journalists' and users' roles as conveyed through the content, an approach that is different from quantitative content analysis or qualitative methods of textual and discourse analysis. These mainstream trends seek to analyse how media represent or frame a certain issue in society. In contrast, this study aims to analyse the relationship between VR and journalistic culture by analysing the semiotic resources found in VR content regardless of the topic.

VR journalism is a new phenomenon. Therefore, there is no established or even previously used instrument to explore it through social semiotics. The researcher developed this instrument based on previous literature about multimodal semiotic analysis, which tended to be limited in focus. For instance, a research study would analyse a single film or a single semiotic category from the whole theory (Tseng, 2013). The researcher attempted to apply the whole theory on the sampled sixteen VR piece.

The diverse nature of the sampled VR pieces showed interesting differences in journalists' and users' roles. Across the sampled pieces, the journalist's presence ranged from being the main story character to being seemingly absent, and the user's role ranged from a mere observer to an actual participant. And as journalists' and users' roles changed, the VR objectivity and truth values changed.

The researcher did not examine the validity of information but rather the style of presentation. She divided the VR content according to the main story character, either a journalist- or a character-led story. The character-led story can be a user-led story when the user is a participant rather than an observer. The sampled VR, thus, can be journalist-, user- or character-led stories. The researcher also differentiated between 360° video and interactive VR, recognising that the interactivity is not a categorical variable but rather a continuum. She tried to separate Computer Generated (CG) from real-life captured VR. However, the categories seemed fluid, because a single VR could fit into more than one category. Attempts to classify VR only provide “loose grouping” (Bosworth and Sarah, 2019, p.15). Therefore, the researcher explained the basis of her classification of each VR piece to clarify the overlapping aspects.

The researcher organised the findings according to the theory’s analytical descriptive categories that serve representational, compositional and interactive meanings. She divided the categories into two groups or dimensions, including the audio-visual narrative and the interactive VR design. The first dimension looks at the story side of the VR, whereas the second dimension looks at the interactive gaming side of the VR.

The first dimension examines the story side of the VR, including the narrative and orientation. The narrative refers to the characters, their processes and the presentation elements such as actors, CG elements, music, sound effects, context and rhythm. The rhythm is the overall composition of the presentation elements and their meanings. Orientation is the second category in this dimension, which focuses on the user’s position from the VR by analysing contact, distance, point of view and modality.

The second dimension examines the interactive gaming side of the VR, including the ludo-narrative and the system gameplay. The ludo-narrative includes the game design elements such as action rules, game mechanics, spatiotemporal design, non-user characters, action patterns. Action rules identifies the types of actions permitted to the VR user, whereas action patterns look at the overall pattern, determining whether it is flexible or rigid. The second category in this dimension is system gameplay, which examines the relation between pattern of actions permitted for a single situation in the virtual environment and the real world.

The classification of VR social semiotic categories is illustrated in Table 4 in page 119.

The following section analyses each category mentioned in the table, using frames and shots from the VR to illustrate the analysis, when possible. The researcher selected illustrative frames, acknowledging that they are not the complete picture because VR offers 360° footage not a flat video.

1st Dimension: Audio-visual Narrative

The audio-visual narrative consists of the narrative and orientation. The narrative conveys representational and compositional meanings, while orientation conveys interactive meanings.

(a) Narrative structure

- Main characters, their processes and other characters

The main character of the stories was either the journalist or a character inside the story.

I. Journalist-led VR

“Damming the Nile”, “Bloodhound” and “Fight for Falluja” are journalist-led stories. The “Fight for Falluja” VR is a 360° film featuring an embedded journalist with Iraqi forces during their fights to liberate Falluja from ISIS (Daesh), and the aftermath of the conflict. It was produced by Ben C. Solomon for *The New York Times*. The other two journalist-led VR were produced for the BBC by Alistair Leithead. The “Damming the Nile” VR is a two-episode 360° film about the Nile and the construction of The Ethiopian Renaissance dam. The “Bloodhound” VR is a 360° film about the world fastest vehicle created by UK car manufacturers in Congo.

In these journalist-led VR, the journalist was the main character both narrative wise and time wise. The journalist moved the story forward and linked between its different nuances. However, the journalist did not appear on camera in the “Bloodhound” VR but clearly identified himself as the narrator.

Despite being the main character in the story, the journalist was never framed in the thumbnail of the VR as experienced in Gear VR headset. However, the journalist was acknowledged in the

describing text beneath the thumbnail in the “Fight for Falluja” VR only. The describing text said: “Embed with Iraqi forces as they retake the city from the ISIS and experience the battle aftermath”. Although there was not any clear personal identification of Ben C. Solomon, the VR content creator, the text provided a subtle reference to the VR nature as a form of embedded journalism. The VR showed users what it is to be like an embedded journalist with Iraqi forces fighting ISIS.

Journalists engaged in different types of narrative processes in “Fight for Falluja” and “Damming the Nile”, where they appeared on camera. Journalists did transactional actions, in which a story character does something to a goal. Alistair Leithead in the “Damming the Nile” VR, for instance, was walking in a historical church in Ethiopia, opening the doors and pointing to the artistic paintings. Solomon in the “Fight for Falluja” VR, checked the ISIS cells, opening the door and seeing what is inside. He also jumped to the ground once a bomb exploded near him. While being embedded with Iraqi forces, Solomon was cautious enough not to participate in their actions. He was either holding a still photo camera or looking at the Iraqi forces fighting ISIS, while wearing the press flak jacket, as shown in Figure 2.



Figure 2 Solomon is surrounded by Iraqi fighters in the “Fight for Falluja” VR (The New York Times).

Both Leithead and Solomon did transactional reactions, in which story characters are just looking and contemplating phenomena. Leithead, for instance, stood in a hot air balloon above Luxor contemplating the beauty of the Nile.

The journalists engaged in verbal processes but in different ways. Leithead in the “Damming the Nile” VR often talked to the camera directly, addressing the viewer as if he or she is physically present. He said: “I am Alastair Leithead the BBC’s Africa correspondent, and this is our first stop in what’s going to be an extraordinary journey”. Leithead also interviewed journalists and ordinary people on-camera, yet he rarely engaged in mental processes or monologues. This was somehow different from Solomon in the “Fight for Falluja” VR. Solomon never appeared talking on-camera. And in interviews with refugees, the fixer was asking questions because of the language barrier. Solomon, instead, relied on mental processes where he observed actions and commented on them off camera. Solomon, for instance, said when he saw the Falluja’s refugee camp: “I filmed in dozens of refugee camps all over the world, and this by far is the harshest and most unforgiving”.

The different narrative processes in which the journalist involved revealed parts of the journalistic work behind the story. Journalists appeared on camera observing, doing interviews and listening to the story subjects as shown in figures 3 and 4.



Figure 3 Solomon is interviewing an Iraqi refugee in the “Fight for Falluja” VR, and the fixer is in the middle (The New York Times)



Figure 4 Leithead is interviewing the Ethiopian minister in “Damming the Nile” VR. Users can see the cameramen shooting the video, if they turned around (the BBC).

In the “Bloodhound” VR, the journalist did not appear on camera, but he drove the narrative with his voice. As the main character, the journalist was not engaged in transactional actions, reactions or mental processes. However, the journalist engaged in verbal processes directly addressing the VR user, saying: “You are in an aircraft hangar in Congo, and this is the bloodhound”. The degree to which the narrative was dynamic is seemingly less in the “Bloodhound” VR due to the absence of the main character’s/the journalist’s transactional actions. However, the story included other secondary characters such as Mark Chapman, the chief engineer, and Andy Green, the wing commander. Both were mainly talking to the camera explaining their work (verbal processes). Green drove the vehicle at its fastest speed. This transactional action added greatly to the dynamic nature of the narrative, as shown in figure 5.



Figure 5 Testing the world fastest Vehicle in Congo in the “Bloodhound” VR (the BBC)

II. Character-led VR

The main character in the other thirteen VR pieces of the sample were not journalists. Most of the VR contained an identifiable character who has a role to play: a refugee, a former prison inmate, a new-born, a forensic scientist, a woman trafficking victim, a schoolgirl, an astronaut, a sea-life explorer, an activist, an expert from NASA. Only one VR relied on a narrator providing literary description for the footage. Dennis Overbye, the famous science writer, narrated *The New York Times'* "Seeking Pluto's Frigid Heart" VR, telling the story of New Horizon the robotic spacecraft which landed on Pluto after nine years of its launch. Overbye as the narrator engaged in verbal processes, describing the scene and addressing the VR users. "Look around you," he said. "You are standing where no known creature has ever stood".

Except for Pluto's piece, the main story character engaged in different forms of transactional actions, reactions, mental and verbal processes. However, these processes relied on whether the user was embodying the main character of the story or not. There were seven VR pieces where the user embodied the main character of the story, becoming a participant. They can be called user-led stories (the user's role is discussed in detail in the orientation section).

On the other hand, the "Crossing the Sky", "I am Rohingya", "Oil in Our Creeks", "Greenland Melting" and "After Solitary" VR featured main story characters as distinct from the user. The researcher called them character-led stories.

"Crossing the Sky" is a 360° film, produced by the BBC, telling the story of two Himalayan girls and their struggles to reach their school. The "I am Rohingya" and "Oil in Our Creeks" VR were produced by Contrast VR studio in Al Jazeera. "I am Rohingya" is a 360° film about Myanmar refugees in Bangladesh, following the experience a refugee named Jamalida. "Oil in Our Creeks" is a 360° film about the oil spill in Niger Delta. The "Greenland Melting" and "After Solitary" VR were produced by Frontline, the documentary series broadcasted on the US public broadcast TV network PBS. "Greenland Melting" is a walkaround VR about climate change, explaining rising temperatures and melting glaciers. "After Solitary" is a walkaround VR about five years in a solitary confinement cell at a US state prison.

The degree to which the narrative was dynamic varied among the five pieces. Transactional actions were almost absent in the “Greenland Melting” and “After Solitary” VR. The number of voices, regardless of their positions, differed among the five pieces. The “I am Rohingya”, “Oil in Our Creeks” and “After Solitary” VR relied on a sole main character, telling their own story without voicing any other character.

In the “Crossing the Sky” VR, two school girls formed the main story characters explaining their everyday struggle to go to school in their remote village in the Himalayas. They were walking down the road, pulling the ropes to move the trolley or the carriage and cross the river, a transactional action shown in figure 6. They were talking to each other on camera and talking directly to the users (verbal processes). The schoolgirls at many times were looking at the environment around them thinking about their future (transactional reactions and mental processes). In addition to the main two school girls, their father, as a secondary character, was talking to the camera explaining his worries about his daughters’ dangerous journey to school.



Figure 6 Two Himalayan girls are pulling the ropes to move the trolley in the “Crossing the Sky” VR (the BBC).

In the “I am Rohingya” VR, a 26 years old woman was telling her story in Myanmar and how she fled to go to a refugee camp in Bangladesh. She engaged in various transactional process, including walking around, washing her children, dancing and cooking. She was talking to the camera, introducing herself and telling her story as the only voiced character in the story (verbal processes). At some point she was standing in front of a lake, looking at her children playing and

thinking about her sufferings, a form of transactional reaction and mental processes shown in figure 7. No other character was voiced in the story.



Figure 7 Jamalida is sitting and her child is playing football in the “I am Rohingya” VR (Al Jazeera).

In the “Oil in Our Creeks” VR, Lessi Phillips, a Nigerian citizen, was describing the consequences of Shell oil spill in the water of Bodo, a Nigerian village. She was engaged in various transactional actions such as walking in the market, buying vegetables, riding a motorcycle, teaching school children, as shown in figure 8. In some scenes, she was standing near the polluted water and explaining the negative consequences of the oil spill (transactional reactions and mental processes). Phillips was the only voiced character in the story, telling her story and encouraging a positive action towards the problems. “It will take over twenty years to ... clean the space. I am not an expert, but I think we have to start now”. No other character was voiced in the story.



Figure 8 Lessi Phillips is teaching children at a Nigerian School in the “Oil in Our Creeks” VR (Al Jazeera).

In the “After Solitary” VR, the main character was Kenny Moore, a former inmate who spent several years in a solitary confinement cell inside a US prison. Moore was doing transactional reactions and verbal processes, while being in either his cell or his room explaining his experience and how it affected his life afterwards. The only transactional action for Moore was Fishing as the only possible method of communication in solitary confinement, as shown in figure 9. He was folding a piece of paper, tying it to the rope and throwing it beneath the door in the hope that another inmate picks it up and reads it. There were other characters in the story portrayed in the 2D footage harsh treatment of prisoners. However, they were not voiced characters.



Figure 9 Kenny Moore is “fishing” in the “After Solitary” VR (PBS).

In the “Greenland Melting” VR, Josh Wills, a NASA scientist, was describing the increasing rate of melting glaciers due to climate change and changing temperature of deep waters. He was mainly involved in verbal processes and transactional reactions where he was looking around contemplating the view around them and talking to the camera explaining his scientific work and findings, as shown in figure 10. The only transactional action for Wills was dropping a device called “probe” from an aircraft to measure the temperature at the bottom of the sea. The secondary character was Eric Rignot, another NASA scientist working in the same team. He was only involved in verbal and transactional reactions as the main character.



Figure 10 Josh Wills is explaining the implications of climate change in the “Greenland Melting” VR (PBS).

The main characters were portrayed on the VR thumbnail as experienced through the Samsung Gear VR, in three of the character-led VR pieces. “Greenland Melting” and “After Solitary” did not portray the main story characters in their thumbnails. The “Greenland Melting” VR was a scientific journalism piece, where NASA scientists were the story characters explaining their research and findings about glaciers’ melting. The thumbnail featured glaciers in Greenland without framing any particular character. The “After Solitary” VR thumbnail featured a dirty empty tiny cell, conveying a sense of isolation and psychological burden. The thumbnail was accompanied by introductory descriptive text. The text focused on the feelings of the experience rather than the specifying the main story character. The text ran as follows:

“The cell is 13×7 and covered with cement cot, florescent light and a metal toilet. Imagine spending a year in that space. Frontline and Emblematic take you inside the solitary confinement cell and tell you one former inmate’s story”.

In the remaining three character-led VR pieces, VR thumbnails featured the main characters of the story. “I am Rohingya” and “Oil in Our Creeks” were accompanied by introductory descriptive text, but “Crossing the Sky” was not. The “I am Rohingya”, for instance, included the following descriptive text:

“‘I want to talk to you,’ says Jamalida as she shows you her life inside a refugee camp. Watch this account of how she fled the violence in Myanmar in immersive animation”.

This text clearly identifies the story as an account of a Rohingya refugee rather than a comprehensive report. The “I am Rohingya” is one of seven different 360° videos shown in AL Jazeera VR app under the category of “Rohingya Persecution”. The seven VR thumbnails are preceded by an introductory statement: “Over half a million of Rohingya have fled to Bangladesh since August 2017. Explore videos, photos and more to learn about this ethnic cleansing in Myanmar”.

Thumbnails featuring the main story characters were real-life captured footage. Only the thumbnail of the “Oil in our Creeks” was animated, although the VR experience was a synthesis of real-life footage and animation. Lessi Phillips, the main story character, was animated as sitting in front of the creek in Nigeria, as shown in figure 11.



Figure 11 The thumbnail picture of the “Oil in Our Creeks” VR (Al Jazeera).

- Presentation: (actors, music, sound effect, CG content, context and rhythm)

VR presentation includes various semiotic resources such as actors, music and sound effects, CG content and narrative voice. CG elements and narrative voice add context to the story. This context can be connecting the story to a wider issue to add relevance, or it can be revealing news processes to authenticate the story. The overall composition of these semiotic resources is called the rhythm. It shows the compositional meaning of the narrative.

The following sections explains the presentation elements in the same order shown in table 7.

Presentation Elements

- i. Actors
 - ii. Computer Generated (CG) Environments
 - iii. Music and Sound Effects
 - iv. Written Text
 - v. Other Elements of Context
 - (a) Opening and Ending Credits
 - (b) The Narrator
 - (c) Interactive Soundbites
 - (d) Subtle Elements of Context
 - vi. Rhythm
-

Table 7: A classification of VR presentation elements

i. Actors

Actors in VR could be on-camera performers or voice actors. Two of the sampled VR pieces used on-camera actors, including the “First Impressions” and “Crime Scene” VR.

The “First Impressions” VR explicitly used actors to perform the role of a new-born’s parents, as shown in figure 12. The actors were acknowledged in the ending credits rather than the first part of the piece. “First Impressions” was an artificial setting where acting parents were treating the 360° camera/the VR user as a new-born, yet these parents did not have any scripted dialogue.



Figure 12 An actress is treating the 360° camera as a new-born in the “First Impressions” VR (The Guardian).

The “Crime Scene” VR used a mixture of on-camera actors and voice actors. It was a set-up situation in which an actor is playing the role of a murdered victim. The scene was, then, digitised

using 3D scanning technology³⁰. The digitised scene did not look photorealistic. It could be easily identified as a re-constructed rather than a real footage, as shown in figure 13. The ending credit acknowledged the victim as an actor, in addition to the crime scene manager. However, the crime scene manager was only a voice actor. She did not appear or act in front of the camera.



Figure 13 An actor is digitally scanned in the “Crime Scene” VR (the Guardian).

“Sea Prayer”, “Trafficked”, “Spacewalk”, “Damming the Nile”, “Fight for Falluja” and “I am Rohingya” used voice actors. Voice actors are different from narrators. Voice actors are characters performing a role in the story, not detached narrators telling the story. The six VR pieces used voice actors in various ways. Voice actors can form the only voice in the VR story, or they can dub the non-English speakers, whose native speech is heard in the background.

“Sea Prayer”, “Trafficked” and “Spacewalk” used voice actors to accompany CG environments.

The “Sea Prayer” VR used the award-winning actor Adeel Akhtar to read first-person narrative, written by the award-winning novelist Khaled Hosseini. Reading the first-person story, Adeel embodied the character of a refugee father reflecting on his life and how circumstances forced him to flee towards the unknown future. Adeel’s voice accompanied an animated 360 footage, as shown in figure 14.

³⁰ <https://scanlabprojects.co.uk/work/crime-scene/> [Accessed 20th November 2018].



Figure 14 Animated environment in the “Sea Prayer” VR (The Guardian)

The “Trafficked” VR used voice actors to tell the story of a human trafficking victim called Maria. “Trafficked” is a fully scripted CG VR that featured Maria and other characters, as shown in figure 15. Each 3D character had a corresponding voice actor performing its role. However, this VR piece was based on a real story and interviews with Maria, as revealed in its written context (see page 194).



Figure 15 Low naturalistic modality characters in the “Trafficked” VR (the BBC).

The interactive “Spacewalk” VR used voice actors to perform the role of other characters in the story, such as the spaceship leader and the astronaut EV2 (figure 16). These voice actors were addressing the user as an astronaut named EV1. They were giving the users instructions about how to perform their assigned mission.



Figure 16 Spacewalk thumbnail (the BBC)

For Dubbing the non-English speakers, the “I am Rohingya”, “Fight for Falluja” and “Damming the Nile” VR used voice actors. Jamalida, a refugee in Bangladesh, was the only speaking character in the “I am Rohingya” VR. She was a non-English speaker, so a voice actor dubbed her speech. The voice actor was heard from the beginning to the end of the story. In the “Fight for Falluja” and “Damming the Nile” VR, the journalists guided the story. Non-English speakers appeared in short segments of the VR, where they gave testimonies of their personal experience. However, in all dubbing experiences, the speaker’s original voice was heard in the background. The original voice added veracity to the content.

ii. Music and Sound Effects

Music and sound effects represent other semiotic resources in the presentation. All sampled VR pieces used music to immerse the users and convey the feelings of the experience. VR music was quiet and indistinct to the user, unless it had another purpose. The “Damming the Nile”, for instance, featured a live concert in Sudan. In this part, music was clear to the user.

Music in the sampled VR piece, was a part of the experience that did not transgress the narrative or exaggerate the feelings, except for the “Spacewalk” and “Seeking Pluto’s Frigid Heart” VR. “Spacewalk” gave the user the chance to contemplate the beauty of Planet Earth from open space, while listening to music to add a sense of wonder. The user could listen to the loud recognisable music or switch it off. The “Seeking Pluto’s Frigid Heart” VR did not use the interactive music listening option, yet the music was a recognisable component of the piece that worked with the literary language of the narration to exaggerate the user’s sense of wonder.

Added sound effects were frequently used in VR CG environments. The sound effects conveyed the feeling of the story. The “6×9” VR used sound effects to convey the feeling of isolation and fear when being held in a solitary confinement cell. Sometimes, sound effects were a necessity when telling a story from the past. The “Oil in Our Creeks” added sound of singing birds in the animated scenes, picturing life in the Nigerian village before the oil spill. Real-life captured VR used sound effects conservatively to avoid influencing the truthfulness of the content. The “Fight for Falluja”, for instance, relied on the natural sounds of bombs, explosions and gun shots, rather than added sound effects.

iii. Computer Generated (CG) environments:

Every VR piece within the sample used Computer Generated (CG) elements. The CG elements could be either an add-on visual cues, or CG environments. A VR piece could be a full CG environment or a mix CG and real-life environments.

The researcher found it very difficult to categorise certain elements such as an add-on 2D film to the VR. The flat video can be a piece of evidence, or an illustration to what is being explained. The flat video is not part of the VR environment – an add-on–, yet it captures real-life past event. A leaked 2D flat video was added to the “After Solitary” VR to show a guard beating a prison inmate (figure 17). The “Greenland Melting” VR content creators added a flat video of large chunk of ice driven away of Jakobshavn glacier southwest of Greenland in 2008 (figure 18). The “Bloodhound” content creator used a flat video to illustrate how the engine of the world fastest vehicle works as the chief engineer explains it (figure 19). A flat video was added to the “6×9” VR to illustrate prison inmates’ thoughts while being held in a solitary confinement cell.



Figure 18 An embedded flat video in the "After Solitary" VR shows prison guards beating an inmate (PBS).



Figure 17 An embedded video in the "Greenland Melting" VR shows Jakobshavn glacier in 2008 (PBS).



Figure 19 An embedded video in the "Bloodhound" VR shows the world fastest vehicle (the BBC).

Volumetric capturing and photogrammetry techniques seemed also problematic to judge as a purely computer-generated environment or a mix. In this technique a 3D environment is built using photos of the real environment. The story characters are then volumetrically captured to be inserted as holograms in the 3D environment. Frontline used these techniques in creating the "After Solitary" and "Greenland Melting" VR. In a full disclosure of the production techniques, the "Greenland Melting" started with the following introductory text:

"This Virtual Reality Experience was created using 360 footage, 2D videos, photos, videogrammetry and photo-realistic environment computer generated imagery. Many environments were built by stitching together thousands of photos into fully dimensional scenes and drew upon NASA provided data. Additional computer-generated environments were combined with 360 footage shot on scene. The NASA scientists in this story were filmed using 8i technology and added to scenes as videogrammetry".

The full CG environment formed either the complete VR experience or parts of it. For instance, “Damming the Nile” is a two-episode VR, which featured CG environments at the beginning of each episode. The CG environments featured the earth and how the Nile runs from downstream to upstream countries, as shown in figure 20. The CG helped the user to visualise his or her upcoming journey along the Nile in the VR.



Figure 20 A CG environment embedded in the “Damming the Nile” VR (the BBC).

The VR was completely a full CG environment in the “Sea Prayer”, “6×9”, “Crime Scene”, “Trafficked”, “Spacewalk”, “BBC Earth: live in VR” and “Seeking Pluto’s frigid Heart”. “Sea Prayer” was a 2D animated piece built using the “Tilt Brush” tool. The animation was not detailed or photorealistic as shown in figure 21. It was symbolic animation that conveyed diverse emotions. The VR started with serene environment and moved to unexpected protests that turned into violence forcing people to flee their homes towards the unknown. The remaining six VR pieces were 3D CG environments. Their degree photorealism/naturalistic modality is explained in detail in the following section.

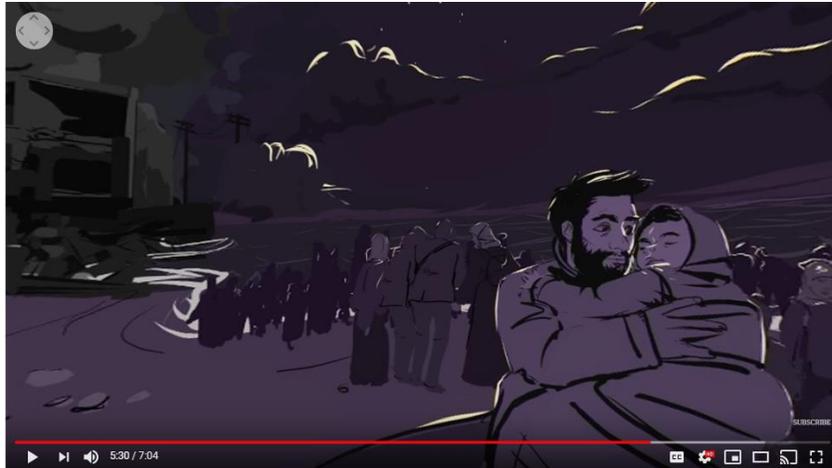


Figure 21 low-modality animation in the "Sea Prayer" VR (the BBC)

CG elements in the form of add-on visual cues were used frequently in real-life captured footage. The "I am Rohingya" and "Oil in Our Creeks" VR superimposed animation over 360° real-life captured. The "I am Rohingya" VR, for instance, used a symbolic animation to illustrate the rape of Jamalida, the main story character, in Myanmar before she fled to the refugee camp in Bangladesh, as shown figure 22. The "Oil in Our Creeks" VR used animation to illustrate the beautiful and rich environment around the creek before the oil spill, as shown in figure 23. Visual cues of birds, trees and blue water were added to let the user experience the change.



Figure 22 An illustrative animation is superimposed over real-life footage in "I am Rohingya" VR (Al Jazeera).



Figure 23 An illustrative animation is superimposed on real-life footage in the "Oil in Our Creeks" VR (Al Jazeera).

The “First Impressions” VR used a different type of visual cues. It used video effects to show how the visual ability of a new-born develops from blurry black and white images towards clear and colourful ones (figure 24).



Figure 24 Visual effects show the development of the visual ability in the “First Impressions” VR (The Guardian)

iv. Written Text:

Written text can be considered a CG element added to all types of VR environments, including straight 360° real-life captured videos, CG environments. Text can be used to give credentials for talking heads inside the VR such as the “Bloodhound” VR, or it can be used to identify different story chapters. The “Fight for Falluja”, for instance, was divided into two parts. The first is called “Part I: Retaking the City”, and the second is called “Part II: The Aftermath”.

Text may repeat words from the VO to add emphasis to certain parts of the spoken words. For instance, the following sentences were displayed on the cell’s walls in the “6×9” VR:

- “You think you will be here for a year. It can quickly become 4 or 5 years”
- “Solitary confinement alters neural and psychological states”.

Text may illustrate the spoken words, allowing the users to experience the story and adding to its depth instead of mere repetition. In the “After Solitary” VR, for instance, the main story character was describing how he cut himself and wrote on the cell walls with his blood, while words were being displayed on the walls saying: “Help me - Down in a hole, feeling so small”. Sometimes text is used as subtitles, fully repeating the exact words of the main story characters and using the same language. The main story character in the “Oil in Our Creeks” VR was speaking English and subtitles came to repeat her exact words in English, too. The subtitles helped to avoid

any misunderstanding that could be produced by using an uncommon English accent. Lessi Phillips, the main character, was a Nigerian girl explaining the story of her home village in English. Text can provide essential context to the story. “Sea Prayer”, “6×9”, “First Impressions”, “Trafficked”, “Crossing the Sky”, “Greenland Melting”, “After Solitary”, “I am Rohingya” and “Oil in our Creeks VR” used various forms written context.

Written context can be as short as a single sentence in the whole VR as in “Sea Prayers”, or it can be much longer and distributed among different parts of the VR as in “After Solitary”. “Sea Prayer” ended with a sentence saying, “In the year after Alan’s death 4, 176 others died or went missing attempting that same journey. The number of deaths at sea continues to rise”. It helped to tap the story into the wider issue of refugee crisis. The “After Solitary” VR, on the other hand, displayed written text in different parts of the experience. The written text gave more details about the main story character, Kenny Moore, the former prison inmate. It tapped into bigger issues of prisons’ conditions in the US. At the beginning, the user could read on the cell’s walls:

“In 1995, Kenny Moore was convicted with aggravated assault, burglary and theft and was sentenced 18 months in the prison. After a series of fights and disruptive behavior, he was put in a solitary confinement cell in the Maine State Prison”.

In the middle, the user could read on a black screen:

“While Kenny was incarcerated, Maine State Prison began to reduce the use of solitary confinement. The prison also started rehabilitation classes to inmates”.

At the end of the story, the user can read on the walls of Kenny’s room:

- “Kenny’s wife arranged for him to see a therapist to help him to adjust to life outside of prison”.
- “In November 2016, Kenny was briefly hospitalised for a psychotic breakdown”
- “Studies shows that an ex-offender is more likely to go back to prison if he had significant time in isolation”
- “Today Maine State Prison says it conducts fewer cell extractions, and violence and self-harm have dropped by 80%”

The written context did not just added depth to the Kenny’s story, but also balance. The “After Solitary” did not stop at highlighting the bad conditions and its negative impacts on inmates but moved further to show current improvements.

The “I am Rohingya” VR, similarly, explained the story of Jamalida, a Rohingya Muslim refugee in Bangladesh, and used context to link it to the wider context of Muslim persecution in Myanmar. At the beginning of the experience users could read:

- “Since the filming of this documentary, another brutal offensive by Myanmar military has forced the mass exodus of more than 400,000 Rohingyas across the border to Bangladesh”
- “It followed attacks on police posts by Rohingya militants in August, 2017. The United Nations has described the military crackdown as a textbook case for ethnic cleansing”.

In the middle of the experience, the users could read:

- “Myanmar is a majority Buddhist nation and does not recognize Rohingya Muslims as citizens”
- “Tens of thousands of Rohingyas have fled violence at the hands of the military and now live as refugees in Bangladesh”.

At the end the users could read:

“No Rohingya has been resettled in another country since 2012”.

This could be the conventional function of context in any story, which is expressing the connections between a single story and the wider context, to show its relevance to the audience. This conventional function was found in all sampled 360 VR stories that used written context except for the “Crossing the Sky” VR. In “Crossing the Sky”, content creators used text to introduce the users to the experience, without adding factual information or tapping it to a bigger issue. The only written text displayed in the VR story was: “Two sisters... A village in the Himalayas... a journey to a faraway school”.

The “Oil in Our Creeks” VR existed in the middle ground. The written text helped to set the story within the wider perspective of the international oil companies’ responsibility towards the environment. However, the text was limited and lacked precision. The users could read “Niger Delta is the largest oil producing region in Nigeria”. And when they moved slightly to the right, they could read: “Several oil spills by large international oil companies have destroyed local fishing and farming”. Also, users could easily miss the written text because there was not any cue to alert them.

The written text can have an additional function in VR. It can act as a disclosure for the news processes behind the story, a preparation tool for what users are about to experience and/or a warning from potential negative impact of the experience. The written text becomes particularly important in case of scene re-constructions. For instance, “First Impressions”, “Trafficked” and “6×9” used disclaimers to emphasise the facticity of their content.

“First Impressions”, the acted VR piece, started with an introductory statement, saying: “‘First Impressions’ is a virtual experience of the first year of life. Voice narration by: Natasha McElhone”. The statement was followed by an explanatory paragraph, emphasizing that “First Impressions” VR is research-based and warning the user of potential disturbing impact. The paragraph read:

“Using the latest research in neural development and colour vision in infants. This film allows you to experience and interact with the world from the point of view of a baby. It’s a period that none of us remember, but it’s the most crucial stage of development. Warning the film includes effects which may cause anxiety for some viewers.”

“Trafficked”, the CG VR piece, started with a disclaimer on its thumbnail warning the users from potential disturbing impact “Guidance – contains violent content”. The “Trafficked” VR also started with written text assuring the users that it is a fact-based story, and preparing them to an extraordinary experience, where users embody the main story character. The “Trafficked” VR started as follows:

- “This is a story of Maria - a single mother who has been trafficked from Nicaragua to Mexico. All events are based on interviews”.
- “For the next 8 minutes, you will become Maria”.

Although, these types of disclaimers are often short and concise. The “6×9” VR contained a lengthy written context - about three paragraphs long - to explain to the user necessary background information, to emphasise the facticity of the experience and to prepare users to what they are going to experience. The written text, displayed in the VR app before the start of the experience, ran as follows:

“Right now, 80,000 - 100,000 people are in the solitary confinement in the US. They spend 22-24 hours a day in concrete cells with little to no human contact for days or even decades. The cell you see is based on real US prison cells, the voices you hear are not actors. The sounds around you are from Maine maximum security prison, courtesy of Frontline”

“Before watching further you should be aware that this piece has disturbing material and could provoke an emotional reaction. You should take this and your comfort level into consideration before you choose to continue. You must be at least eighteen years old to participate in this virtual experience”

“Your participation in this virtual experience is at your sole risk and by participating in this virtual experience you agree to and do release the Guardian News & Media LLC from all claims arising from or related to your participation in this virtual experience. If you are not at least eighteen years old, or you are not comfortable continuing with this virtual experience, please discontinue your participation immediately.”

Of the whole three paragraphs, “6×9” content creators used two sentences to emphasise the fact-based nature of the CG VR. However, they did not explain how the CG experience was re-constructed. The “Greenland Melting” VR, on the contrary, started with a long paragraph explaining the complex nature of the content and the techniques used to create it (see page 187).

The “BBC Earth: Life in VR”, “Crime Scene” and “Spacewalk” VR are highly interactive. They all used written text. Text was used to explain the user’s mission inside the experience. “Explore and discover the California costs, diverse ecosystems and come face to face with creatures that call it home”, this was the introductory text in “BBC Earth: Life in VR”. The text invited the user to explore the sea life and to follow a sea creature, which could be a sea otter, a whale or a blue shark. The “Crime Scene” VR started in a similar way setting the scene for users and explaining their mission:

“It’s 2am in the morning and you are the trainee scenes-of-crime officer in duty. Can you gather the right evidence to solve the crime? A crime scene manager will guide you through the process – from fingerprint dusting and DNA contamination to the latest in digital forensics. This interactive allows you to experience and understand the crucial role forensics play in solving crimes”.

The “Crime Scene” VR did not have any warning for potentially disturbing material, the written context was limited to explaining the user’s role. The “Spacewalk” VR, on the contrary, did not have any introductory text explaining the user’s mission. The VR started with asking users to choose between “Astronaut Mode” and “Easy Mode”. If users choose “Astronaut Mode”, they will get a warning message: “This mode contains highly disorienting sections and should only be attempted by experienced VR astronauts”. If users choose “Easy Mode”, they will get a warning message: “This mode contains mild disorientation suitable for novice astronauts.” Written text in Spacewalk VR was more concerned with potential negative impact on users rather than explaining users’ roles in the story.

v. Other Elements of Context

Written context is not the only form of context given to the VR story. There are various elements that helps to give context to the story. Ending credits, characters inside the story, narrators, added photos and 2D videos help to place the story within a broader context and reveal the news processes involved.

(a) Opening and Ending Credits

“Seeking Pluto’s Frigid heart”, the CG VR, used ending credits to show that data came from NASA, John Hopkins University Applied Physics laboratory and South East Research Institute. It tried to emphasize the fact-based nature of the VR. However, the credits included a short disclaimer that recommendations and suggestions implied do not necessarily reflect NASA’s opinion. The content creators wanted to authenticate their material while maintaining their distinctive position to reach their own conclusions about the story. The disclaimer ran as follows:

“This was based upon work supported by NASA. Any opinion, finding, conclusion or recommendation expressed in this material are those by the authors and don’t necessarily reflect NASA”.

The “Greenland Melting” and “After Solitary” VR used credits to clearly disclose partners who worked on the piece as well as the funding sources. The “Greenland Melting” VR, for instance, started with an opening scene specifying the exact partners who worked on the piece, as shown in figure 25. Both “Greenland Melting” and “After Solitary” VR specified clearly their funding sources (see figure 26, 27 and 28).



Figure 26 Opening credits of the “Greenland Melting” VR (PBS)



Figure 25 Funding sources of the “Greenland Melting” VR (PBS)

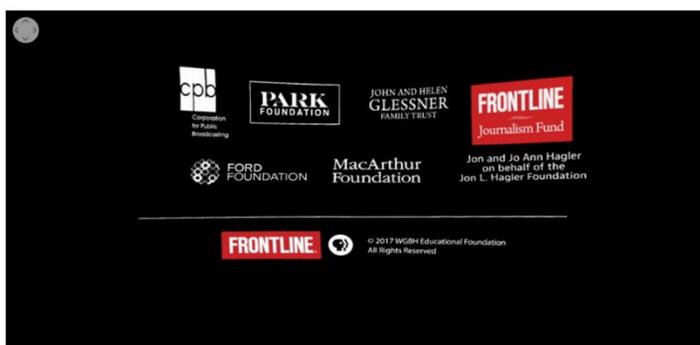


Figure 27 Foundation Funding sources of the “After Solitary” VR (PBS)



Figure 28 “After Solitary” and “Greenland Melting” VR were funded by the Knight (PBS)

All VR pieces that included collaboration between different media organisations and production studios were clearly identified in the ending credits. These credits act as a disclosure or a transparency tool, where VR content creators reveal their production partners. The “6×9” VR clearly identified Google News Labs as a major partner in that piece, as shown in figure 29.



Figure 29 Ending Credit of the “6×9” VR (PBS)

(b) The Narrator

Another form of context can be given by the narrator of the story. The narrator is distinct from story characters and tells the story from detached point of view, linking between different story nuances and providing a broader perspective. When telling one’s own story, the character is not a narrator as in the “After Solitary” VR. The narrator is a distinct character, who may not clearly be defined as a journalist.

“Greenland Melting”, “Seeking Pluto’s frigid Heart” and “First Impressions” used narrators to tell the story. The narrators reduced the amount of written context needed. The “Seeking Pluto’s Frigid Heart” VR did not display any written context during the VR experience. The “Greenland Melting” and “First Impressions” VR used a single introductory paragraph at the beginning (see pages 187, 193). These introductory pieces of text helped introduce the story and the processes of the content creation. Written context almost disappeared in narrated VR, because the narrator gave the sufficient context.

The “Seeking Pluto’s Frigid Heart” VR started with the narrator, Dennis Overbye, describing the marvels of Pluto and New Horizon spacecraft in a literary language. Overbye started by saying: “On the edge of the solar system, three billion miles from the sun, a planet has spun through the void unseen and unknown for millennia. Pluto, a ball of ice and rock [...]”. The narrator was the only voice in the story, there was not any other character either acting or speaking in the piece.

The “First Impressions” VR featured a narrator, Natasha McElhone, who introduced the user to the story and prepared the user to his or her role as a new-born. McElhone’s voice continued throughout the VR guiding and reassuring the user through his or her journey as a new-born. She said: “Open your eyes. Welcome to your first day. It doesn’t look like much, does it? You don’t know where you are or who you are. You are vulnerable unfinished, despite your nine months in the womb [...]”. However, the narrator was not the only character or voice in the story. “First impressions” included background audio featuring an interview with professor Charles Nilson from Harvard University, who is specialised in this area of research. “Tell us about your research in Harvard”, a journalist asked in the background. Though the expert’s voice was not completely audible, it gave a sense of authenticity to the piece.

The “Greenland Melting” VR featured a Narrator, Will Layman, who explained scientific facts about the story and introduced the user to the experience. Layman spoke at various parts of the VR, adding context and extra depth to what NASA scientists – the main story characters – were explaining in front of the camera. At the beginning of the experience, Layman said: “The Island of Greenland is covered with an enormous ice sheet in some places two miles thick. If it is all melted, it is estimated that the sea level around the world would rise about 20 feet”.

Non-narrated VR stories used other sources to provide context in addition to written text. These sources were soundbites, photos, 2D flat videos or even the indirect signs revealed in the main character’s clothes. (See page 187, for examples of 2D flat videos).

(c) Interactive Soundbites:

The “6×9” VR, for instance, used real voices and soundbites of psychiatrists, inmates and guards in Maine State Prison to add context. In a soundbite of a prison guard, the user could hear: “The only thing that these people understand is violence”. The “6×9” VR also used interactive

soundbites. Inmates' stories were spelled out when the user looked at a certain VR element such as books, magazines or letters. The stories were contextual information that helped the user understand how inmates passed their time in solitary confinement.

The "Crime Scene" VR used similar interactive soundbites of a crime scene manager to give contextual information about the story. The crime scene manager, at the beginning of the VR, called the user and said: "I am stuck in another job, so you have to do this job yourself." This call prepared the user for his or her role in the story as a trainee forensic scientist and explained his or her mission to collect the three most important evidence from the crime scene. The manager guided the user throughout the experience, providing contextual information about each piece of evidence found. The contextual information was revealed in an interactive way. Whenever the user pointed towards a certain piece of evidence using the Daydream controller, the manager's voice came in. The following statements are examples of contextual information, given by the crime scene manager:

- "Weapons and body have to be examined first"
- "Footprints may be as unique as fingerprints"
- "95% of criminals leave digital footprints on their phones"

The "BBC Earth: life in VR" piece used similar interactive soundbites. The user started with choosing a single species to follow in California water. When users chose Sea Otters, for instance, they were asked to follow the white crystals in the water. Whenever they pointed to the white crystal using the Daydream Controller, a voice came in, providing contextual information.

(d) Subtle Elements of Context:

Apart from the narrator's voice, written text and soundbites, VR can include subtle elements that add context to and illustrate the story. The content creators of "After Solitary", for instance, were cautious enough not to trick users to mistakenly believe that Kenny, the main story character, is still in prison. Kenny was not wearing the prison's uniform, when his hologram was featured in the solitary confinement cell in Maine State Prison, as shown in figure 30. The main character's

clothes were part of the story context. In addition, photos of Kenny's family appeared on the cell's wall, adding more context to the story and showing his happy family (figure 31).



Figure 30 Kenny is not wearing prison uniform in the cell (PBS).



Figure 31 Kenny's photos on the wall in the "After Solitary" VR (PBS).

All non-narrated VR pieces used different tools to reveal context either written context or soundbites, except for the "Oil in Our Creeks" VR. It was a character-led story, relying on single voice of Lessi Phillips, the Nigerian citizen talking about life in Bodo village after the oil spill. No other character was voiced. No written context was given except for two statements: "The Niger delta is the largest oil producing region in Nigeria", and "Several oil spills by large international oil companies have destroyed local fishing and farming".

vi. Rhythm:

Rhythm is the last element within the narrative structure analytical category, one of two categories addressing the VR story side (see table 4 in page 119). Rhythm is the arrangement of various semiotic resources within the VR piece, which conveys a compositional meaning. The VR Rhythm in the sampled pieces was a narrative that has a beginning, middle and ending. However, the narrative's nature was not explicit in the "Greenland Melting", "Seeking Pluto's Frigid Heart", "BBC Earth: Life in VR" and "6x9" VR.

The "Greenland Melting" VR was explaining a scientific fact about climate change rather than revealing a story in a chronological order. This science journalism story was not applicable for a balanced argument measures, where both sides of the story are featured. The principle of accuracy meant that the non-factual side of the argument –climate change deniers– should not be voiced.

The “Seeking Pluto’s Frigid Heart” did not have a narrative, a chronologically ordered chain of actions that are either performed or narrated. Instead, the VR was descriptive experience that conveyed the sense of wonder and impressed the user through literary language, music and high-quality CG content. “Out there in the dark, unknown horizons are waiting,” said the narrator at the end of the Pluto’s VR experience.

“BBC Earth: Life in VR” did not have a narrative. It was an interactive experience, in which the user got extra information as he or she pointed to the white crystals in the ocean. There was no narrative order, but there were different chapters in the VR. The user could choose to follow a sea otter, a whale or a blue shark for each chapter. The experience inside each chapter was not chronologically ordered or goal oriented –no “win-lose situation”. It was an informative experience.

The “6×9” VR was not a narrative piece, but an experience of certain moment when an inmate is held in a solitary confinement cell. The user embodied the inmate and listened to testimonies from other prisoner inmates and psychiatrists about their feelings. As a focused experience, the “6×9” VR did not provide a balanced or contextualised argument, where a solution is given for the problem or a counter argument is provided. Comparing “6×9” to the “After Solitary” VR piece, the researcher could get idea about how “6×9” could have been balanced.

Some VR pieces adopted the narrative rhythm and offered a balanced argument at the same time, including “After Solitary”, “Fight for Falluja” and “Damming the Nile”. The “After Solitary” VR, for instance, highlighted the psychological damage of being held in the solitary confinement through telling the story of Kenny Moore, a former prisoner inmate. However, it provided a balanced argument through mentioning the current improvement in the US Maine State prison (see page 191). The “Fight for Falluja” VR attempted also to provide a balanced argument about the conflict, despite of first-person mode of address used by the content creator. Opposite opinions were given a chance in the refugee camp outside Falluja. On the one hand, there was a woman thanking God for everything despite her suffering. On the other hand, there was a man who cannot take it anymore because his house in Falluja was destroyed three times in the last thirty years. Although Ben C. Solomon, the content creator, was embedded with Iraqi forces, he

maintained a distinct position, and he openly criticised them. Solomon said in the “Fight for Falluja” VR:

“The brutality of Iraqi forces was on display as well. A body of an ISIS soldier is left on the street. He has been beheaded. He looked like he had been dragged by a car. They watched him comfortably and Iraqi militia fighters took photos of the body”.

The “Damming the Nile” VR also attempted to provide a balanced argument through a narrative rhythm. Alistair Leithead, the content creator, followed the Nile as it flows between Ethiopia, Sudan and Egypt. He attempted to provide a balanced argument about the Ethiopian Renaissance Dam and its positive impact on Ethiopia and its imminent dangers to Egypt.

Narrative VR pieces may have a problem-solving nature. “Crime Scene” was an interactive narrative VR piece that had multiple ending depending on the user’s actions. The VR user embodied a forensic scientist who scanned the crime scene for the DNA of the murderer. The user had a chance to select three pieces of evidence. If the user gets everything right, the crime scene manager will say: “Well done. All the evidence you selected are useful. You made the police happy”. If the user gets two things wrong, the crime scene manager will say: “You chose one thing right. Do you want to reselect your evidence again or see what actually happened?”. And at the end of the experience, the problem is solved, and the murderer is identified. “You have completed your first crime scene. Well done get some rest. We will have a busy day tomorrow”, says the crime scene manager at the end of the VR. The “Crime Scene” VR informs the user through a problem-solving experience.

In contrast, the “Spacewalk” VR was an interactive narrative VR that did not involve a problem-solving approach. It had a chronologically ordered events and a specified ending. The user was an astronaut, who left the spaceship with his colleague EV2. The user had to open the door of the spaceship before leaving. The user then spent time enjoying the marvellous view of planet earth, before a problem occurred and prevented him from returning to his or her ship. The experience always ends with the death of the user so it cannot be identified as a problem-solving VR.

The “I am Rohingya”, “Oil in Our Creeks”, “Trafficked”, “Crossing the Sky” VR were non-interactive narrative VR that did not have a problem-solving or a balanced argument nature. They were all

straight narratives explaining problems. They did not provide a balanced argument through contextualisation, nor did they offer a way out. They were character-led stories that voiced victims but did not offer counter arguments through voicing the perpetrators, discussing the causes, or showing measures taken to counter them.

(b) Orientation (distance, contact, point of view and modality)

Orientation is the second analytical category that addresses the VR story side, after the narrative structure category (see table 4 page 119). Orientation reveals the interactive meaning of the VR, through analysing the user's role and modality. The user's role is analysed through examining distance, contact, point of view in addition to the level of user's agency. Figure 32 illustrates the components of orientation analytical category and their interrelationships.

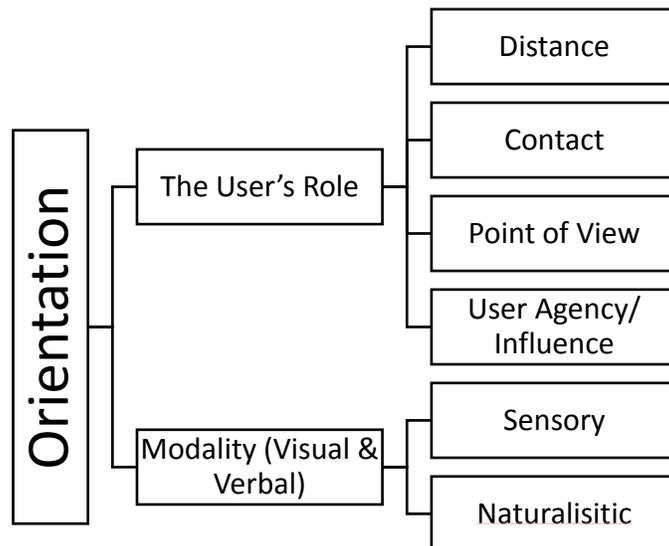


Figure 32 the components of orientation category

- Distance

Distance primarily refers to the position of the audience in relation to the communication message. VR always situates the user inside the virtual environment. Distance in VR thus may refer to user's position in relation to the main story character. The distance diminishes when the user embodies the main character of the story. However, many VR pieces contain distinct main story character whom the user observe from a near distance.

i. User-led VR

The “Sea Prayer”, “6×9”, “First Impressions”, “Crime Scene”, “Trafficked”, “BBC Earth: Life in VR” and “Spacewalk” VR allowed the user to be the main character of the story. The user was embodying the main story character and a participant. The diminished distance gave the user a greater understanding of the events. The user was in the shoes of a refugee, a former inmate, a forensic scientist, a human trafficking victim, a sea life explorer and an astronaut.

The user could not see the main story character but could view the world through their eyes except in the “Sea Prayers” VR. The user was inside the head of the Sea Prayers’ main story character. The user was able to observe the mental processes of a refugee father fleeing his country. In his imagined monologue, the refugee reflected on his past and pictured himself at the current moment. Therefore, the user was able to examine main character’s world view and see the main story character at the same time. The “Trafficked” VR presented a similar dual position for the user, yet the user could not see the main story character. The user embodied Maria, the human trafficking victim. The user could see the world through Maria’s perspective and listen to her mental processes at the same time. Maria’s thoughts acknowledged the user as a distinct character at some points. “Go on take a look around. What do you see? My name is Maria this is where I live and where I work,” Maria said at the beginning of the VR piece. She acknowledged the user’s existence in her head.

ii. Character-led VR

Being an observer, the user’s distance from the main story character is often predetermined by the content creator. The distance is not too far or too close to provide a visible quality. However, the distance can be changeable in walkaround VR because users can walk in the virtual environment approaching or distancing themselves from the main story character. “Greenland Melting” and “After Solitary” are the two walkaround VR within the research sample, but they were not released at their highest interactive modes during the time of analysis. The researcher watched their non-walkaround versions on Samsung Gear VR.

- Contact

Contact refers to the way story characters address the user inside the VR experience, regardless of being a participant or observer. The sampled VR conveyed demand and offer modes of contact, which varied across the different types of VR, such as journalist-led, character-led or user-led. Both character- and user-led stories contain a main story character other than the journalist. The user is distinct from the main story character in character-led stories, whereas the user embodies the main story character in user-led stories.

- i. User-led VR:

In user-led stories, content creators mixed offers and demands both visually and verbally when they addressed VR users. The “Sea Prayer” and “BBC Earth: life in VR” pieces were exceptions because of their nature.

The “Sea Prayer” VR was visualising mental processes of a refugee. It did not include any demand for the user. The main story character did not acknowledge the user existence inside the experience. The refugee was imagining a conversation with his child. “My Dear Marwan, in the long summers of childhood. Your uncle and I spread our mattress on the roof of your grandfather’s house in Homs [...] We took you there when you were a toddler”, said Adeel Akhtar voicing the refugee as the main story character. The whole story was an exchange between second-person mode of address “you” and first-person mode of address “I”. However, the user is not in the shoes of the child but rather in the head of the father. Therefore, the whole story is considered an offer. The father is offering information about his life experience without addressing or contacting the user.

The “BBC Earth: life in VR” experience was another special case because it was exploring the sea life. All portrayed characters were sea creatures, and there was a distinct narrator. These sea creatures were not visually interacting with the user; they are not humans. Instead, the user was following them in the sea. There was no demand visual mode of contact. The narrator gave users information about different creatures under the sea through interactive soundbites. This

information was offered using a third-person mode of address. Though “BBC Earth: life in VR” was an interactive experience, the VR used offer mode of contact only.

The “First Impressions” and “Trafficked” VR combined demand and offer modes of contact both visually and verbally. The narrator of the “First Impressions” VR, Natasha McElhone, acknowledged the existence of the user throughout the whole experience, addressing the user with the second person pronoun “you”. She mixed demands and offers as she said: “Open your eyes. Welcome to your first day. It doesn’t look like much, does it? [...] This time is critical. Days are passing, your brain is colouring the world”. The narrator is offering information and demanding users to do certain things. The story also mixed demand and offer visual mode of address. The mother character in the story goes to the kitchen to prepare food, while the user embodying a new-born looks at her from far away, as shown in figure 33. This offer visual mode of address, was often interrupted by demand and direct interaction with the parents. The parents many times approach their baby, look at him as if they are asking him to do something, as shown in figure 34. “Trafficked” VR showed a similar example. The user embodied Maria, a human trafficking victim. The user was constantly engaged in mixture of demand and offer modes of address. The story begins with Maria introducing herself and addressing the user. “My name is Maria. This is where I live and where I work,” she said. Then, Maria’s boss enters her room, and give an order: “Eat something and get dressed”. The mixture of demand and offer helped to keep the user involved and engaged throughout the experience. Yet, the demand visual mode of contact could potentially cause the user to feel unease. Content creators of the “First Impressions” VR, for instance, wrote in their disclaimer: “Warning: the film includes effects which may cause anxiety for some viewers”.



Figure 33 Visual offer in the “First Impressions” VR (The Guardian)



Figure 34 Visual demand in the “First Impressions” VR (The Guardian)

“6×9” and “Crime Scene” combined the demand and offer mode of contact only verbally. Different characters did not have physical presence, and their contact was only verbal.

The “6×9” VR featured a variety of characters, including prison inmates, prison guards and psychiatrists. Their voices used first-, second- and third- person modes of address. At the beginning the user hears a voice saying: “Welcome to your cell. You are going to pass 23 hours here daily [...] memorise the space and count the bricks”. This second-person mode of address, characterised by demand, is followed by soundbites of a psychiatrist offering some information: “Solitary confinement alters neural and psychological states”. Throughout the VR, the user listens to soundbites of inmates describing their own feeling inside the cell: “I found myself floating”.

The “Crime scene” VR also used mixture of demand and offer verbal modes of contact. At the beginning, the user gets a phone call from the crime scene manager, saying: “I am stuck in another job, so you have to do this job yourself”. The mixture of first- and second-person pronouns – I and you – meant that the story character is offering information and demanding the user to do something in return. However, the information offered in the VR piece often used third-person mode of address to add a higher truth value and a sense of objectivity to the experience (truth value is explained when discussing modality as a semiotic resource in the orientation analytical category). Interactive soundbites of crime scene manager were revealed whenever the user point to a piece of evidence using the Daydream controller. These soundbites use third-person mode of address. For instance, the crime scene manager says: “Weapons and body have to be examined first”.

The “Spacewalk” VR could not combine demand and offer modes of address visually, though a non-user story character was physically present in the experience. The astronaut EV2 was a colleague of the main story character EV1, embodied by the user. EV2 was wearing the space suit, the user was not able to identify him or have a visual contact with him. The user kept getting instructions and feedback from his colleague EV2 as well as the physically absent spaceship leader about how to open the door or how he can go back to his spaceship. These instructions formed demand mode of contact, that was interrupted by an offer when the user heard: “Just looking back at human relationships from high above the earth, you realise you have to ...”.

ii. Character-led VR:

Character-led stories used also a mixture of demand and offer modes of contact. “Crossing the Sky”, “I am Rohingya”, “Greenland Melting” and “After Solitary VR” used demand and offer visual modes of contact, but their verbal mode of contact was arguably just an offer. The main story characters were sometimes pictured standing in front of the camera, looking at the camera acknowledging the user’s existence. This was straightforward in the “Crossing the Sky” and “I am Rohingya” VR because the user’s position in relation to the main character was fixed. The two young school girls in “Crossing the Sky” and Jamalida, the main character of “I am Rohingya” stood in front of the camera, looked toward the camera as if they were establishing eye contact with the user (figure 35, 36).



Figure 36 Demand mode of contact in the “Crossing the Sky” VR (Al Jazeera)



Figure 35 Demand mode of contact in the “I am Rohingya” VR (Al Jazeera)

“After Solitary” and “Greenland Melting” VR were problematic to identify the visual contact because they were walkaround pieces. The user was free to choose his position in relation to the main character. However, the researcher analysed their non-walkaround versions using the Gear VR headset. Kenny, the main character of “After Solitary”, looked around the room rather than

staring at the direction of the camera, providing a contemplative or an offer mode of contact, as shown in figure 37. Josh Wills, the main characters in the “Greenland Melting” VR, stood facing the camera to explain the problems of climate change, shown in figure 38.



Figure 37 Contemplative/offer mode of contact in the “After Solitary” VR (PBS)



Figure 38 Demand mode of contact in the “Greenland Melting” VR (PBS)

Although visual demand mode of contact was explicit, verbal demand mode of content was less clear in three of the aforementioned pieces. The “Crossing the Sky”, “I am Rohingya” and “After Solitary” VR did not employ second-person mode of address “you”, in which the main character demand something from the user. In “I am Rohingya”, Jamalida greeted users on-camera before she introduced herself, yet she did not demand anything from them. There was no question or order in her speech. The main character of the “After Solitary” VR used the informal phrase “you know” while explaining his own experience. However, he was not really demanding anything from the user. “You know, I would take blood and I would cover my cell and I would write messages all over my cell, you know, help me [and] lyrics to songs that I knew,” said Kenny Moore, the main story character in the “After Solitary” VR. Thus, verbal mode of contact in the three VR pieces can be perceived as an offer.

The “Greenland Melting” VR had a mixture of offer and demand verbal mode of address. The narrator, Will Laymen, explicitly asked the user to “try looking below the water surface”, in addition to the vast amount of factual information Laymen was offering. The main character, on the other hand, was less clear in his verbal demand mode of contact. Josh Wills, the NASA scientist and the main story character in the “Greenland Melting” VR, addressed the user using first-person mode of address “we”. “This is a dangerous place to be. This is west Greenland 220 miles north of the Arctic Circle, and we are looking,” he said. The use of “we” represented the

user as if he is in the same team with the main story character. The user was presented as effective team player with NASA scientist rather than an outsider.

The “Oil in Our Creeks” VR represents a special case in character-led stories regarding the modes of contact. The visual mode of contact was strict offer. Lessi Phillips, the main story character, was never talking and facing the camera. She was always involved in something else buying, fishing or farming, as shown in figure 39. She did not explicitly acknowledge the camera. All her talk was recorded off-camera as a Voice Over (VO). Phillips’ VO was a mixture of demand and offer. Phillips used first-person mode of address “I”, offering information about her life experience in the village. “When I was younger, the village used to be better. I remember buying vegetables and fish at much cheaper rates,” Phillips said. She uses a mixture of second-person mode of address “you” and first-person mode of address “we” to demand user’s attention and work. “Look around you. You can see this place is polluted,” she said. “It will take over twenty years to clean the space. I am not an expert, but I think we have to start now”.



Figure 39 Lessi Phillips is in the market and her voice continues in the background (Al Jazeera).

iii. Journalist-led VR

“Fight for Falluja”, “Damming the Nile” and “Bloodhound” were journalist-led stories that used different storytelling strategies. The “Fight for Falluja” VR used the offer mode of contact solely both visually and verbally, whereas “Damming the Nile” and “Bloodhound” VR used a mixture of demand and offer.

The content creator of “Fight for Falluja”, Ben C. Solomon, never talked directly to the camera. Instead, Solomon’s voice was recorded off-camera and added to the footage. He was captured taking picture, interviewing refugees or checking the aftermath of the conflict. Solomon never acknowledged the existence of the camera/user in the scene, as shown in figure 40. Verbally, Solomon mixed



Figure 40 Solomon is taking pictures while battles were unfolding in the “Fight for Falluja” VR (The New York Times).

first-, second- and third- person modes of address. However, the mixture was to offer information rather than demand anything from the user. “We spent a lot of time with fighters, sitting around and waiting for something to happen. You never know what is coming,” said Solomon explaining his news process and addressing the user, via the pronoun you, without demanding anything. The change in modes of address helped keep the user in focus while offering information. Solomon relied heavily on first-person mode of address, using the pronouns “I and we” explaining his journalistic work and the challenges of embedded journalism. The story was focused on his experience and feelings of the event. For instance, Solomon said:

“We spent a month this summer embedded with Iraqi fighting forces [...] ISIS fighters are close by only a few hundred meters away. We weren’t sure how this rag-tagged unit of Shiite militia with mismatching uniform and little organisation were going to protect us. Moataz [the fixer] and I were nervous. Things were quiet and suddenly [sounds of bombing and shooting]”.

Solomon used the first-person mode of address to show a form of engagement with the story. Though he was cautious not to participate in fighter’s actions on the battle ground, his verbal language explicitly communicated the story as his own view rather than independent facts. “I filmed in dozens of refugee camps all over the world, and this by far is the harshest and most unforgiving,” he said. Solomon also tried to mix first- with third- person modes of address, to

balance his position. The story is not only his personal experience, but also separate events that speak for themselves. “The brutality of Iraqi forces was on display as well. A body of an ISIS soldier is left on the street,” Solomon said. In a way, Solomon constantly shifted his role between a main story character and a narrator. He was a main story character, in the aspects depicting the challenges of embedded journalism. Solomon was also the narrator describing events unfolding around him.

The VR content creator, Alistair Leithead, mixed demand and offer modes of address in the “Damming the Nile” and “Bloodhound” VR.

“Damming the Nile” featured Leithead both verbally and visually. He mixed first-, second- and third-person mode of address throughout the experience. He used first-person less than Solomon in the “Fight for Falluja” VR. Leithead only used first-person to reveal news process, rather than his feeling or judgement about events. “We struggled to get permission to film here,” said Leithead explaining the challenges he faced. Leithead also used the first-person “we” to refer to the user, as part of his team in the journey along the Nile. “The river’s next stop is in Sudan, which is where we are heading next,” he said. This increases the user’s immersion and engagement in the story. Leithead relied mainly on third-person mode of address to remain detached from what he is reporting. He sometimes mixed the third- with second- person mode of address, while maintaining the offer mode of contact. The mixture helped keep the user’s focus throughout the experience.

Leithead used the demand mode of contact, acknowledging the existence of users in the virtual environment and addressing them directly. “Join us for an Ethiopian traditional meal in Addis Ababa. I’ll pour you a glass of water anyway,” Leithead said. He dealt with users as if they were physically present around the food table, offering them food and water, as shown in figure 41. This increased the user’s engagement. Leithead shifted his role between a narrator and a story character. However, the number of scenes depicting Leithead as a story character, like the table scene, were significantly less. They were aimed at adding vividness to the experience.



Figure 41 Leithead is filling a glass of water for the imagined user in the “Damming the Nile” VR (Al Jazeera).

The “Bloodhound” VR was a journalist-led story, in which the content creator was not physically present. The content creator, Alistair Leithead, mixed verbal demand and offer modes of address. The story contained two other characters, who explained their work on the world fastest vehicle. Therefore, Leithead did not rely heavily on third-person mode of address to convey facts about the story. “Teams work for the very best. Aston Martin, Williams Formula One, McLaren Formula One and Rolls Royce. They make very complicated things and they make them go very fast,” he said. Leithead was conveying the information in a detached third-person mode, yet he changed his voice tone showing enthusiasm. Such changing voice tone clearly showed his personal position and helped attract the user’s attention. Leithead also used first-person mode of address as a transparency tool to communicate his position and his role in the story. “I have been following this story for a long time and for disclosure my name along with thirty thousand other supporters is displayed on that tail fin,” he said.

Leithead used the demand mode of contact to increase audience engagement with the story. The demand came in the form of instructions to make sure that the user does not miss important moments of the story. “Don’t forget to turn around and check out Andy,” Leithead said. Questions also helped to engage users and increase their attention. “Who would you want in the driver’s seat?” he asked. Leithead was a narrator telling the story and attracting users’ attention. He may have revealed himself as a character in the story using the first-person mode of address. However, this was limited, and it provided a form of transparency.

“Seeking Pluto’s Frigid heart” was a unique VR experience in the sample, which did not include story characters but a narrator and an observer/user. The narrator was mainly describing the scene in a literary language. He combined demand and offer mode of contact. He never used the first-person mode of address, since he was a detached narrator commenting on a scene in front of him. He used both second- and third- person mode of address to engage the user. “Look around you. Step on a place where no-one else has stepped before,” the narrator said. “Out there in the dark, unknown horizons are waiting”.

- Point of View

Point of View is related to the user’s position from the semiotic resources presented in the footage either characters or objects both on the horizontal and the vertical axes. On the vertical axis, most of the sampled VR pieces used the eye-level position, a normal position for a standing person in the place of the event. There were changes on the camera position on the vertical axis, yet these changes did not always convey power relations between the user and other story characters. The “Damming the Nile” VR contains high angle shots captured via drones. One high angle shot, for instance, showed Leithead and his crew riding a hot air balloon over Luxor, as shown in figure 42. It allowed the user to see the landscape and enjoy the journey from above. Also, the “6×9” VR changed from the eye-level position to high angle shot to illustrate an inmate soundbite saying, “I found myself floating” (figure 43).



Figure 42 A high-angle shot taken to view the landscape in the “Damming the Nile” VR (the BBC).

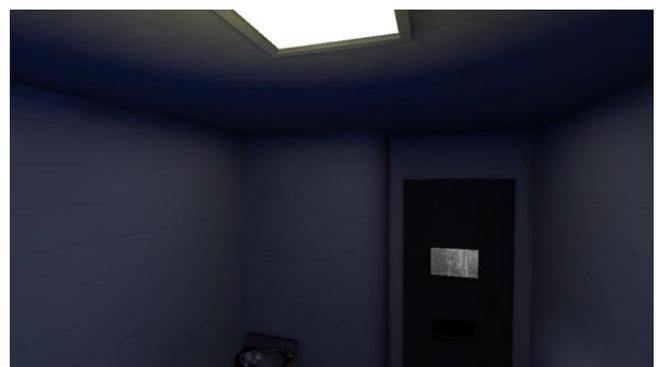


Figure 43 A high-angle shot illustrates the sense of floating in the “6×9” VR (The Guardian).

“Trafficked” and “First Impressions” were the only VR pieces within the research sample that actively used camera position on the vertical level to convey power relations. The “Trafficked” VR started with a low angle shot of the boss/woman trafficker addressing Maria, the main story character. The low angle showed Maria as a powerless victim, as shown in figure 44. Also, “First Impressions” content creators fixed the camera throughout the experience to capture low-angle footage, as shown in figure 45. The low angle shot was necessary to convey the viewpoint of a helpless new-born in the face of the outer world.



Figure 45 a low angle shot of the women trafficker addressing the user in the “Trafficked” VR (the BBC)



Figure 44 a low angle shot of the parents in the “First Impressions” VR (The Guardian)

On the Vertical axis, the camera may be placed on the eye-level position, yet the story characters may be either high or down on the ground. The content creators of “Crossing the Sky”, for instance, put the camera down a valley to show how high and dangerous a crossing trolley is. The two main story characters were standing on the trolley to cross the river, while the camera was fixed on the river side down, as shown in figure 46. The content creators of “I am Rohingya” similarly fixed the camera on the eye level of a standing person, while the main story character was sitting on the ground to cook, as shown in figure 47. This did not convey power relation but reflected the habitual behaviours of the main story character. The camera represented the viewpoint of a standing observer, looking at scenes around him or her.



Figure 46 the camera is fixed on the ground to show the height of the “Crossing the Sky” VR (the BBC).



Figure 47 the camera is on a standing person’s eye level in “I am Rohingya” VR (Al Jazeera).

On the horizontal axis, the camera’s position differs between frontal and lateral position according to the main story character. However, the researcher found it difficult to determine the camera’s horizontal position in several VR categories. The first category is VR experiences that did not include physically present human story characters such as the “6×9” and “Seeking Pluto’ Frigid Heart” VR. The second category is VR, in which the main story character is not physically present but there are other human characters in the experience such as the “Bloodhound” VR. The third category is VR portraying abstract animated human characters such as the “Sea Prayers” VR. The fourth category is interactive VR, in which users can walk around and change their position in relation to main story characters such as the “Spacewalk”, “After Solitary”, “Greenland Melting”, “BBC Earth: Life VR” and “Crime Scene” VR. The fifth category is VR with fixed camera position throughout the experience such the “First Impressions” VR. The following section explains these categories in detail.

1st Category: No Physical Presence of Any Human Characters

Without the physical presence of any human story characters, the researcher was unable to determine the camera position as in “6×9” and “Seeking Pluto’ Frigid Heart VR”. There was no human character upon which the researcher can measure the camera’s position.

2nd Category: No Physical Presence of the Main Story Character

Sometimes the main story character is not physically present in the VR, but other story characters are. Bloodhound VR, for instance, was a journalist-led story in which the journalist did not appear on camera. The researcher, thus, could not determine the camera's position relative to the main character. Instead, she looked at the camera's position relative to other story characters, who were occupying a frontal position, as shown in figures 48 and 49.



Figure 49 Mark Chapman, a story character in the “Bloodhound” VR, is occupying a frontal position (the BBC).



Figure 48 Andy Green, a story character in the “Bloodhound” VR, is occupying a frontal position (the BBC)

3rd Category: Animated Human Characters in Abstract Forms:

Portraying the story character in abstract forms makes it difficult to determine the camera's horizontal position. The “Sea Prayer” VR, for example, had abstract animated characters painted on the 360° canvas. Their positions relative to the camera were hard to determine and did not convey a specific meaning, as shown in figure 50.



Figure 50 Abstract figures depicted in the “Sea Prayer” VR (The Guardian).

4th Category: Interactive VR

The camera's horizontal position in interactive pieces was problematic because the user was able to walk around the virtual environment such as the "Spacewalk", "After Solitary", "Greenland Melting", "BBC Earth: Life VR" and "Crime Scene" VR.

The fully interactive version of "After Solitary" and "Greenland Melting" VR were not available during the time of analysis. The researcher viewed the 360° versions of them using Samsung Gear VR. The story characters in both stories occupied frontal and lateral positions in relation to the camera throughout the experiences. Eric Rignot, for instance, a NASA scientist in the "Greenland Melting" VR was standing without facing the camera and explaining the climate change. The lateral position of Rignot encouraged the user to see what Rignot is looking at, as shown in figure 51. The user was easily guided to see graphical illustration of how fast icebergs are shrinking. The change between frontal and lateral position of the story character was used as a tool to guide the user's focus within the story.



Figure 51 Rignot, a NASA scientist, is standing in a lateral position to the camera, encouraging the user to turn around and look at the graphical illustration of the iceberg in the "Greenland Melting" VR (PBS).

5th Category: Fixed Camera Position Throughout the VR

Having the camera fixed in a single position throughout the VR experience makes determining the horizontal position further problematic. The "First Impressions" VR, for instance, had a fixed position while the story characters were moving around it. They took frontal and lateral positions depending on their actions. The mother, for instance, approached the camera/the new-born occupying a frontal position, as shown in figure 12 in page 182. And she was in other moments

occupying potentially lateral positions while cooking in the kitchen, as shown in figure 47 in page 216.

The rest of the VR sample mixed frontal and lateral camera positions, including the “I am Rohingya”, “Crossing the Sky” and “Damming the Nile” VR. The VR pieces captured main story characters talking to the camera and doing actions. This helped to change the user’s position from a fly on the wall to an involved observer.

- User Agency and Influence on the Narrative

VR offered a spherical view that freed users from frames of flat videos. Users were free to explore the canvas around them, yet there were cues that either guided or forced users to look at certain direction.

The degree of user’s freedom to explore the footage was at its highest levels in “Spacewalk”, “Crime Scene”, “BBC Earth: Life in VR”, “Greenland Melting” and “After Solitary”. The user’s perspective was not pre-set by the content creator but rather it depended on where he or she wanted to position himself or herself in the story. In these interactive stories, there were cues to guide the user. “BBC Earth: Life in VR”, for instance, instructed the user to follow the white crystals in the ocean.

The audio-visual cues in the 360° VR guided and sometimes forced the user throughout the experience. The 360° version of “After Solitary” had 2D video displayed on the wall showing an inmate being mistreated by the prison guard. When showing the 2D video on a wall, the three other directions were made black, forcing the user to watch the 2D video, as shown in figure 17 page 187.

Most VR pieces used cues to guide rather than to force a specific user perspective. They used sound design, direct VO instructions and visual cues to direct user attention. “Trafficked”, “First Impressions” and “6×9” VR used sound design. “Bloodhound”, “Damming the Nile”, “Oil in Our Creeks”, “Seeking Pluto’s Frigid Heart VR” used direct VO instructions to guide the user experience. The “Sea Prayer” VR used visual cues. However, some VR experiences did not

explicitly use audio-visual cues, including “Crossing the Sky” and “I am Rohingya”. They carefully crafted the experience to predict the user’s viewing direction.

“Trafficked”, “First Impressions” and “6×9” used sound design to direct users’ attention. Audio encourages users to look towards its source. The “6×9” VR was a special case, the audio design guided users, yet they could actively make decisions and take control of their experience. Users could look at certain elements in VR environments such as books, magazines or letters. Once they look at an element, it becomes lightened and an interactive audio is triggered. Users’ choice guided their experience and the amount of information they can get.

“Bloodhound”, “Damming the Nile”, “Oil in Our Creeks”, “Seeking Pluto’s Frigid Heart” VR used direct VO instructions to guide the user’s experience. However, the source of these instructions was different. The source of instructions was the journalist in “Bloodhound” and “Damming the Nile”, the narrator in “Seeking Pluto’s Frigid Heart” and the main story character in “Oil in Our Creeks”. These instructions were guiding rather than forcing users, who kept their freedom to follow or to ignore the instructions. The “Oil in Our Creeks” VR may appear as an unmediated experience, where the main story character is talking directly to the user without any journalist mediation (spoken or written). However, the journalist’s voice is indirectly visible in the selection of character’s words and camera positions.

The “Sea Prayer” VR used visual cues to guide the user throughout the experience. The story was painted on the 360° canvas gradually as the voice actor was telling the story. The painting was guiding the user to gradually turn clockwise to explore the story as it is being depicted on the 360° canvas.

The “Crossing the Sky” and “I am Rohingya” VR did not use explicit audio or visual cues to guide the user. Instead, the story was carefully crafted. Content creators attempted to predict the user’s viewing direction and work accordingly. However, content creators could not predict the user’s viewing direction always. For instance, written context was displayed at all four directions in “I am Rohingya” VR, to make sure that the user will not miss it.

The audio-visual cues used in all 360° VR pieces, as well as the high-end VR showed that no matter how free the user could be, the VR is still a guided experience. The user role could differ according to the three dimensions of contact, distance, point of view as well as influence on the narrative.

- The user's role

The researcher developed an updated version of Donald's and Paret's (2016) Model to classify the VR user's role, as shown in table 6 in page 177. She used distance semiotic resource to define user existence in the VR experience as either an observer or a participant. She used user agency and influence to differentiate between passive and active users. She also added contact and point of view to determine the degree of user involvement. A frontal camera position and demand mode of contact lead to an involved user, whereas a lateral camera position and offer mode of contact lead to a non-involved user.

Users were passive involved observers in "Damming the Nile", "Crossing the Sky", "Bloodhound", "I am Rohingya", "Oil in Our Creeks", "Seeking Pluto's frigid heart". Users in these experiences were passive because their actions did not influence the narrative or the story, yet they were involved because of demand mode of contact and frontal point of view. Users were certainly observers, not story characters. The "Crossing the Sky" VR, for instance, featured users as observers watching the story of the two young girls' dangerous journey to reach school. Users' actions did not influence the narrative that was time restricted and that was developing in a single path. Users were involved during the frontal moments when the two girls talked to the camera and acknowledged the user's existence in the environment, as shown in figure 35 page 208. The "Greenland Melting" and "After Solitary" VR could be classified under the same category, especially that the researcher did not have the chance to experience their walkaround version.

Users were passive non-involved observers in the "Fight for Falluja" VR. Users were observers watching the content creator covering the battle ground. Users could not influence the development of events, which was time constrained and predetermined by the content creator. The VR piece did not include any moment of demand mode of address or frontal point of view,

making users feel as flies on the wall. Although the emotional intensity of the events engaged users, their presence was never fully acknowledged by the content creator.

On the contrary, Users were an active involved participant in “Crime Scene”, “BBC Earth: life in VR” and “Spacewalk”. Users embodied a character in the experience either as forensic scientist, a sea life explorer or an astronaut, becoming participants. User were involved through demand mode of contact, in which instructions were given. User were active, and their actions influenced the narrative that was not time restricted. In the “Crime Scene” VR, for instance, users had to collect evidence to identify the murderer. They constantly received instructions from the crime scene manager, explaining their mission.

Users were passive involved participants in the “Trafficked” VR. Users embodied the main story character. Other story characters were directly addressing users through frontal point of view and demand mode of contact. However, user’s actions did not influence the narrative path, which was time restricted.

Users were passive, non-involved participants in the “Sea Prayer” VR. Users were in the head of the main story character. Users could experience the thoughts of the main story character through listening and looking at the animated view around him. Users did not experience any demand mode of contact or frontal point of view, simply because the whole story was a monologue. Users were inside the main character’s head, and other characters in the story were only depicted as passive characters revealed in the monologue (i.e. the character’s child Marawan). Also, Users were passive since their actions did not influence the narrative, which was predetermined and time restricted.

Despite all the strict classifications of the user’s role, the level of interactivity was hard to determine in some VR piece, including the “First Impressions” and “6×9” VR. They allowed users to be involved participants, yet the level of users’ influence on the narrative was grey. Users’ actions could influence a time restricted narrative. “First Impressions” VR users could press the Daydream controller to call the mother to come, and “6×9” VR users could look at certain elements of the scene and unlock interactive soundbites. However, both VR pieces were time restricted. They provided a semi-active involved participant role for the user.

- Modality:

Modality, the fourth element of orientation analytical category, is concerned with the truth value of the content. VR modality is two-sided, including the verbal and visual modality. In terms of visual modality, some VR used the naturalistic, other focused on sensory modality. Verbal modality in both written and spoken words, ranged between information presented as opinions and as facts.

“Greenland Melting”, “After Solitary” and “6×9” used CG environments that was aimed at high naturalistic modality, and mixed different verbal modalities. The CG environments approached the level of photorealism, in which there was high resemblance between footage and reality, as shown in figures 52, 53 and 54. Content creators prevented the users from being tricked into a false belief through explicit disclaimers and creative techniques. The “After Solitary” VR, for instance, showed the main story character wearing casual clothes rather than the prison uniform to emphasize that he is not a prisoner anymore, as shown in figure 53.



Figure 52 Volumetrically captured Josh Wills, NASA Scientist, is inserted inside the CG environment of a NASA research boat in the “Greenland Melting” VR (PBS).



Figure 53 Kenny Moore is volumetrically captured and inserted in the CG environment of a solitary confinement cell in the “After Solitary” VR (PBS).



Figure 54 The photorealistic CG environment of a solitary confinement cell in the “6×9” VR (The Guardian)

The three VR pieces mixed presenting information as facts and as opinions. In “Greenland Melting”, most scientific information was presented as undisputed facts, such as: “The glacier retreated more in the last 15 years than in the previous 70 years”. However, when the information is not confirmed and still at the level of examination and study, they were presented in first-person mode of address “we”, using lower modality words such as “think”. Eric Rignot, the NASA scientist, said: “We think that the climate warming has something to do with this not just air temperatures”. The varying levels of modality in fact statements shows a high level of accuracy and dedication to the truth.

The “After Solitary” VR main story character was expressing his personal experience and his feelings whereas the written context was presented as neutral facts with high truth value. “I would write messages all over my cell”, said the main character of the “After Solitary” VR. The written context complemented the information, indicating that such negative feelings could cause permanent damage to inmates: “Studies show that an ex-offender is more likely to go back to prison if he has spent significant time in isolation”.

The “6×9” VR restricted the presentation of undisputed facts to psychologists, whereas inmates’ testimonies explained their personal feelings using first-person mode of address. However, all fact statements given by psychologist had a high level of modality without any room for doubts. A psychologist, for instance, said: “people’s brain waves alter [...] the more time spent in solitary confinement, the more we expect negative consequences”. The expression of feeling and personal experiences in “After Solitary” and “6×9” helped to add a sensory modality to a high level of naturalistic modality conveyed through the photorealistic CG environment. Thus, the overall truth value as presented in the content was high in them, and the variation in the modality levels of fact statement showed a high level of accuracy.

“Seeking Pluto’s Frigid heart” and “Spacewalk” used CG environment and achieved a high naturalistic modality, as shown in figures 55 and 56. The user could feel a sense of photorealism in the projected footage. Both attempted to improve the level of modality by using music that added an element of sensory modality. The music aroused users’ feelings and increased the truth

value of the content. Their verbal content was presented as undisputed facts rather than opinions. The “Spacewalk” VR started with written context giving detailed information about the experience in a high modality language. All spoken content was in the form of instructions rather than opinions or personal experience. The “Seeking Pluto’s Heart” VR relied on the narrator’s spoken words, which described the footage and offered information as facts emphasized by strong adjectives. “New Horizon was the fastest spacecraft that has ever been launched, built in decades of ignorance about this most distant realm of the solar system”, the narrator said. Both VR pieces were presented as undisputed factual experience, with high level of modality.

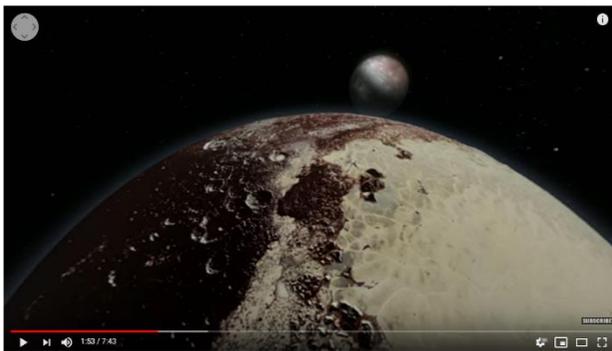


Figure 56 Photorealistic environment in the “Seeking Pluto’s Frigid Heart” VR (The New York Times).



Figure 55 Photorealistic environment in the “Spacewalk” VR (the BBC).

“Crime Scene” and “BBC Earth: life in VR” were interactive CG VR, in which content creators provided a low level of naturalistic modality. The user could easily tell the difference between the footage and reality. The lower modality level in the “Crime Scene” helped reduce the potential negative psychological impact of seeing a dead body, as shown in figure 13 page 183. It reminded the user that the VR is a re-constructed event rather than a real one. Despite the low level of visual modality, both VR pieces provided a high-level verbal modality. Crime Scene VR, for instance, offered users with fact statement as they scanned the place looking for evidence. “Weapons and body have to be examined first,” said the crime scene manager.

“Trafficked” and “Sea Prayer” VR used CG environment that had low level of naturalistic modality and higher level of sensory modality. The CG content did not achieve any degree of photorealism, it did not look real, as shown in figures 57 and 58. Instead, the CG content felt real. The VR pieces evoked emotions through the first-person mode of address used by the main story character. The use of first-person mode of address presented information as personal experiences not

undisputed facts. However, such personal experiences evoke feelings in the user and increase the level of sensory modality. The “Sea Prayer” main story character, for instance, said:

“I wish you hadn’t been so young. You wouldn’t have forgotten the farmhouse. The soot [sound] of its stone walls. The creek where your uncle and I built a thousand boyhood dams”.



Figure 57 Low naturalistic modality CG environment in the “Trafficked” VR (the BBC)



Figure 58 Low naturalistic modality environment in the “Sea Prayers” VR (The Guardian)

The VR that used real-life captured 360° video, provided a high-level of naturalistic modality, in which there is high resemblance between footage and reality. Some of them combined the 360° content and CG elements. The CG elements had low naturalistic modality intentionally to alert the user that it is re-constructed. The “Oil in Our Creeks” VR, for instance, included animated scene to show how the environment used to be clean and fresh in the past, as shown in figure 59. These animated scenes were recognisable to the user so as not to be confused between the past and current reality.



Figure 59 Animation is superimposed on the real-life footage in the “Oil in Our Creeks” VR (Al Jazeera)

The verbal language used in the VR mixed presenting information as facts and as opinions. The “Fight for Falluja”, “Crossing the Sky” and “Oil in Our Creeks” VR relied heavily on first-person

mode of address, in which information is presented as a personal experience. These personal experience evoked users feeling adding a degree of sensory modality to the existing high degree of naturalistic modality projected in the 360° video. The three VR pieces did not contain any written context except for the “Oil in Our Creeks” VR, which included two fact statements. Neither statement included statistics or numbers or specific data:

- “The Niger delta is the largest oil producing region in Nigeria”
- “Several oil spills by large international oil companies have destroyed local fishing and farming.”

The “Oil in Our Creeks” VR presented all the information in the form of personal experience. The main story character, for instance, said: “When I was younger, the village used to be better. I remember buying vegetables and fish at much cheaper rates”. The main story character, in rare occasion, provided information in the form of fact but with low-level modality. For instance, she said: “it will take over twenty years to clean. I am not an expert, but I think we have to start now”.

In “Crossing the Sky” VR, the main story characters provided information in the form of fact, yet they maintained a high level of modality. For instance, they said: “Four to five people from our village have lost some of their fingers”. The main story characters in both “Oil in Our Creeks” and “Crossing the Sky” provided facts, yet the low level of modality in the fact statement in “Oil in Our Creeks” conveyed a higher commitment to accuracy.

The “Fight for Falluja” VR relied heavily on first-person mode of address expressing opinions and personal experience. It included less fact statements, most of which were accompanied visual evidence to maintain high level of accuracy. For instance, when Ben C. Solomon said: “The brutality of Iraqi forces was on display as well”, the user could see the body of an ISIS soldier left on the street.

“I am Rohingya” also relied heavily on the first-person mode of address, where the main story character was explaining her personal experience. It was also balanced with written context told in third-person mode of address to present information in the form of facts. The “I am Rohingya” VR used a low modality animation to illustrate the torture scenes explained by the main story

character, as shown in figure 22 in page 189. The animated scenes along with first-person mode of address evoked feeling in the user. This sensory modality added to the naturalistic modality presented in the overall 360° video. Therefore, the truth value of “I am Rohingya” was heightened.

In contrast, “Damming the Nile” and “Bloodhound” relied more on third-person mode of address to present information in the form of facts. The third-person mode gave high modality to the verbal language and added to the already existing naturalistic modality of the 360° video. Yet many facts were opinions but written in a clever way to avoid using the first-person mode of address and thus maintain a high truth value. Alistair Leithead created both VR stories and used a similar technique in both. In the “Damming the Nile” VR, Leithead mixed facts and his opinion as follows:

“It's very exciting standing over and looking at this incredible sight of this dam. Look at that far corner, that's the final height it's going to be. It's gonna come right across the air. All this concrete is going to be built up. It is gonna be 1.8 km across that's well over a mile across about 170 meters deep. And look at...”

The “First Impressions” VR as an acted VR piece was the exception. It used the 360° video and a background audio interview with an expert to add truth value to the experience. The piece mixed the high naturalistic modality of the footage and the third-person mode of address offered by the expert. “First Impressions” also aimed at sensory modality through music and the storytelling strategy. Letting the user embody the main story character enabled experiencing what it feels like to be a new-born. Moreover, the VR attempted to maintain high truth value through preventing the actors from speaking. Actors had no scripted dialogue in the “First Impressions” VR.

The researcher thus far explained the findings in relation to the first group or dimension of VR analytical categories focused on the story side of the VR experience, as shown in table 4 in page 119. She examined the narrative structure and orientation categories, including characters, their processes, presentation elements, point of view, distance, contact and modality. The following

section examines the second dimension or group of VR analytical categories focused on the gaming side.

2nd Dimension: VR Design

VR design dimension contains the gaming-focused analytical categories, including the ludo-narrative and system game play categories. The ludo-narrative is concerned with the representational meaning of the VR design elements, whereas the system gameplay examines the meaning of the VR design in relation to the real-life situation. Such relationship can be an affirmation or a contradiction.

(a) Ludo-narrative

The ludo-narrative analytical category examines the representational meaning of VR design elements, including action rules, game mechanics, spatiotemporal design, non-user characters and patterns of actions. Action rules refers to the types of actions permitted to the user, game mechanics refer to the main theme of the VR experience and the action patterns represents the collective meaning of the actions permitted to the user, either flexible or monotonous.

Eleven of the sampled VR pieces were 360° videos, in which the only action rule permitted for the user was looking around exploring the 360° spherical view. The basic theme of these experiences was observing events as they occurred around the user. The patterns of actions were strict, rigid and monotonous, users did not influence the narrative. The major thing that differed across the eleven different pieces were spatiotemporal design and the non-user characters presented in the narrative.

- Non-user characters in character- and journalist-led VR (360° videos)

Non-user characters in the 360° videos were presented as either actors in the story or voiceless figures. Journalist- and character-led stories presented non-user characters as main story characters. They had voices to tell the stories. Their assisting characters were voiced most of the time.

However, the main story characters may be the only actors within a community of voiceless individuals in “I am Rohingya” and “Oil in Our Creeks”. In the “I am Rohingya” VR, the voiceless

characters helped to balance the gloomy nature of the content. They were dancing in one scene and playing in another, as shown in figures 60 and 61. In the “Oil in Our Creeks” VR, the voiceless characters were just affirming the main character’s story. For instance, a scene of market illustrated the level of poverty that struck Nigerian village due to the oil spill, as shown in figure 62. The main story characters can be the only non-user character in the story such as the “After Solitary” VR. Kenny Moore, a former inmate, was the main and the only story character in the piece. The absence of other characters conveyed the feelings of isolation in the prison cells.



Figure 60 Story characters are dancing in the “I am Rohingya” VR (Al Jazeera).



Figure 61 The son of Jamalida is playing football in “I am Rohingya” VR (Al Jazeera).



Figure 62 Story characters are buying and selling in “Oil in Our Creeks” VR (Al Jazeera).

Voiced non-user characters – other than main story characters – were present in “Greenland Melting”, “Fight for Falluja”, “Crossing the Sky”, “Bloodhound” and “Damming the Nile”. They added more information and context to the story.

The non-user characters could present one side or one single group in the story such as the “Greenland Melting”, “Crossing the Sky” and “Bloodhound” VR. The “Greenland Melting” VR featured NASA scientists only. The “Crossing the Sky” VR featured the father of the two the school girls, the main story characters. The “Bloodhound” VR featured the engineers who worked on manufacturing the world fastest vehicle.

The non-user character could present also several sides of the story. “Fight for Falluja” and “Damming the Nile” VR were journalist-led stories which voiced a variety of characters from various groups to balance the story. The “Damming the Nile” VR, for instance, included ministers, journalists and ordinary people to gain a comprehensive overview about the Renaissance Dam.

“Seeking Pluto’s Frigid Heart VR” represented an exception, in which there was no non-user character. The story consisted of a detached narrator and the user as the only characters in the story.

- Non-user characters in user-led VR (360° videos)

The “Trafficked”, “Sea Prayer” and “First Impressions” VR were user-led stories, and they included non-user characters. The nature of non-user characters was different in all three pieces.

The “Trafficked” VR voiced non-user characters who interacted and talked with the user to explain the problem of women trafficking. The non-user characters were traffickers, victims and victims’ families. They were addressing the user and evoking his or her emotions to feel the experience as real. The non-user characters added also vividness to the story. However, all characters addressed one angle of the story, which is the process and the impact of women trafficking. The characters did not address the reasons for the problem. The characters gave a comprehensive view of the pre-determined story angle.

In the “Sea Prayer” VR, non-user characters were problematic to identify due to the nature of the story that represents mental processes inside the head of the main story character. The main story character, for instance, imagined talking to his child Marawan. However, Marawan was not an active participant in the story. Marawan represented a passive voiceless receiver in a mental communication process inside the head of the main story character.

The “First Impressions” VR was another problematic 360° video since it included an element of interactivity. The user, embodying the new-born, could call the mother using the Daydream controllers. Still, “First Impressions” had a single story-path that existed regardless of user’s interactivity. The user is exposed to the same amount of information whether he or she interacted or not. In this arguably interactive story, the non-user characters were voiceless actors performing the role of parents. The actors were interacting with the user without speaking to restrict the boundaries of the reconstructed reality and/or fiction.

- Interactive VR

Action rules, game mechanics and patterns of actions emerged in the interactive VR. They conveyed significant meanings in addition to the non-user characters and spatiotemporal design. “6×9”, “Spacewalk”, “BBC Earth: Life in VR” and “Crime Scene” represented the interactive VR pieces. User’s patterns of actions varied in the degree of their flexibility, still they were all predictable, strict and confined to limited types of action rules.

The “6×9” VR, for instance, limited the interactivity level to looking around the solitary confinement cell and its components. When the user looks at a certain element such as a book, a magazine, a letter or a toilet, an interactive soundbite is triggered. The user chooses to listen to a certain soundbite rather than the other. The user could listen to soundbite to its end or choose to switch his or her focus to another element. This level of interactivity made the experience different from one user to another. The “6×9” VR permitted patterns of action that revealed the game mechanics or the main theme of the story, which is isolation in solitary confinement. The spatiotemporal design and the nature of non-user characters added greatly to the main theme of the story. The user was locked in a small cell all the time, unable to differentiate between day and night. All non-story characters were not physically present, but their voices were guiding the user. These voices belonged to either fellow inmates or psychologists. The whole design emphasized the sense of isolation in solitary confinement.

The “Spacewalk”, “Crime Scene” and “BBC Earth: Life in VR” pieces conveyed a slightly higher level of interactivity, in which the user can do actions other than looking around and triggering interactive soundbites. They were not time restricted experiences, instead they relied on the users’ interactions. The “Spacewalk” VR had a single story-path and a single ending, unlike “Crime Scene” and “BBC Earth: Life” in VR that were non-linear experiences with multiple endings. The “Crime Scene” VR allowed the user to choose among numerous pieces of evidence in the crime scene and end with success or failure. The “BBC Earth: Life in VR” experience allowed the user to choose which animal to follow and that significantly changed the overall experience from one time to another.

Despite this level of interactivity, the patterns of actions were still monotonous and predictable in “Spacewalk”, “BBC Earth: Life in VR” and “Crime Scene”. Action rules were limited and restricted. The “Spacewalk” VR allowed the user to hold and grab tools necessary to move in zero gravity environment. The “Crime Scene” VR allowed the user to walk around explore the crime scene, look for evidence, select three and pick them up. “BBC Earth: Life in VR” allowed the user to explore the sea-life, point to the white crystals in the ocean and listen consequently to the interactive and informative soundbites.

The game mechanics represented the main theme of the story, either problem solving or exploration. The “Spacewalk” VR combined the two themes. The user was embodying a trainee astronaut trying to fix a problem in the spaceship. The user was also given the opportunity to enjoy looking at the planet earth during the sunset from outer space. The “Crime Scene” VR was mainly problem-solving experience, in which the user was forensic scientist gathering evidence to identify the murderer. The user learnt from the experience that DNA testing is not necessarily reliable and that financial limitations may curtail its results. The “BBC Earth: Life in VR” experience had an exploration theme, where the user could explore the wonders of sea life creatures.

The non-user characters and the spatiotemporal design emphasized the main theme of the VR. In the “Crime Scene” VR, the user was in a graphically scanned apartment in the dark, looking for evidence needed to do the DNA testing and identify the murderer. The non-user characters were a murdered victim and a crime scene manager. In the “Spacewalk” VR, the user moved between the spaceship and the outer space. The time was hard to identify except at a moment when the user was asked to watch the sunset on earth from outer space. The non-user characters were the spaceship leader and the astronaut EV2. The spaceship leader was not physically present but kept giving radio-transmitted instructions to the user. The astronaut EV2 was physically present but always in the space suit, which limited his interaction with the user. The user could only listen to his voice. In “BBC Earth: Life in VR” the user was under the sea in an indefinite time. The story did not contain any non-user character except for the sea creatures wandering in the sea. These settings enhanced the main theme of the VR which is exploration of sea life.

(b) System gameplay

System gameplay is the second analytical category in the VR design dimension focusing on the gaming side of the VR. System gameplay refers to the relationship between the VR design meanings and the external reality.

The eleven 360° videos did not provide any level of interactivity except for looking around. The system gameplay category seemed irrelevant because there were no action rules, game mechanics or patterns of action.

Instead, the system gameplay category revealed interesting meanings in interactive VR such as the “Spacewalk”, “6×9”, “BBC Earth: Life in VR” and “Crime Scene” VR. There was no dissonance between what was presented in the experience and the reality. Even in the most restricted patterns of action as in the “6×9” VR, the experience communicated the sense of isolation and boredom felt in solitary confinement. The patterns of action in the three remaining VR were rigid and monotonous but conveyed a slight sense of reality. These restricted monotonous patterns of action enabled users to engage, absorb information and better understand the story, though they might not have achieved a high degree of realism.

In “Crime Scene” VR, the puzzle and problem-solving themes showed how difficult forensic scientist work in reality. Forensic scientists must make difficult decisions about which piece of evidence to analyse due to budget limitations. However, the action rules of highlighting the evidence as the user looks at them oversimplified the reality. In reality, the forensic scientist has to look hard to find the evidence.

The “Spacewalk” VR allowed a single mode of action which is holding something and grabbing it, using the Rift controller. Although it was very difficult as it depicts a zero-gravity environment, it was a monotonous experience that did not resemble the flexibility of actions in real-life situations.

The “BBC Earth: life in VR” experience allowed the user to stay long under water, in contrast to how complicated it is in reality. In real-life, humans must keep an eye on pressure and oxygen levels while diving. In a way, the VR simplified the reality.

System gameplay and ludo-narrative analytical categories represent the VR gaming side that seemed less relevant to VR journalism compared to the narrative side. To this date, 360° videos dominate the field of VR journalism except for a few interactive VR projects that provide a limited level of user agency. Interactive VR journalism, examined in the sample, provided rigid and monotonous patterns of actions. Users had to perform specific actions in order for the story to move forward. Such rigidity reduced the level of realism since real-life situations are more flexible. Yet it allowed for a degree of editorial control to maintain the represented stories accurate. The monotonous actions in VR sometimes represented the reality of the situation. For instance, limited interactivity in the “6×9” VR helped to convey the sense of despair, isolation and emotional damage experienced in solitary confinement cells.

The audio-visual narrative dimension of social semiotics, however, yielded richer insights about VR journalism. The difficulty of categorising the sampled VR within this dimension is in itself an important finding. Each VR piece fitted more than one category when examined according to the variables of the audio-visual narrative dimension. This showed the complexity of VR journalism that is not a narrative but a storyliving experience.

The researcher followed the established classification of variables in the audio-visual narrative dimension. She grouped the variables into two categories: narrative structure and orientation. However, the presented findings were complex. Some examples were mentioned several times throughout the chapter since each time of occurrence revealed a different aspect in the social semiotic analysis. The researcher was not selective in her presentation of findings because any attempt to simplify might result in a misleading reduction. Each VR piece was a unique project that needed to be equally examined in this qualitative analysis.

The first category of audio-visual narrative dimension examined characters and presentation elements. The findings helped understand the role of content creators/journalists who could be present or absent, detached or involved. However, content creators used several techniques to keep their piece valid while engaging the users. They used the presentation elements to guide the user’s experience and offer context. These elements included text, narrators, interactive soundbites and visual elements.

The second category of audio-visual dimension examined the orientation elements to reveal the user's role and the truth value of the content. Variables of distance, contact, point of view and user agency showed users' roles. Users could be passive or active, involved or non-involved and participants or observers. However, the complexity of VR prevented the researcher from making categorical statements. Likewise, the truth value or the modality did not offer sharp classifications of VR. Many sampled VR pieces combined sensory and naturalistic modality, when examining the verbal and visual mode of address.

The researcher, thus far, attempted to remain truthful to the findings of the VR social semiotic analysis to represent their diversity and complexity. In the upcoming discussion chapter, the researcher synthesised the social semiotics' and interviews' findings to answer the research questions in the light of Actor-Network Theory (ANT) and research literature. She focused on specific aspects of the findings to provide a meaningful discussion about the relationship between VR and journalistic culture, ending with conclusions and recommendations for future research.

Chapter VIII

Discussion and Conclusions

Discussion

Using Actor-Network Theory (ANT) and sociological explorations of journalistic culture allowed the researcher to analyse VR journalism. The researcher identified actors revealed in the discourses of interviewees and through an examination of VR content, focusing on the roles of technology, users and content creators. The interrelations among these actors helped her conceptualise performative understandings of VR journalism and trace their relations to journalistic ideals.

The revealed performative understandings represent an extension to normative discourse surrounding narrative and interactive data-driven journalism. From facticity and accuracy, to objectivity and detachment, VR journalism is the natural development of narrative journalism discourses, bringing transparency to the forefront as a means of demonstrating journalistic rigor. The role perceptions of VR content creators also give rise to experimental and collaborative cultures, assimilating entrepreneurial and interactive data-driven journalism. The following sections explore: (a) facticity and accuracy, (b) objectivity and detachment, (c) transparency, and (d) collaborative and experimental cultures in VR journalism.

(a) Facticity and Accuracy in VR journalism:

The effort to use VR journalism to create a compelling experience resembles the goals of narrative journalism. As narrative journalists use literary devices to engage the reader (Johnston and Graham, 2011), VR content creators search for creative techniques to offer a visceral experience. Both VR and narrative journalism represent the move from being a mere reflection of reality toward an engaging narrative with “dramatic heartening stories, moral lessons and compelling plotlines” (Zelizer, 2017, p.19).

VR journalism uses the literary devices of scene re-construction, character identification and plotline development. These literary devices blur the line between facts and fiction (Kormelink and Meijer, 2015), but traditional journalistic discourse emphasises the need to cover

concrete verifiable events (Baym, 2017). The journalistic narrative must serve truth and accuracy (Kovach and Rosestiel, 2014) and generally follows the strategic ritual of avoiding broad timeless issues that are not easily fact-checked (Tuchman, 1978). However, VR journalism can encompass events that have been fictionalised or issues that have no unique point of reference in external reality. The “Sea Prayer” VR, for instance, is a fictional monologue, yet its interviewed content creators perceive it as grounded in real journalism because it is inspired by real events. “Sea Prayer” represents a shift, where a story can be truthful but not strictly accurate. Narrative journalists reflect the same distinction when they justified intervening with the story facts to make it more truthful (Boesman and Meijer, 2018).

The use of composite sources and stories by VR content creators increases the degree of intervention in reality even beyond the practices of many narrative journalists (Van Krieken and Sanders, 2017). Because these VR stories are based on research into real events or experiences, they are not so much non-real as they are unreal. An unreal story is a hypothetical situation derived from reality (Ward, 2008). Unreal VR stories can use professional actors or CG content. Regardless of their nature, VR creators use creative techniques to emphasize the authenticity and journalistic validity of the content. The creators of “First Impressions”, for instance, indicated in their interviews that they avoided using scripted dialogue in their acted piece to add a sense of authenticity. Actors were moving around the 360° camera without speaking, as if they were an illustration accompanying the narrator’s voice.

Other unreal composite stories used CG content with a low naturalistic modality. CG content does not aim to achieve absolute photorealism. It signals the artificial nature of the VR content and prevents potential user deception. Users are not tricked into believing that something is real when it is not. Content creators of composite stories emphasize the sensory modality, in which the content feels real but does not necessarily look real. The focus on sensory modality in composite stories opens the door for “unlimited as ifs ... moving away from naturalism as authenticity” (Aitamurto, 2019, p. 15).

However, the use of CG content is not limited to composite unreal stories. CG content helps create scene re-constructions that correspond to identified and witnessed events. VR content creators

follow rigorous procedures to ensure that scene re-constructions accurately represent reality. All types of visual, audio and textual evidence, as well as eyewitness testimonies may be used; an example can be found in the acted “Out of Exile” VR piece. AP’s Nakagawa explained how Nonny de la Peña used audio recordings to enact a scene of Daniel Ashley Pierce being kicked out of his home after his family discovered he is gay.

Narrative journalists follow similar procedures to authenticate scene re-constructions. They reference documentary evidence and cross-check accounts of various news actors to ensure journalistic rigor (Lorenz, 2005). They use the internet and digital media capacities to embed audio, video, photos and maps creating multimedia stories, such as *The NYT Snow Fall* story (Van Krieken, 2018)

VR content creators build on these multimedia storytelling ideas, taking advantages of the more digitally advanced capabilities afforded by the medium. Technology is, thus, an actor (Latour, 2005) that transforms the journalistic product into a storyliving experience and interacts with content creators, another VR actor, to demonstrate journalistic rigor behind the experience.

“After Solitary” content creators, for instance, used holograms, volumetric capture and photogrammetry techniques to tell their story. Volumetric capture enabled them to scan the home of the main story character, and photogrammetry was used to construct a CG duplicate of his prison cell. They then created a hologram of the character that could be placed inside these constructed environments. After the complex CG environment was established, VR creators added photos of the character’s family on the cell wall and embedded a factual video of prison guards torturing inmates. “After Solitary” shows how VR content creators strive to adapt the medium to journalism, looking for creative techniques to maintain and demonstrate their accuracy. Just as narrative journalists did in print and continue to do in digital storytelling, VR content creators seek to maintain journalistic standards.

Although scene re-constructions aiming at “faithful duplication” can be more accurate in VR than in some other journalistic genres (de la Peña et al., 2010, p. 299), scene re-construction cannot claim to be the truth. Like any other form of journalism, VR is never an unmediated reality (Ward, 2019, p. 48). VR content creators add audio-visual cues to engage and guide the user, and they

may use low naturalistic modality CG content to prevent harm. Low-modality CG content can create a strange distance between the user and the virtual environment, which engages users and shields them from harm, a traceable difference deprived from intentionality but acknowledged as a level of agency by ANT (Sayes, 2014). “I am Rohingya” VR, for instance, illustrated the story of how a soldier tortured the main story character in Myanmar by superimposing a low-modality animation. The animation moved the user without causing psychological harm.

Audio-visual cues used to engage and guide users pose distinct normative paradoxes in VR. Engagement cues undermine the truth value, but they engage the users and provide deeper understanding of the story, the same paradox found in narrative journalism (Kormelink and Meijer, 2015). Most narrative journalists attempt to combine ethical and aesthetic persuasiveness (Greensberg, 2014). They aim to achieve a compelling story without the need to embellish the facts or bend them to fit the aesthetic mould (Frank, 1999).

VR content creators adopt a similar perspective when using music and voice actors. They use music to engage users without overwhelming the narrative. VR content creators strive to maintain the delicate line between engagement and manipulation. “Spacewalk” VR creators, for instance, acknowledged users’ agency and gave them the choice to turn the music on or off while looking at the Earth from outer space. Content creators also use voice actors to ensure accuracy, for instance dubbing non-English speakers while allowing the foreign speech to be heard in the background. This technique is designed to engage the user and reduce potential overload of subtitles, while maintaining truthfulness, the interviewees suggested.

The guiding audio-visual cues create another normative paradox. Content creators add audio-visual cues to guide the user experience and reduce the risk of missing significant moments of the VR experience. Audio-visual cues are added elements that undermine truth value of the content, yet they ensure the user’s experience is comprehensive and potentially more contextually accurate. This normative paradox resembles the discourses around journalist presence or absence in the VR environment. The journalist’s absence may add a sense of

authenticity to the captured footage, but it also may imply staging or post-production editing, posing questions about the truth value of the content (Aitamurto, 2019).

Staging and post-production editing represent a form of reality intervention, though their effect is not to create composite unreal stories, as previously described. Varying degrees of staging occur in documentaries (Winston, 2000; Aaltonen and Kortti, 2015) and arguably in photojournalism and broadcast journalism, according to the interviewees. Staging includes mutual understandings between content creators and story characters of the camera's existence, such as adjusting scene elements in relation to camera and asking story characters to repeat activities or re-enact a witnessed event (Winston, 2000). VR content creator make situation-based judgments to determine which level of staging, if any, can be used without undermining the journalistic validity.

Content creators' ethical decisions are case-by-case assessments, in which they actively think, discuss and balance between the intended meaning and potential outcome. For instance, content creators may remain outside the scene, but they seek to find the right balance between getting the shot right and not staging or overplaying the scene. Content creators may add elements to guide user attention but not for mere aesthetics. They clearly distance themselves from Hollywood filmmakers. The "Greenland Melting" VR, for instance, contained CG illustrating shrinking ice-bergs due to climate change, but its interviewed content creators were reluctant to add CG birds because they served no meaning. Illustrative CG content in VR is very similar to the use of animation and 3D models in digital storytelling. They add to the story when they are accurate and clearly explained to the users (McAdams, 2015).

VR represents a step closer to a less idealistic ethical position, where journalists are more outcome-oriented (Hanitzsch, 2007). The grey area between fact and fiction has long existed, but journalists used strategic rituals and narrative conventions to distance themselves from fiction writers and maintain their authority (Tuchman, 1972). With the narrative turn of journalism and the emergence of new media, the rituals started to loosen up and the ethical dilemmas of facts vs fiction re-surfaced. VR content creators, in this study, uphold the journalistic ideals of facticity and accuracy, but they prefer case-by-case decisions rather than a one-size-fits-all-approach.

They are exceptionists, allowing ideals to guide their decisions, but they are pragmatically open for exceptions (Hanitzsch, 2007, p. 379).

Interactivity poses more concerns about VR facticity and accuracy. The users' presence in the VR environment does not mirror reality but deepens their understanding of the story, offering another normative paradox. However, social semiotic analysis of VR content revealed that user presence is a complex notion that varies along two different continua yielding varying ethical implications. On the first continuum, the user could be an observer or a participant. As an observer, the user is an eyewitness to the experience, a role that does not differ significantly from that of the traditional media audience. In contrast, the participant user experiences an embodiment illusion. Although that experience is not real, the implications of the illusion on accuracy depends on the nature of the VR content.

Influence then is the second continuum of varying user presence. Participant VR users can be passive when they are confined to a linear authored narrative. The VR here ideally is a research-based carefully crafted narrative, which enables the user to embody the main story character. The passive participant user has a very little opportunity to affect the narrative, maintaining a high level of accuracy. In contrast, the active participant role raises bolder questions about accuracy since the user exercises a higher level of agency, selecting among different scenarios. Users are influencing their own experience and determining not only where to look but also which story-path to navigate. Users may miss significant parts of the story, and the VR experience becomes less repeatable, varying from one user to another (Moody, 2017).

However, the same argument may apply to print media. Readers may only read the lead or skim through the story. The journalist has no control over readers' experience. The VR content creators learn to be comfortable with users not achieving the intended experience but must create strategies to ensure that significant moments are not missed (Bosworth and Sarah, 2019). The VR-guided experience thus ensures a level of accuracy in the interactive piece and increases its journalistic validity.

Interactive journalism on digital media also can provide a roundtable narrative structure, which users experience in a non-linear way, becoming active participants (Sizemore and Zhu, 2011). The

content of such interactive pieces is journalistically valid when every story-path is verified and checked. “The user can follow more than one route, but usually there is no option to smash through a wall where no door exists” (McAdams, 2015, p. 189). VR content creators, in the same sense, can ensure the accuracy of the interactive VR displaying multiple story-paths. Highly interactive VR that is not time-bound may add other measures to ensure accuracy. “Crime Scene” VR, for instance, allowed predictable and repetitive action patterns, enabling users to point to and select evidence in the crime scene. Although the restricted action patterns were less realistic, they ensured a level of accuracy, in which the VR game engine could provide a verified and accurate response to predicted user actions.

VR accuracy can move a step further, when content creators consider interactivity and multiple story-paths as techniques to add context. The 360° spherical view in VR adds context to the story by releasing the user from the limited frames of flat videos (Migielicz and Zacharia, 2016). The user gets a broader perspective, rendering the experience more representative to the underlying reality. And as interactivity increases, the user may navigate different story-paths, adding more breadth to the experience (Marconi and Nakagawa, 2017).

The added context may increase the truthfulness and objectivity of VR. However, context is mediated by the receptivity and willingness of the user to absorb and navigate the experience. Users have limited capacity to absorb the contextual information in VR. Content creators keep looking for ways to simplify contextual information to avoid overwhelming the user. They cannot add large chunks of text, or too many numbers and statistics. Content creators must boil down each story-path and keep it simple. These attempts to simplify the content may render it narrow focused and potentially incomplete and inaccurate. The subjectivity and incompleteness of the user experience may be exacerbated by the 360° spherical viewing options as well as the multiple story-paths.

VR users exercise varying levels of agency choosing where to look and which story-path to navigate allowing their inherent subjectivities to influence the experience, just like fresco art where viewer’s perspective is bound by their physical position in relation to the painting (Arnheim, 1974 cited in Kress and van Leeuwen, 1996)

VR technology is, thus, a journalistic actor that interacts with other VR actors, including content creators and users, bringing significant changes to the journalistic practice. Each VR actor continues to define and redefine other actors' roles through interactions, forming impermanent and contingent translation processes (Law, 2008). VR technology challenges the naturalistic notions of truth, facticity and accuracy, driving content creators to strategize to maintain their work journalistically valid. The technology also empowers users and acknowledges their subjectivities as determinants of the experience.

The traditional journalistic norms of detachment and objectivity are thus not only affected by journalist's but also user's subjectivities, as explored in the next section.

(b) Objectivity and Detachment in VR Journalism

VR objectivity can be perceived as an acting network that is defined by constant interactions between content creators and users while simultaneously influencing VR journalistic validity. VR objectivity is constantly influenced by the content creator authorship on the one hand, and the user agency on the other. The contested nature of VR objectivity, thus, extends the discourse about journalistic objectivity, the *raison d'être* of journalism (Broersma, 2013), the unattainable moral ideal (Schudson, 2001) and the strategic ritual composed of narrative conventions and practices, which help journalism to maintain its authority and jurisdiction (Tuchman, 1972). VR technology adds user-mediated subjectivity as a new element to objectivity discourse in journalism.

The user-mediated subjectivity affects the VR experience at two levels. On the first level of influence, users' intentions, traits and cognitions mediate their immersive response to the VR experience (Shin and Biocca, 2018). Their familiarity with the topic induces a high level of immersion (*ibid.*), but over-familiarity may drive them away (Archer and Finger, 2018). Once users are immersed in the virtual environment, their agency shapes their VR experience. Users' motivations and thoughts affect the way they interact in the virtual environment, the second level of influence. Users may choose to look at one direction rather than the other; they may choose to follow a certain story-path rather than the other. As the users experience the VR, they engage in a sense-making process where they relate meaning to the VR symbols, creating their

own subjective experience (Shin and Biocca, 2018). Sense-making process is arguably an inherent characteristic of any communication message, which is constantly interpreted and re-interpreted by the audience (Kress, 2015). However, the high degree of user agency, as described in the literature section, increases the influence of user-mediated subjectivity on the VR experience.

The increased user agency baffled VR content creators at first, spurring them to search for creative techniques to maintain a degree of authorship and narrative control. They tried forced perspective techniques, sacrificing the VR essence and transforming it to a flat video. Content creators then settled on creating a guided experience using subtle elements of coercion, such as audio-visual cues. A VR-guided experience became the desirable option, pointing us back to journalist-mediated subjectivity in VR.

Content creators are responsible for story selection and its initial framing. They choose where to place the camera and strategize to guide the user's focus to experience the significant moments of the story. In VR as in any other media genres, the journalist's culture guides the news selection and framing processes (Tuchman, 2002). This culture result from institutional role, organisational practice (Tuchman, 2002; Deuze, 2005) and personal characteristics (Ward, 2019). Journalists are humans who see the world "through concepts, norms, presumptions, prior knowledge, memory and interests" (Ward, 2019, p.20).

In this understanding, objectivity becomes a strategic ritual to assert journalistic authority in society (Tuchman, 1972). Journalists practice this ritual through adhering to narrative conventions, which include separation of facts and opinions (Schudson, 2001), balanced reporting, detached description, quotes and references to eyewitnesses (Bock, 2016). VR journalism challenges these conventions, causing the content to appear less objective.

Focused stories are more suitable to VR than complicated stories with multiple nuances. Interviewed VR content creators indicated that they constantly try to simplify the VR experience to avoid overwhelming users, similar to the way in which digital news stories work better when focusing on "one issue and one character and one location" (McAdams, 2015, p. 195). However, such simplification may cause topic misrepresentation (Sambrook, 2012) and one sidedness (Peer and Ksiazek, 2011). Multimedia packages can add context to the digital video by connecting

threads such as audio, video, text, photos, maps on the same platform (McAdams, 2015). In contrast, the VR user needs to switch among different platforms to view a story package, including the VR headset and the website. Content creators may try to embed different materials in the VR experience (VO, video excerpts, maps, graphical illustration), yet they must ensure a simple experience that can stand alone. VR users prefer a single clear protagonist guiding the experience (Archer and Finger, 2018), which defies the balanced reporting narrative convention.

The clear protagonist can be a story character or the journalist. Each option presents challenging questions to the strategic ritual of objectivity. Setting a story character as the single or main story guide may challenge the balanced reporting convention. Story characters become dramatized narrators, telling their stories and expressing their own thoughts, feelings and observations (Tulloch, 2014). This technique may add authenticity, but it makes the VR one-sided. Interviewed content creators perceived the character-led VR as profile stories that has long existed in journalism, presuming that users can differentiate between individual views and broader reality. Content creators attempt to balance the subjective nature of character-led stories by adding context. “After Solitary” VR, for instance, focused on an inmate negative experience in a US state prison but added written context about the current improvements in the prison. The added context transformed the subjective experience of the story character into a vessel to tell a bigger story.

The VR character-led story is seemingly subjective, but it attempts to follow the narrative convention of separating facts and opinion. The added context provides objective third-person facts, whereas the character’s voice represents subjective experience told in first-person mode of address, “I and we”. However, content creators limit the amount of added context for fear of overwhelming the user. Their fear may run to the extreme, driving content creators to eliminate context from the character-led story. For example, content creators may decide not to include separate context in the form of written text or voice-over (VO) narration, which if used could provide useful background information. “Oil in Our Creeks” VR, for instance, relied solely on the main character’s voice with the support of two sentences repeating her speech. The main character in VR thus may become responsible for reporting his or her personal experience as well

as the general facts of the story. The character therefore may need to shift between first- and third- person modes of address, converging the personal experience with external objective facts.

The VR story thus abandons the narrative convention of separating facts from opinion, becoming more subjective. The truth value of the factual claims is reduced as well. A third-person factual statement of an involved subject has a lower truth value than a third-person statement from a detached person, potentially turning the VR experience into an opinion piece. Journalists “outsource emotional labor” to non-journalists to remain objective and professional (Wahl-Jorgensen, 2013, p. 129). VR becomes a platform for subjects to tell their own stories *as if* they are unmediated experience.

The journalist-led VR poses greater challenges to the strategic ritual of objectivity. The journalist’s presence does not necessarily challenge the narrative convention of balanced reporting because journalist’s voice accompanies other voices in the story. However, the explicit journalist’s voice may endanger narrative conventions of detachment and separation between facts and opinions. The journalist becomes a dramatized narrator rather than an implied narrator, who is an invisible all-knowing storyteller (Tulloch, 2014).

In this sense, the VR content creator’s dilemma reflects problems addressed in narrative journalism. Narrative journalism may feature the journalist as a dramatized narrator (Harbers and Broersma, 2014), yet it is a fictional writing technique that defies journalistic conventions and objectivity rituals (Tuchman, 1978). Journalists become story characters entitled to express their personal feelings, thoughts and observations (Tulloch, 2014).

Narrative journalists may adopt a personal-ironic approach. Although they do not separate themselves from the reported events (Harbers and Broersma, 2014), they continually acknowledge their limitations to decipher the ambiguous nature of reality. VR content creators who place themselves within the narrative, in contrast, take the personal-engaged approach. They express their personal experience through the first-person mode of address, which may distort journalistic narrative conventions. However, their personal experience works as an evidence to support an external-discoverable truth. Content creators assume the authoritative

position of eye-witness observers, who use their subjective experience as a truth-supporting method.

The content creator of “Fight for Falluja”, for instance, was the main story character. He explained the experience of being an embedded journalist with Iraqi fighters. The journalist constantly shifted between first- and third-person modes of address, explaining his personal experience and reporting on events around him. He constantly switched between the roles of the main story character and the detached observer. However, he acknowledged himself as an actor distinct from the other story characters, including Iraqi fighters and victims. He appeared in his press flak jacket, taking photos or doing interviews. His near-subjective stance was comparable to that of journalists investigating the NSA leaks, who acknowledged their roles as significant characters but still distanced themselves from the story’s protagonist to maintain their professional status (Eldridge II, 2017).

The near-subjective position moves VR content creators a step closer to the interventionist journalist role. Journalists towards the end of an interventionism continuum may participate, advocate and promote social change (Hanitzsch, 2007). Interviewed content creators expressed diverse views about advocacy in VR journalism. Some content creators rejected advocacy and equated it with social activism that should never take place in journalism. Others tolerated a degree of advocacy when tackling an important issue such as a UN cause. They resemble journalists at quality newspapers, who feel advocacy is permissible when there is a social consensus around an issue (Wade, 2011, p. 1181).

However, VR advocacy may not be restricted to important causes. The essence of VR is providing a visceral experience that users can remember with their entire body (de la Peña, 2015). The near-subjective stance coupled with VR immersion may push the advocacy role to the fore. Recent research suggest that VR users may be more likely to take a social or political action than traditional media audiences (Finger and Archer, 2018). If such situation, the VR content creator becomes more of a “civic partner” (de la Peña, 2013, para. 4) than a detached journalist. It is interesting to note that among the interviewees, content creators with formal journalism

backgrounds were reluctant to acknowledge the advocacy role apart from issues that clearly involved common good.

Because of its visceral power, VR advocacy may have a strong impact, but it arises from the same impetus as advocacy in traditional media. Fisher (2016) argued that all works of journalism contain elements of advocacy implicitly or explicitly because of “organisational, journalism production, source and personal factors” (p. 723). “Pragmatic objectivity” is then necessary to acknowledge the impossible quest for neutrality, allowing journalists to become engaged citizens and “advocates” (Ward, 2019, p. 24). Journalists can be engaged citizens advocating a certain perspective as long as they are not ignoring inconvenient facts and as long as they adopt truthful interpretations and unbiased decisions – objective methods – to reach their goal. In that sense, VR content creators can be advocates and journalists as long as they adhere to ideals of facticity and accuracy.

Pragmatic objectivity also entails transparency, in which journalists are transparent about their partialities, sensitive to their undue influence and willing to submit to public scrutiny; transparent journalists provide reasons for their actions, which audience may or may not accept as valid (Ward, 2019). Transparency is another crucial measure for journalistic validity, which VR content creators emphasize.

(c) Transparency in VR journalism:

VR content creators use direct and indirect tools of transparency to serve a variety of functions. They adopt the transparency of disclosure (Karlsson, 2010), which entails openness about editorial methods of production and factors influencing it (Ward, 2015). Content creators use transparency to signal scene re-constructions, ensure facticity and reveal news-making processes, including production processes and intentions. They perceive transparency as a truth-supporting method and a defence mechanism that counter doubts about journalistic validity. They also perceive transparency as a tool to protect users from potential harm and deception.

Content creators, as journalistic actors, engage in a two-way interactive relationship with VR technology, a recurring translation process among actors (Law, 2008). VR technology causes normative challenges, blurring the line between facts and fiction and emphasizing user-mediated

subjectivity. Content creators, in turn, attempts to address these challenges by exploiting technological capacities and constructing creative transparency techniques. They employ direct and indirect transparency tools to signal scene re-constructions, ensure facticity and reveal news making processes.

Signalling scene re-construction prevents deception because users are not tricked into believing that something is real when it is not. Many documentary filmmakers and digital multimedia storytellers emphasise the importance of transparency about scene re-constructions (Winston, 2000; MacAdams, 2015). Likewise, VR content creators stress this form of transparency because users are not sophisticated enough with the medium. Interviewees felt that users can be wowed by the technology and be easily deceived.

However, as suggested in the discussion of accuracy above, the disclosure of scene re-constructions may generate doubts about content veracity and accuracy. Transparency is a form of truth-telling, but it may “subvert journalism” (Broersma, 2013, p.33). It may endanger audience trust, increase social pressure and undermine journalistic autonomy (Allen, 2008). The journalist, thus, needs to decide which degree of disclosure suits the story and its potential audience. Transparency is a situation-based assessment rather than a “one-size-fits-all approach” (Karlsson and Clerwell, 2018, p. 1930). Therefore, VR content creators try to balance between being transparent and endangering journalistic authority.

Content creators use direct or indirect methods of disclosure to signal scene re-constructions. CG VR creators see the low naturalistic modality of the visuals as enough to signal their reconstructed nature. “Trafficked”, for instance, used low-polygon-count characters as an indirect method of disclosure without the need for a direct disclaimer stating the use of CG content. Photorealistic CG VR creators also do not use direct disclaimers to signal scene re-constructions when the indirect methods of disclosure are clear enough. The “6×9” photorealistic CG VR, for instance, allowed for user interactivity through a first-person perspective experience. The VR creators did not explicitly mention the constructed nature of the content in the three-paragraph long disclaimer. Instead, they explained the journalism work behind the piece and its evidence, and alerted users for potential negative influence. The “After Solitary” photorealistic CG VR also did

not use direct disclaimers, but the content creators signalled its re-constructed nature through indirect methods. The main story character did not wear the prison uniform while being in the solitary confinement cell. Photorealistic CG VR creators display a higher level of transparency only when users could be easily tricked, and when content creators feel indirect signals are not explicit enough. The “Greenland Melting” VR, for instance, started with a long opening disclaimer, explaining the re-constructed nature of the content and technicalities of its production process. The VR creators also emphasized the fact-based nature of the content in the disclaimer.

Acted VR creators also use direct and indirect methods of disclosure to signal the re-constructed nature. However, the direct methods are not always explicit. Acted VR creators acknowledge the actors at the ending credit, but at least among the pieces included in this study, acting was never mentioned in the opening disclaimer, if there was one. Opening disclaimers may distance users from the content before they start the VR experience, by negating the sense of authenticity that content creators wish to communicate. “First Impressions” VR creators, for instance, did not acknowledge the actors until the end, and they instructed actors not to speak to convey a sense of authenticity. However, the first-person perspective, where users embody a new-born baby, clearly implied the re-constructed nature of the experience. “Crime Scene” VR creators also used an actor, without acknowledgement in the opening disclaimer. The interactive and CG appearance of the content implied its re-constructed nature.

Although VR content creators may signal re-constructions, they try to do so without endangering facticity and accuracy; the foundations of journalistic authority and credibility (Karlsson and Clerwall, 2018). The forms of transparency just described may prevent user deception, but they also can detract from the experience of consuming journalistic content. Therefore, VR creators may place more weight on presenting factual evidence and disclosing the journalistic practices, particularly in acted and CG VR.

Narrative journalists use transparency in a similar way to maintain journalistic jurisdiction while utilising fictional writing techniques (Lorenz, 2005). When the story is “too good to be true”, narrative journalists use transparency to address doubts about the veracity of the details and the methods of access (Frank, 1999, p.1947). Their transparency tools for validating scene re-

constructions includes attribution, soundbites, photos and video evidence (Lorenz, 2005; Van Krieken, 2018). CG and acted VR not only use similar techniques but also add direct disclaimers because the facticity of evidence such as soundbites is contested in VR. Direct disclaimers emphasize the factual nature of the VR content, and the evidence embedded in the presentation. The “6×9” VR opening disclaimer, for instance, stated clearly: “the voices you hear are not actors”. VR content creators want to ensure that users do not perceive the experience as a fictional story or a trivial game. For instance, the “Seeking Pluto’s Frigid heart” VR used the ending credit to emphasize it was based on research. For a similar purpose, the “Greenland Melting” VR used an opening disclaimer and an archive video, whereas the “First Impressions” used the opening disclaimer and soundbites. VR content creators are constantly looking for creative techniques to separate themselves from fiction.

Non-acted and non-CG VR content creators may find it easier to be transparent without compromising the ability to deliver an effective narrative. The nature of this content conveys a sense of authenticity without the need to explain the news-making process. Users can see the real-life captured footage and interviews, and can identify with original story characters. However, journalist-led VR goes a step further and reveals the news-making process. Traditional journalists may provide original documents and correct report error, but they rarely demystify the news-making process (Karlsson, 2010). In contrast, journalist-led VR identifies the content creator as an actor with an explicit voice. The content creator thus can explain his or her own experience and the challenges of his work. The content creator’s presence adds another layer of transparency. Users can observe closely what it is to be like a journalist working on the field. The “Fight for Falluja” VR, for instance, enabled users to experience embedded journalism, as described above. The content creator explained his experience and the challenges he faced through the VO, and users could see him on the field facing dangers, taking photos and doing interviews. VR can pull back the veil of journalism and provide insights into the news-making process.

The process of producing journalistic work used to be opaque, all but invisible to news consumer (Tandoc and Thomas, 2017). The rise of internet culture and the decline of audience trust gave rise to transparency (Singer, 2007), one of many tools used by journalists to reinforce their own

professional status in the face of digital challenges (Bogaerts and Carpentier, 2013). Online news uses transparency add-ons such as time stamps, external links and original documents (Karlsson, 2010). VR uses transparency add-ons such as embedded photos and archive videos in addition to its inherent 360° truth-revealing nature. VR users can explore production work, normally locked behind the scene in flat videos. As long as the content creator chooses to remain on-camera, there is no need to film the “making-of” to show the actual production processes.

Transparency about the news-making process also includes openness about intentions behind the story selection (Ward, 2015). Opening disclaimers explicitly mention the intended purpose of the VR piece. Intention disclosure in disclaimers helps prepare users for what they are about to experience and make them aware of potential negative consequences. VR can develop a deep sense of immersion that can cause unexpected psychological risks (Madary and Metzinger, 2016). Disclaimers can clarify the nature of the experience, so users can make informed decisions about risking exposure to this potential harm.

Intention disclosure varies in functions and intensity according to the nature and the expected outcome of VR content. First-person perspective VR increases the need for intention disclosure. Content creators must prepare users for their new participant roles. The “Trafficked” VR, for instance, ran a “may contain violence” disclaimer and prepared the user for the embodiment illusion. More interactive VR displays a higher level of intention disclosure because interactivity may increase immersion and magnify potential harm. “6×9” VR creators, for instance, had to run a three-paragraph disclaimer to alert users and explain its intended purpose of enabling the user to experience psychological damage in solitary confinement. Intention disclosure seems to be a tool to prevent harm and clear the creator’s conscience.

The intention disclosure performs another function as VR interactivity level increases: explaining the rules guiding the user’s action. It prepares users for their roles, missions, action patterns and limitations. Interviewed content creators believe that users are not sophisticated enough with VR at this early stage, so intention disclosure is needed to help users understand how to behave in interactive virtual environment. The “Crime Scene” VR, for instance, combined written and

spoken intention disclosure, which introduced users to the intended purpose, their mission and their potential actions.

However, explaining the user role and action rules is not participatory. The participatory transparency entails openness for users to participate in the news-making process through allowing their comments or inviting users to publish original materials, including text, photo or video (Karlsson and Clerwall, 2018). VR does not allow users to publish their original content. Instead, VR enable users to freely navigate their way in a pre-designed experience. The users are bound by permitted action rules and the pre-designed VR environment. Instructions and openness about users' roles are aspects of disclosure, not participatory, transparency. The "Space Walk" VR, for instance, asked users to choose between astronaut and easy modes, and followed each choice with an alert about a potential disorienting effect. This technique helped disclose the intended purpose, the user role and the potential effect.

Disclosure transparency also entails openness about funders, editorial partners and potential conflict of interest (Ward, 2015). Content creators are upfront about external collaborators and funders, and identify them either in the opening disclaimer or the ending credits. The "Greenland Melting" VR, for instance, started with identifying five actors working on the content creation process, including Frontline, Emblematic, Nova, Realtra and xRez Studio. It ended with another list of funders including the Knight Foundation and Corporation of Public Broadcasting (CPB). The disclosure shows the integrity of content creators, yet the very fact of funders' existence might undermine trustworthiness by inviting doubts about the editorial independence. Although the funders may not have any role in the editorial work, their inclusion as a part of disclosure could raise questions in users' minds, said the BBC's VR hub commissioning editor during her interview. This example suggests that transparency should not be the only or even the primary guiding principles. Instead, it can be argued that content veracity should come first. Facts and verification precede transparency (Ward, 2015), since audience values objectivity over transparency as a predictor for journalistic credibility (Tandoc and Thomas, 2017). The findings suggest that VR creators take extra care not to let funders influence their autonomy in their noble quest to get the story right. Interviewed content creators indicated that they uphold the rigorous news

gathering and verification processes as determinants for journalistic validity, and then add transparency as a manifestation for their integrity and rigor.

Funding VR is indeed a huge problem because content creation is an expensive and a complex process. Diverse actors collaborate and experiment to find the best ways to tell stories in VR. New cultures emerge and interact with existing ones in journalism. A form of entrepreneurial journalism arises from VR content creation and organisation of work, as content creators engage in new roles and acquire different skills.

(d) Collaborative and Experimental Cultures in VR Journalism:

Collaborative experimental culture of work can be viewed as an acting network that is defined by on-going interactions among VR actors while simultaneously shaping the characteristics and the roles of content creators, a recurring translation processes resulting in a contingent impermanent network (Law, 2008). Content creators interact with funders, story characters and technology. These content creators themselves are a heterogeneous network of journalists, artists and technologists, who interact with each other. As the complex interactive processes continue, the collaborative experimental VR culture emerges as an acting network, which exercise a level of agency that defines the characteristics and roles of VR content creators.

VR content creators seek funding opportunities to cover the expense of VR, becoming fundraisers who try to appeal to potential funders to secure financial resources. The convergence of fundraiser and journalist roles endangers the church-state separation of editorial and business sides of journalism (Porlezza and Splendore, 2016). VR thus represents an extension to the ongoing threats of editorial independence that started with digitization (Küng, 2015) and continued with in entrepreneurial journalism (Vos and Singer, 2016). VR creators may pitch content to potential sponsors. They may publicly compete in challenges to win grants for start-up costs. They may form partnerships to fund their experimentations. Such an entrepreneurial culture is not restricted to independent content creators. VR creators at established media organisations also apply for grants, search for sponsors and experiment with potential revenue streams.

VR thus marks a considerable cultural shift, in which established media organisations are endorsing entrepreneurial culture of media start-ups. The Euronews VR editor, for instance, works closely with the marketing teams and develop pitches for potential sponsors. Content creators perceive the fundraiser role as essential to cover production expenses and fuel VR experimentations. Traditional journalists have been urged to understand the business side of news to survive the economic crisis facing media organisations (Vos and Singer, 2016). Yet VR represents an actual shift in journalists' understandings of their role.

However, content creators attempt to preserve their autonomy while being fundraisers, interviewees insisted. They clearly label sponsored content and use its revenues to fund original content. They may receive grants from organisations that pose no conflict-of-interest threats. For instance, Frontline, the PBS documentary series, received a grant from the Knight Foundation, a US non-profit that promotes excellence in journalism.

VR creators may apply for grants or partner with technology companies without harming their autonomy. They are upfront about their partners and explicitly list them on the VR piece. A transparency policy may solve entrepreneurial journalism issues, if it sets guidelines for funders' roles and details how to deal with conflict-of-interest claims (Ward, 2015). Although the actual partnership contracts may not be readily accessible, VR creators are transparent about their funders and insist that they are handoff the narrative. The funders are concerned with the quantity of production, the number of VR projects done over a certain period of time. *The Guardian*, for instance, had to produce twelve VR pieces over an eighteen-month period during the partnership with Google (Anderson, 2017). Still, critics question the funder's influence at the critical time of contract renewal. News organisations may not be able to report objectively about their partners when they are about to renegotiate a deal (Watson, 2017).

The shifting role of content creators does not stop at fundraising. Content creators work in multi-disciplinary teams, acquiring new skill sets and fostering collaborative and experimental cultures of work. VR content creators may work with technologists and creative artists inside the boundaries of their organisation or outside it. The collaborators' numbers, places and backgrounds influence the complexity of the content creation process. The large number of

collaborators – especially when working at different organisations – presents a challenging situation, but the unity of purpose helps address the challenges. The unity of purpose helps overcome the sense of competition that journalists normally feel, interviewees suggested. Various media organisations may work together on a VR project to deliver the best VR story possible at reduced costs. Wikileaks, for instance, gave rise to collaboration across media organisation to accommodate the size of journalistic work and mitigate the risk of censorship (Woodall, 2018). However, collaboration in VR is not limited to the story level. It is a broader process, in which diverse VR content creators share knowledge and experience to harness the technology for journalistic purposes. The Journalism 360 initiative provides a good example for that. The initiative was launched by the Knight Foundation, Online News Association (ONA) and Google News Lab to create a VR knowledge-sharing community and foster experimentation with challenge-based grant awards.

The collaboration is more challenging when VR team members have different backgrounds, interviewees agreed. Technologists, creative artists and journalists have distinct norms and occupational values, which lead to different views about the nature of journalism and its creative processes. Creative artists may pursue aesthetic persuasiveness at the expense of ethical persuasiveness, so journalists will have to find the right approach to separate their work from fiction. Technologists may not fully understand the language of journalism and its principles, so journalists will have to engage in prolonged two-way communication processes to listen and explain.

Technologists and journalists speak different languages. They need perseverance to work through their differences and bridge the gap. VR content creation becomes a gradual learning process, in which content creators find their way through a trial-and-error approach. Technologists train themselves to simplify their language and explain their technical jargons, while journalists educate and familiarize themselves with technology and its capabilities. The collaborative work can become an enjoyable experience, a challenging and rewarding one, interviewees agreed. Despite the explicit difference between journalists and technologists, a sufficient mutual understanding makes their collaborations meaningful (Lewis and Usher, 2014). VR journalism teams tend to attract like-minded people. The then technologist at *The Guardian's*

VR team, for instance, said he was always interested in using games to tell meaningful stories rather than mere fantasy. The unity of goal makes VR content creation rewarding at the end.

The findings suggest that the experience of VR content creation reinforces new notions of work in journalism. These notions are explicit in data-driven interactive journalism such as “openness”, “non-linear narratives” and “see-it-for-yourself”, the users’ ability to explore the story themselves, either through layers of an interactive story or through links provided to different articles (Usher, 2016, pp.167, 169, 170). VR content creators provide users with agency to freely explore the 360° view and may offer multiple story-paths for users to navigate. VR content creators present an increased sense of openness, in which they invite the users to view the unfinished versions of their products to get feedback for suggested improvements. BBC VR creators, for instance, may pilot content on the BBC Taster³¹ platform for a limited time period to get audience ratings and feedback, showing how experimental VR content creators are endorsing the openness culture.

Content creators adopt the trial-and-error approach. Interviewed content creators indicated that they are not afraid of mistakes anymore because experimentation – even with failures – helps them to learn and innovate. Media organisations may encourage VR experimentation to promote a positive self-image as innovative companies (Watson, 2017). Al Jazeera, for instance, did not mind their technical mistakes when they first tried online 360° streaming of a TV show because they felt the experience showed them as forward thinkers open to new ideas.

The experimental culture may collide with journalistic traditions urging the journalist to publish verified error-free stories. Audience expect the news to be accurate in the first place. Openness about corrections does not necessarily increase or win back the lost audience trust (Karlsson et al., 2017). However, errors in VR journalism are different in nature. They are technical errors rather than editorial ones. VR content creators are open to experiment with the production techniques as long as the story is editorially accurate. For instance, Cassandra Herrman, the director of *After Solitary VR*, found that users missed the embedded photos when she premiered her VR in the 2017 South by South West (SXSW) US film festival (Bosworth and Sarah, 2019). She

³¹ <https://www.bbc.co.uk/taster/> [Accessed 8th April 2019].

decided to add an audio cue of bird sounds to guide the users not to miss the photos. The error is not in the story itself but in the technicalities of production.

To create VR, journalists must be willing to get outside their comfort zone and experiment with technology. The findings show that content creators must be risk takers, adaptive workers and self-learners. They explore and push the boundaries of what seems conventional because the VR grammar is not well-established. For instance, the BBC's Leithead described how he broke the fourth wall, called the 360° camera Marvin and made a joke of pouring a glass of water to it as if Marvin was a real person in the "Damming the Nile" VR. Leithead was not sure about audience reaction to that joke, yet it ended up very well, he said.

As VR content creators explore, they may mess things up until they eventually learn how to use technology and adapt to its changeable nature, interviewees agreed. VR content creation, thus, represents a new example of how journalistic work is changing. The Internet, for instance, challenged traditional print or broadcast deadlines and created a 24/7 news cycle (Deuze, 2008), a shift that critics worried would undermine professional values (Witschge and Nygren, 2008). However, VR content creators stress their understanding of journalism remains unchanged. They still hold professional ideals and journalistic rigor as guiding principles for their work. As described above in relation to norms, content creators put facticity and accuracy of information at the forefront of their work and then add transparency to demonstrate their rigor.

However, the experimental approach of pushing the boundaries may endanger journalistic ideals even if driven by the noble quest for truthfulness. VR creators, for instance, may collaborate with story subjects, perceiving them as co-creators. Story subjects may oversee the whole production processes. They may even have the final say on the story. Freelancer Ross, for instance, indicated that all the story subjects get to sign the narrative of the VR piece before being released. The close collaboration adds truthfulness to the story and protect story subjects from potential harm, interviewees agreed. However, it may endanger journalistic autonomy to tell accurate stories, causing a potential conflict of interest (Ward, 2015). The willingness of content creators to explicitly acknowledge their close collaboration marks a considerable difference from earlier habits of practice. For instance, Lorenz (2005) found that narrative journalists are reluctant to

acknowledge letting the subjects read the stories before publication, though the journalists may actually do that as an accuracy check. The difference here is that content creators do not see the contradiction between close collaboration and their normative understanding of journalism.

This close collaboration introduces another normative paradox to the ones mentioned earlier. However, it is a paradox that some content creators are unable to perceive. Collaboration has become normalised as part of their own understanding of what journalism should be, which might not be the widely held understanding among journalists outside the VR field. VR content creators perceive their close collaboration with story subjects as adding truthfulness to the story, without paying attention to its potential impact on accuracy. Their core normative understanding of journalism, thus, remains stable even as the ways in which they enact it changes.

Conclusions

The findings of this exploratory study showed a significant change in journalistic practice. VR technology is present as a major actor along with content creators and users. All are actors who exercise a level of agency in a two-way interactive process (Latour, 2005). The interaction introduces changes to the roles of content creators and users as well as the nature of the content. Collaborative and experimental cultures of work emerge, and new forms of content appear. These emerging cultures and content forms challenge the journalistic norms of facticity, accuracy, objectivity and detachment. Content creators look for creative ways to maintain the norms while exploiting the technology to achieve the journalistic potential. Content creators' normative understanding of journalism remains unchanged, but their work becomes more challenging. The emerging cultures of work and the nature of VR content make it easier to slip away from journalistic norms. Content creators seemed to share the response of journalists to earlier digital innovations. Their habits of practice dramatically change while their normative understanding of journalism remains unchanged (Singer, 2019).

Content creators, in this exploratory study, struggle to uphold journalistic ideals in VR journalism. They face many normative paradoxes related to accuracy and objectivity as well as ethical dilemmas related to journalistic autonomy. However, these paradoxes and dilemmas are not unique to VR. Similar paradoxes exist in narrative journalism, and similar dilemmas emerge from

entrepreneurial journalism. The difference is the intensity level of these paradoxes and dilemmas. VR technology and user agency emphasize the paradoxes and dilemmas, making it harder for content creators to make sound ethical judgments.

In this environment, ethical judgements become situation-based assessments. Content creators adhere to traditional normative understandings of journalism, but they allow for exceptions to prevent potential negative consequences for users' experiences. Content creators are exceptionists, who "allow moral absolutes to guide their judgment but remain pragmatically open to exceptions" (Hanitzsch, 2007, p. 379). Their ethical judgment is no longer a one-size-fits-all approach but rather a situation-based assessment guided by journalistic ideals. Content creators start with a story-first approach, in which the story passes through the conventional research and verification processes. They then try to figure out how to tell the story in VR, weighing their intentions and potential outcomes to address potential ethical concerns.

The exceptionist position explains the diverse nature of ethical judgments. Content creators struggle to balance between ethical and aesthetic persuasiveness, as well as between their autonomy and the collaborative nature of work. They make situation-based ethical judgments to maintain journalistic ideals while seeking to prevent potential negative consequences. This situation-based approach is evident in interviewed content creators' inability to form generalisations, despite their insistence on the unchanged nature of their normative understanding of journalism.

Exceptionist VR creators perceive the unconventional practices to be allowable to prevent a number of negative consequences. The normative paradox of accuracy provides a clear example, as revealed in the social semiotic analysis and explained in the interviews. Added audio-visual cues prevent the audience missing the important moments of the experience. CG environments with low naturalistic modality prevent harm and potential deception. Plating out the journalist and the camera tripod prevents intervening with the authenticity of the experience. Close collaboration with story subjects protects them from harm when telling a sensitive story. A degree of staging – in the sense of repeating parts of daily routine or changing elements' positions in relation to the camera – prevents potential effort, time and money losses. Acknowledging the

user as a story character helps prevent the user from confusing the composite piece with the real one. Limiting user agency to specified action rules and patterns prevents the user from messing with the story and thus keeps it accurate.

Exceptionist VR creators are pragmatic. They adopt the notion of pragmatic objectivity, which allows objective journalists to be engaged as long as they do not avoid inconvenient facts. Pragmatic objectivity calls journalists to be transparent about their partialities, sensitive to their undue influence, and willing to submit to public scrutiny as well as to present reasons for their actions that people can accept as valid (Ward, 2019). This type of objectivity has enabled content creators to become dramatized narrators, defying the conventions of detachment. Content creators in this study adopted a near-subjective stance, in which they were major actors but distinct from the main story characters. The presence of content creators helped demystify the production processes, confirming the content creator's role as an eyewitness who uses his or her subjective experience as a truth-supporting method. The presence also helped retain users' attention levels as the content creator directly addressed users, acknowledging their presence in the virtual environment.

With pragmatic objectivity, transparency gains a level of prominence. Transparency becomes a truth-supporting method, a defence mechanism and a tool to prepare users and protect them from potential deception and harm. Content creators used creative ways to demonstrate transparency, including direct and indirect methods. Direct methods included written text in opening disclaimers or ending credits, whereas indirect methods included low-modality CG content, first-person perspectives and even cues provided by the clothes of the main story characters. Content creators make situation-based assessments to determine the method of transparency needed. Transparency helps demonstrate rigor, but it can undermine audience trust (Allen, 2008). The VR creators of "First Impressions", for instance, acknowledged professional actors in the ending credit instead of the opening disclaimer to avoid potential user disconnection from the story. CG VR, on the other hand, used an opening disclaimer to emphasize its fact-based nature.

A unique form of transparency emerges in interactive VR. Content creators explain the purpose behind the VR experience and explain the user's mission, role and action rules in the virtual environment. This form of transparency prepares the users for their new roles, which dramatically shift from their conventional roles in print, broadcast and online journalism. However, users' roles are still bound by the predesigned nature of the VR experience, reflecting journalistic authorship. The journalistic authorship may be decreasing but not vanishing in VR. Journalistic autonomy arguably is still in effect despite the high level of user agency.

However, there also is a sense in which collaborative VR culture poses a danger to journalistic autonomy. Funders, creative artists and technologists collaborate with journalists in VR content creation, with each actor posing a distinct question about journalistic autonomy.

Funders help cover the expensive costs of the VR content creation process. VR creators often seek funders, in addition to their main role of generating content. As they become fundraisers, they potentially blur the boundaries between editorial and business work (Porlezza and Splendore, 2016). VR is, thus, a form of entrepreneurial journalism, in which content creators try to prevent the external funders from intervening with editorial decisions and use transparency to show rigor. Transparency in entrepreneurial journalism may entail full disclosure of funders' roles and the procedures journalists take to deal with conflict-of-interest claims (Ward, 2015). Likewise, VR content creators insist on their editorial independence, and say that external funders are more concerned with the number of VR pieces than their actual topics.

Creative artists and technologists help create effective VR, but they also introduce challenges to journalism work. They have distinct norms and occupational values, which lead to different views about the nature of journalism and its creative processes. They may emphasise aesthetic persuasiveness over ethical persuasiveness. Journalists in VR teams become responsible for maintaining the balance, seeking to ensure that the VR experience does not turn into a Hollywood film or a fantasy game. The multi-disciplinary team collaborate, learn and internalise the journalistic norms and ideals, so that the final VR piece remains journalistically driven.

However, such collaborative work is challenging. The multi-disciplinary team members speak different languages due to their different backgrounds. Journalists work hard to familiarize

themselves with technical jargon and methods of work. They embrace the open-source and experimental cultures, where content creators are not afraid of mistakes. They openly acknowledge the experimental nature of their work, recognising the technical errors identified by users and willing to work on them. Content creators differentiate between technical and editorial errors in VR. Stories go through rigorous fact and verification processes before content creators start putting the pieces together. The experimental nature of work thus does not collide with norms of accuracy and autonomy. The normative understanding of journalism remains unchanged. Content creators' individual qualities enable them to experiment without influencing their journalistic ideals. They are adaptive risk-takers and self-learners, who demonstrate qualities similar to hacks and hackers in interactive data-driven journalism (Usher, 2016).

VR content creation, indeed, may pose questions about journalistic ideals, yet these questions are not new. They existed in ethical and cultural discourses around narrative, entrepreneurial and interactive journalism. VR content creation is a stage within the long continuum of shifting journalistic practices. It represents the constant attempts for journalists to remain truthful to journalistic norms while adapting to change.

VR also represents a further step towards embracing emotionality in journalism. Despite the strict normative definitions, emotionality is arguably a component of journalism (Baym, 2017). Storytelling is an integral part of daily journalistic practice (Kromelink and Meijer, 2015), a method to produce "culturally evocative narrative" that locates audience in socio-cultural and political contexts (Baym, 2015, p.17). Such daily practice has become controversial with the rise of narrative journalism due to the emphasis on aesthetic persuasiveness (Greenberg, 2014). Boundaries between journalism and entertainment blurred because narrative journalists used fictional writing techniques (Johnston and Graham, 2011). Social media also has given rise to affective news streams that helped reconnect the public to the news, yet such affective news was not always accurate (Papacharissi, 2015). Affective news streams on social media were "collectively generated, pluralistic arguments on what should be news, and how news stories should be told" (p. 33).

VR journalism emphasizes the emotionality component due to its nature as a storyliving experience (Maschio, 2017). It permits a sense of immersion and presence that varies among users according to cognitive, behavioural and affective factors (Shin and Biocca, 2017). Such psychological impact has the potential to turn into manipulation due to the subjective nature of the VR experience. As indicated in this exploratory study, VR technology drives content creators to reduce context and privilege character-led stories and first-person experience to create the illusion of embodiment. Still, content creators continue to look for ways to prevent VR from becoming a source of manipulation. As described above, they balance between aesthetic and ethical persuasiveness. They use journalistic rigor to determine what the story is before deciding how the story can be told in an engaging way. The story must be grounded in facts regardless of how those facts are conveyed. Content creators' normative understanding of journalism remains fixed. The boundaries of journalistic practice are expanding, yet *perceptions* of its normative foundation remain unchanged. Although an external observer might think that journalistic norms also are expanding, the theoretical approach adopted in this exploratory study does not permit such a claim. The researcher set out to examine VR creators' perceptions of journalism rather than theorizing what journalism is or is not.

The researcher used an ANT approach to examine the interrelationships among networked actors because it permitted a deep understanding of VR journalism as a discursive practice. ANT highlighted the diverse actors involved in the VR journalism as well as their ongoing translation processes, in which they constantly defined and redefined their roles and identities. ANT underscored VR technology as an actor that exists on the same ontological footing with human actors, including content creators, funders and users. ANT also helped demystify the hybrid nature of content creators, who could be journalists, documentary filmmakers, creative artists or technologists. Each one of these human actors brings his or her distinctive culture and frame of reference to the VR-journalism network. ANT permits a consideration of cultures as actors, enabling researchers to explore engagement in reciprocal processes with other networked actors. On the one hand, cultures shape the interactions among networked actors, including technology, users, funders and content creators. On the other hand, cultures are shaped and re-defined by the ongoing interactions with other networked actors in VR journalism.

ANT allowed the researcher to view journalistic culture as a performative outcome that needed to be understood within the broader normative context, to add meaning and depth to the findings. She used research literature about journalistic culture as a conceptual framework, which allowed her to see meanings amid the state of flux extensively described by ANT. She was able to deduce the exceptionist ethical ideology of VR content creators, in which they agreed on journalistic ideals but remained pragmatically open to exceptions to mitigate potential negative consequences. The conceptual framework also allowed the researcher to see the notions of pragmatic objectivity reflected in content creators' practices and ethical decisions. Such notions tolerated subjectivity and journalism of attachment as long as journalists did not ignore inconvenient facts.

The researcher used semi-structured interviews to examine the perceptions of content creators and social semiotic analysis to examine the nature of the VR content. She did not examine directly the roles of users and technology – the remaining VR actors. The researcher could not conduct extensive audience research, both because of logistical constraints and because the consumer market remains “incredibly small” (Doyle et al., 2016, p. 8). Consequently, she examined VR users indirectly through examining the content itself and analysing the content creators' perceptions of users. The researcher also could not conduct ethnographic research to directly examine the role of technology as a VR actor. Instead, she relied on content creators' accounts in the semi-structured interviews. Although ethnography is the most preferred method in ANT research (Anderson and Kreiss, 2013), VR content creation is an iterative process that is not restricted to a specific workplace. Therefore, comprehensive participant observation seemed logistically challenging and perhaps not viable, creating a risk of incorrect interpretation based on incomplete data.

The qualitative methods of data collection reduced the ability to make generalisations. The researcher used purposive sampling techniques to recruit thirty fact-based content creators and select sixteen VR pieces.

The content creators' sample was a fraction of the entire population of fact-based content creators. However, the researcher applied Maximum Variation Sampling (MVS) technique (Etikan

et al., 2016). She included VR creators from diverse backgrounds, including journalism, creative art and technology. She also was not confined to traditional newsrooms. She recruited freelancers and content creators affiliated with VR studios. Such diversity was also inspired by the ANT approach, which removes the inside/outside dichotomies. This sampling technique captures the diversity of opinions, offering a holistic understanding of VR journalism. It helped overcome the inherent limitations of qualitative research methods and added value to this exploratory study.

The same concept applies to the VR content sample. The researcher selected a purposive sample of sixteen VR pieces created by five legacy media organisations, all with a long-held reputation for journalistic quality: Al Jazeera, the BBC, *The Guardian*, *The New York Times* and PBS, the US public service broadcaster. The sampled pieces were diverse in terms of content, users' roles and journalists' roles. They therefore reflected the different types of fact-based VR at the time of the study. They did not represent the entire population of such content, but the deliberate selection of VR journalism from these five elite outlets enabled the researcher to see how the reputation for strongly held normative ideals was enacted in this new medium. The sample thus provided a fruitful basis to examine how long-standing journalistic standards are negotiated in VR work and ultimately demonstrated in the content.

This exploratory study contributes to knowledge through providing a new research instrument to analyse the narrative and interactive nature of journalistic VR. The researcher drew on social semiotic theory and its applications in analysing multimodal discourses and games. She developed a research instrument that complemented the semi-structured interviews and offered rich insights about VR journalism, highlighting potential areas for further research.

Advocacy, for instance, is a debatable practice in VR journalism. Some VR creators endorse it, some reject it and others maintain a middle ground, where advocacy is accepted for the common good or a worthwhile cause. Further research needs to probe what content creators mean by advocacy, and whether it stops with adopting a certain cause or extends to include a call for action.

VR collaboration also presents a promising area for future research. Such collaboration may involve production studios, external funders, NGOs and story characters. Content creators typically list all parties involved in the VR content creations without necessarily explaining their roles.

Future research needs to further investigate the transparency policies used in VR content creation to address concerns about the downside of this collaboration. Are there explicit guidelines defining the roles of production parties? Are there formal policies to address potential conflict-of-interest claims? How are these policies and guidelines negotiated by content creators and communicated to the public?

Future research also needs to examine the users' perceptions of transparency about VR collaborations. Does transparency predict VR trustworthiness? Do the nature of the funder and the reputation of content creators mediate the influence of transparency on trustworthiness? How do users respond to story characters becoming co-creators of VR?

All in all, this study provides an attempt to capture the emerging cultures of practice in VR journalism, and its relation to journalistic ideals of facticity, accuracy, objectivity, detachment and transparency. It applies both ANT and journalistic cultural perspectives to trace the role of content creators, users and technology in VR journalism, identifying the changes and linking them to earlier discourses surrounding narrative and interactive journalism. The study offers an analytical instrument, derived from social semiotic theory, to examine VR content. It also introduces potential avenues for future research, to further understand VR journalism and to trace the constant change in journalistic practice.

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Appendices

Appendix A: The list of Interviewees

	Date	Interviewee	Affiliation and Work	Length	Method of Communication
1	6/11/2017	Taylor Nakagawa	The then emerging media fellow at the Associated Press (AP).	0:57:03	Google Hangouts
2	16/11/2017	KC McGinnis	A photojournalist, a then freelancer at <i>The New York Times</i> for the Daily 360 service and a former intern at the <i>USA today</i> .	0:52:10	Skype
3	26/11/2017	Marc Ellison	Photojournalist and a creator of VR. He is a freelancer, whose work was published on Al Jazeera and the BBC.	1:05:46	Skype
4	26/11/2017	Zahra Rasool	Editorial Lead at Contrast VR, which creates VR for Al Jazeera	0:27:37	Skype
5	29/11/2017	Benjamin Ross	VR content creator and co-producer at CoReality VR studio	1:03:23	Skype
6	1/12/ 2017	Louis Jebbs	Founder and CEO of immersive.ly, a VR studio, and a former journalist. He is an ambassador for Journalism 360.	1:02:22	Skype
7	4/12/2017	Kevin Tsukii	Immersive journalist and VR producer at Emblematic studio	1:12:05	Skype
8	6/12/2017	Laura Hertzfeld	Program director of Journalism 360 initiative	0:27:26	Skype
9	7/12/2017	Joi Lee	VR producer at Contrast VR studio, which creates VR for Al Jazeera	0:53:49	Skype

10	7/12/2017	Jenna Pirog	Senior Director of Immersive Experiences at National Geographic, and the then Senior Producer of immersive journalism at <i>The New York Times</i>	1:53:09	Skype
11	8/12/2017	Gayatri Parameswaran	VR content creator, documentary filmmaker and journalist. The founder of Now Here Media studio.	0:59:53	Skype
12	19/12/2017	Viktorija Mickute	VR producer at Contrast VR studio, which creates VR for Al Jazeera	0:55:45	Skype
13	22/12/2017	Maria Fernanda	VR producer Contrast VR studio, which creates VR for Al Jazeera	1:00:00	Google Hangouts
14	15/1/2018	Thomas Seymat	VR editor at Euronews and an ambassador for Journalism 360.	3:02:00	Skype
15	17/1/2018	Charlotte Mikkelsen	VR creator and founder of Picture This Productions. She was a BBC foreign correspondent.	1:18:26	Skype
16	17/1/2018	Jason Farkas	Vice President and General Manager of CNN Money	0:30:00	Skype
17	18/1/2018	Bronte Lord	CNN VR producer	0:30:00	Skype
18	18/1/2018	Cassandra Herrman	Documentary producer and director. She is a freelance VR creator at Emblematic studio. She is the co-director of After Solitary VR.	3:07:02	Skype

19	19/1/2018	Lauren Mucciolo	A freelancer for Frontline, a documentary series on PBS the US public broadcast TV network. She is the co-director of After Solitary VR.	1:41:38	Skype
20	24/1/2018	Nicole Jackson	The then Deputy Editor of <i>The Guardian</i> VR team.	0:45:00	Face to Face
21	24/1/2018	Lisa Golden	A then VR producer at <i>The Guardian</i> VR team.	0:30:00	Face to face
22	24/1/2018	Anetta Jones	A then VR producer and director at The <i>Guardian</i> VR team.	0:15:00	Face to face
23	24/1/2018	Federico Fasce	The then media technologist at <i>The Guardian</i> VR team.	0:30:00	Face to face
24	5/2/2018	Lakshmi Sarah	Journalist and educator. She is the Founder of Tiny This Productions studio. She is VR content creator freelancer and an ambassador of Journalism 360.	1:15:30	Skype
25	14/2/2018	Charlie Newland	Senior Innovation Producer at the BBC world service. He is co-director, producer and designer of Trafficked VR.	0:30:00	Telephone
26	2/3/2018	Dinah Lammiman	VR producer at BBC VR hub	0:45:00	Telephone
27	16/3/2018	Raney Aronson-Rath	Executive producer at Frontline in PBS, the US public service broadcast TV network.	0:45:00	Skype
28	16/3/2018	Carla Borrás	Director of Digital Video at Frontline in PBS, the US public service broadcast TV network.	0:45:00	Skype
29	6/4/2018	Alastair Leithead	BBC journalist, radio anchor and VR content creator.	2:00:00	Skype
30	23/4/2018	Zillah Watson	BBC VR hub commissioning editor	0:45:00	Face to face

Appendix B: Basic Interview Guide

a. Organisation of Work:

1. Who are involved in producing a VR piece for a news organisation?
 - Are they based inside the news organisation, or external partners?
 - How do they identify themselves?
 - What is their background experience?
 - How do they organise their work and take decisions about the final product?
 - Where does the idea of VR originate and how does it develop?
2. How does the technology company's partners with news organisation?
 - What is the role of technology partners in the VR production?
3. What about the VR studios, how do they come into picture?
 - Can they modify the story?
4. What are the responsibilities of programmers or IT specialists?
 - How do they achieve them?
5. Do you think technology dictates VR genre to be produced?
 - In what way? Would you give me example?

b. VR and Journalism Culture:

- 1- Do you consider VR as journalism?
 - Why do you think it is journalism?
 - What makes you identify a certain VR piece as VR journalism?
(The type of content, the creator, the purpose...)
 - What if one of those elements contradicts journalistic norms?
(Are there definitive boundaries?)
 - What do you think is mission/purpose of VR journalism?
(Should it be a real experience with accurate truthful details, or real experience inspired by truthful events)
- 2-To what extent, do you think VR is truthful?
 - Please elaborate of having a CG (computer generated animated content)?
 - What about imagining hypothetical situations?
 - How do you think the use visual and sound effects in VR affect its truthfulness?

3-Do you think that VR is objective, and impartial?

- Is it similar to creative entertainment culture?
- Does it communicate the unique self of the storyteller/creative artist of the event?

- How can this be accommodated to journalism?
(Is this new to journalism? Can transparency be the solution to subjectivity?)

4-How can VR empathy impact be channelled, to make sure it is not manipulative or harmful?

5-Do you think VR will promote more user control over the content?

- Do you think will become more game-like VR? Why?
- How does this fit to journalist autonomy (authorship) of the information, integrity of news?
- Do you think that VR will become more than a narrative?
- Then, what will be journalistic genres (interviews, human interest stories ...etc.) that fit VR? Or will it invent new genres?

6-Do you think VR piece can be a stand-alone one?

- Does it need to be a part of large project, so the audience can develop the minimum level of understanding about the topic before experiencing it?

7-What do you think is the essential component of successful VR? *(story, audio-visual quality, permitted user interaction, effective marketing strategy)*

8- As a journalist, do you feel comfortable with experimentation and providing incomplete version asking for audience feedback?

Appendix C: The VR Pieces Examined in Social Semiotic Analysis

Institution	Date of Release	Title	Duration	Description
Al Jazeera Contrast VR	August 2017	I am Rohingya	00:8:03	<p>A 360° film about the Rohingya refugees in Bangladesh, following the experience of a refugee named Jamalida. Jamalida tells the story of her family in Myanmar and how Buddhists killed her husband and sexually assaulted her. “I am Rohingya” is character-led experience, where users are passive involved observers. It is a real-life captured 360° video augmented with symbolic animation to illustrate Jamalida’s story.</p> <p>https://vimeo.com/231250109 [Accessed 25th October 2019].</p>
	January 2018	Oil in Our Creeks	0:08:26	<p>A 360° film about the oil spill in the Niger Delta and its impact on life there. The 360° film follows the life Lessi Phillips, a Nigerian schoolteacher. Lessi explains how her life has changed after the oil spill. “Oil in Our Creeks” is a character-led experience, where users are passive involved observers. It’s a real-life captured 360° video augmented with animations and other audiovisual cues.</p> <p>https://vimeo.com/232225374 [Accessed 25th October 2019].</p>
BBC	November 2016	Trafficked	00:06:48	<p>An animated 360° film about trafficking of women in Mexico. It is a first-person perspective story of Maria, a victim of human trafficking. The user embodies the main story character, turning the VR into a user-led experience. The whole VR experience is a reconstructed experience based on real interviews, as indicated in its opening disclaimer.</p> <p>https://www.youtube.com/watch?v=5jBPqveBdfk [Accessed 25th October 2019].</p>
	October 2017	Bloodhound: driving the	00:04:41	<p>A 360° film about the world’s fastest vehicle, created by UK car manufacturers in Congo. Alistair Leithead, the BBC VR content creator,</p>

		world's fastest car		explains the story behind the bloodhound in a Voice Over of the real-life captured footage of the bloodhound and the mechanical engineers working on its development. The VR piece was a journalist-led experience, where users are passive involved observers. https://www.youtube.com/watch?v=uk56oPTr7c0 [Accessed 25 th October 2019].
October 2017	Crossing the Sky	00:07:41	1	A 360° film telling the story of two Himalayan girls and their daily struggles to reach school. The two girls guide the user throughout the experience showing their daily route to school. The VR uses real-life captured footage, where users are passive involved observers. The VR piece does not include any written context or a voice-over narration. https://www.youtube.com/watch?v=Xpq5kBcSYCl&t=315s [Accessed 25 th of October 2019].
November 2017	Spacewalk	Variable		An interactive Oculus Rift piece that gives users an experience of being an astronaut. Users embody an astronaut who gets radio-transmitted instructions from the spaceship leader. Users can switch between “Easy Mode” and “Astronaut Mode”, followed by a warning of potential disorienting effects. Users start by exploring the zero-gravity environment. Then they go outside to contemplate the beautiful look of the “Blue Marble”. Suddenly, a technical problem occurs. Users are instructed to navigate their way back to the spaceship. The interactive experience always ends with users’ failure and their subsequent death. The experience allows users to become active involved participants.
February 2018	BBC Earth: Life in VR	Variable		An interactive Daydream VR experience to explore the Californian coast and sea life there. It is a CG-reconstructed experience that is not time-restricted. The duration of the experience depends on users’ interactions. Users embody sea life explorers, who choose to follow a specific sea creature,

either a sea otter, a shark or a whale. As users navigate their way in the virtual experience, they encounter white crystals. Once they point their Daydream controllers, a voice comes in and provides contextual information. "Life in VR" allows users to become active involved participants.

February 2018	Damming the Nile	0:12:37 0:14:00	A two-episode 360° film about the Nile and the construction of the Ethiopian Renaissance dam. It is a journalist-led VR experience, in which the BBC's Leithead is physically present to guide users in a journey through Ethiopia, Sudan and Egypt along the Nile. Users are passive involved observers in the experience. They are immersed in real-life captured footage of the two episodes. However, each episode starts with a 3D model of Earth, featuring the Nile running from Lake Victoria until it reaches Egypt.
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<https://www.youtube.com/watch?v=Un0LWhH-9CI>

<https://www.youtube.com/watch?v=vqk6Oy1jUMk>

[Accessed 25th of October 2019].

<i>The Guardian</i>	April 2016	6×9: A virtual experience of solitary confinement	00:09:00	A VR piece, allowing users to have a first-person experience of being held for eight minutes in a solitary confinement cell. Users are involved participants who experience a degree of interactivity. When they point their gaze to different elements in the virtual experience, a voice-over gives contextual information. It is a time-restricted CG experience. However, content creators embedded real soundbites from Maine State Prison to add a degree of truthfulness to the content. The VR piece starts with a three-paragraph long introductory text explaining its factual nature and warning users about potential disturbing effects.
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April 2017	First Impressions	00:05:38	<p>A 360° film visualising the development of eyesight during the first six months of life. The user embodies a new-born baby sitting on the ground and looking at its parents. The parents are professional actors, who interact with the user from time to time. The film also uses special visual effects to show the gradual change in eyesight. It allows users a degree of interactivity, when they use the Daydream controller to call on the mother. The content creators emphasized its factual nature in the opening disclaimer but postponed revealing the use of professional actors until the ending credits.</p> <p>https://www.youtube.com/watch?v=N9C9w8sDVLk [Accessed 25th of October 2019].</p>
September 2017	Crime Scene	Variable	<p>An interactive Daydream VR experience, in which users become forensic scientist trainees, searching crime scenes for evidence. Users are active involved participant, who navigate their way in the virtual environment. "Crime Scene" is not time restricted; instead, its duration depends on users' interactivity. "Crime Scene" is a CG environment, built using volumetric capturing technique. Content creators volumetrically captured a re-constructed crime scene and rendered it in a virtual environment. They used a professional actor to appear as the murdered victim. Users can select up to three pieces of evidence and send them to the labs to conduct DNA testing. As users with the Daydream controller point towards a potential piece of evidence, a voice over comes in, providing contextual information. "Crime Scene" has multiple endings. Users win if they select the right three pieces of evidence. If not, they can choose to go back to the crime scene and re-select the evidence.</p>
September 2017	Sea Prayer	00:07:05	<p>An animated 360° story written by Khaled Hosseini, inspired by the Alan Kurdi story, to</p>

portray the psychological feelings of the refugees before crossing the Mediterranean to the unknown. The user essentially embodies a father holding his baby, thinking about his hometown before the civil war in Syria. Content creators used the Tilt Brush tool to paint the 360° canvas, illustrating the father's story. The VR experience was displayed on the Guardian VR online platform under the title of VR journalism. <https://www.youtube.com/watch?v=LKBNEEY-c3s> [Accessed 25th October 2019].

<i>The New York Times</i>	May 2016	Seeking Pluto's Frigid Heart	00:07:43	A VR space experience telling the story of the Horizon spaceship, after a 9.5-year journey to reach Pluto. The VR is a CG environment accompanied by the voice of Dennis Overbye, the famous science writer. The literary description in the narration along with careful use of music makes the VR a visceral experience. Content creators emphasized the fact-based nature of the content, indicating in the closing credits that they used data from NASA and John Hopkins University. The user was a passive involved observer. https://www.youtube.com/watch?v=jlxQXGTl_m0 [Accessed 25 th October 2019].
	August 2016	Fight for Falluja	00:11:06	A 360° film featuring an embedded journalist with Iraqi forces during their fight to liberate Falluja from ISIS (Daesh), including the aftermath of the conflict. It is a journalist-led experience where Ben C. Solomon, <i>The New York Times</i> content creator, explains the challenges he faced while capturing the 360° piece. Users are passive non-involved observers, as Solomon never acknowledges their presence. Solomon was physically present throughout the experience, yet he never talked directly to the camera. And the whole VR was a real-life captured footage. https://www.youtube.com/watch?v=Ar0UkmID6s

				[Accessed 25 th of October 2019].
Public Broadcasting Service (USA), Frontline Series	January 2017	After Solitary	00:09:07	<p>A walkaround experience of life after five years in a solitary confinement cell at a US state prison. Content creators used videogrammetry and volumetric capturing techniques to create a replica of a solitary confinement cell and insert the hologram of the main story character inside. Users with an Oculus Rift headset can walk inside the virtual environment; however, this interactive version was only available to showcase in festivals. The researcher could only experience the 360° version, using a Gear VR headset. This reduced version allowed users to be passive involved observers. Content creators added contextual information through written text. This contextual information balanced the story illustrating the current improvement in the prison's conditions as opposed to the main character's story about his previous experience.</p> <p>https://www.youtube.com/watch?v=G7_YvGDh9Uc</p>
				[Accessed 25 th October 2019]
	November 2017	Greenland Melting	00:05:29	<p>A 360° film about climate change and the potential impact of the rising water levels. In the opening disclaimer, content creators explained their use of videogrammetry and 8i technologies to create photorealistic computer-generated imagery. They embedded archival videos to support NASA scientists' explanations. Although the VR was introduced as a walkaround piece, the researcher could only find the 360° version of it. The walkaround piece was only restricted to festivals. The reduced 360° version allowed users to be passive involved observers.</p> <p>https://www.youtube.com/watch?v=hUWqQ9F3sJk</p>
				[Accessed 25 th October 2019].
