The Reconsideration of Conventional Storytelling Practices in the Light of VR Development

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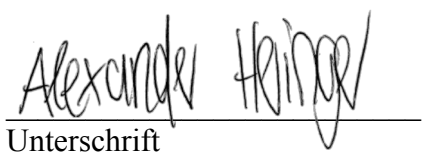

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Abstract

Virtual Reality is on the rise, but VR developers still have not defined the language of the new immersive medium yet. This thesis analyses the current state of VR storytelling and its industry market – in what directions are VR storytellers researching and what problems do they face? The thesis discusses the different categories of narrative Virtual Reality and the new language that we need to develop for Virtual Reality storytelling. It highlights the specific hurdles VR storytellers deal with and introduces storytelling approaches from existing mediums – primarily the interactive game industry – in order to suggest new possible solutions for this matter. The thesis concludes with the latest developments, proposes further possible directions for VR storytelling and shares further thoughts in terms of the ethics, privacy and psychological aspects of Virtual Reality.

Kurzfassung

Virtual Reality ist auf dem Vormarsch. Jedoch haben VR-Entwickler noch nicht die richtige Sprache für dieses neue immersive Medium gefunden. Die vorliegende Masterarbeit analysiert den aktuellen Stand des *VR-Storytellings* und dessen Branche. Im Fokus stehen besonders die Forschungsrichtungen und die dazugehörenden Probleme der *VR-Storyteller*. Des Weiteren führt die Arbeit in verschiedene Kategorien von narrativer *Virtual Reality* ein und diskutiert über die neue Sprache, welche für das *Storytelling* in *Virtual Reality* von Nöten ist. Die Masterarbeit weist auf spezifische Hürden hin, mit welchen *VR-Storyteller* konfrontiert werden und stellt *Storytelling*-Ansätze aus bestehenden Medien – hauptsächlich aus der interaktiven Spielebranche – vor, um neue Denkanstöße für Lösungsansätze zu geben. Neueste Entwicklungen und weitere Möglichkeiten des *VR-Storytellings* bilden den Abschluss dieser Arbeit. Bedenken hinsichtlich der Ethik, Privatsphäre und psychologischen Aspekte von *Virtual Reality* werden gegeben.

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Introduction

"When people ask whether virtual reality will be a real thing or just the next 3D, what I always say is 'take a headset, walk outside and the next person you meet, put it on them and see what the reaction is […] That reaction will speak to how this is really the next great platform for storytelling and art and human expression. It's just that most people haven't had that opportunity to try it yet (Dredge 2015)." Chris Milk, Founder & CEO of Within

In order to have a better understanding of the current state of VR storytelling, I attended the 2016 Tribeca Film Festival (New York City) to get my hands on the latest VR projects and to connect with people who have been working in this field for several years. I wanted to learn from their experiences and get an overall feeling for Virtual Reality.
The festival showcased the most innovative technologies, experiential storytelling and the different approaches to VR storytelling, which included 360° live action movies, animation and fully computer-generated (CG) environments. The CG projects had the most impact on me, especially *"Allumette"* from Penrose Studios was an extraordinary VR experience and for the first time I felt like I was in the virtual environment (Tribeca 2016). I was so impressed that *"Allumette"* stuck with me for a while and it helped me get a better notion of where Virtual Reality storytelling could go in the future. *"That reaction will speak to how this is really the next great platform for storytelling and art and human expression […] (Dredge 2015)."* The experience made me cognisant of the place that VR will have in the future and drew me to find out more about it.

There were other extraordinary animation projects and abstract virtual reality artworks as well, and as *"Allumette,"* those were all created in a CG space made by 3D modeling software packages like *"Unity"* or *"Unreal Engine"* (Saucier 2016). The 360° live action videos showed the use of traditional filmmaking in a new and fresh way where some worked better for me than others. However, while watching those films almost every time I could not help but wonder if traditional linear storytelling on a flat screen still not be the better medium for this? Thus, I understood what other individuals had already experienced that VR is a whole new medium and completely different to film and TV because you do not look *"at"*

something but instead *"are"* in this world. Like in the real world once you are in VR, looking is not sufficient anymore, because you want to touch things and interact with your environment. People within VR circles often use the terms *"Presence," "Immersion," and"Ownership/Agency."*

"Presence" as the unambiguous sensation created by our mind, body and soul of "*being"* somewhere else (Chung 2015). "*Immersion"* as the degree of feeling involved in the experience while being isolated from the real world (Chung 2015), and "*Ownership/Agency"* representing the individual owning the virtual body and being in control of it (Madary & Metzinger 2016).

Similar to other VR developers I realized that VR Storytelling demands a new language with new terminology, and because it is another way of consumption – we need new rules for it.

"The medium, the place where those stories will unfold, exists within our consciousness. We'll find ourselves having passed through our long-held, precious frames to live within those stories. And we'll carry the memory of those stories not as content that we once consumed, but as times and spaces we existed within (Within 2016)."

The navigation through modern computer games and the way the player discovers the story through one's actions and completed tasks felt very natural to me when I tried the VR game narratives. It seemed to me that this comes the closest to the type of language VR storytellers are looking for right now. Because of the CG fundament/environment – where there is the possibility to interact and move in virtual space – there is already ground for interactive storytelling in computer games and I think that this is a good starting point to reconsider the practices of interactive game storytelling for VR storytelling.

In this thesis, I will start with a definition of Reality and Virtual Reality, followed by an analysis of the VR Industry – the different technologies that we currently have on the market and which course the research of developers is going to take. I will then introduce different categories of narrative Virtual Reality, followed by a short discussion about the new language we need to develop for this new medium. After laying these foundations, I will point out the problems of VR storytelling that developers are facing and will introduce storytelling approaches from the interactive game industry to suggest solutions. Within my conclusion I

am going to indicate the latest developments, propose further possible directions for VR storytelling, and share further thoughts in terms of the ethics, privacy and psychological aspects of Virtual Reality.

Reality vs. Virtual Reality

The general opinion in neuroscience is that reality is generated by our brain, and that it wants to predict all the caused sensations that are stimulating our senses (Ananthaswamy 2016). *"Reality is, in fact, a product of our minds – an ever-changing program consisting of a constant stream of perceptions (Ananthaswamy 2016)."* According to Jim Blascovich and Jeremy Bailenson – professors of Psychology and authors of the book *"Infinite Reality"* – Virtual Reality is only a practice of manipulating our perceptions (Blascovich & Bailenson 2011).

They have the view that reality can be described as *"an elusive target,"* as the majority of people split the world into real and not-real. The interesting point here is that our mind decides if our perceptions are real or not. If our mind believes in an experience, it calls it real, otherwise it considers it to be unreal. The question now is what happens if enough people share the perceptions of an alternative reality to be real (Blascovich & Bailenson 2011).

"The difference between heaven, which the great majority of Americans believe is real, and leprechauns, which are fiction to most, is determined largely by consensus, as opposed to scientific proof (Blascovich & Bailenson 2011)."

To better understand the space between the experiences of real and unreal it helps to take a look at Einstein's theory of relativity. Einstein came up with the concept of *"special relativity," "theorizing that the perceived speed of objects depends on the observer's own motion (Blascovich & Bailenson 2011),"* implying that what people sense in terms of movement does not necessarily have to be correct. A moving vehicle seems to move faster when it passes us while we are stationary, than if we would move along with the vehicle. On the other hand people think that when they stand still, they do not move at all, which is inaccurate since all people on earth are moving with the rotation of our planet on its axis. The Earth orbits around the Sun, and our solar system orbits around our galaxy – the Milky Way,

which itself moves within the ever-expanding universe. Microscopically seen *"subatomic particles"* within any atom of our body are constantly moving (Blascovich & Bailenson 2011).

The differentiation between virtual and real is relative. Humans compare what in general is considered to be *"grounded reality"* – things that we believe make a *"natural"* or *"physical"* world – with *"virtual reality"* experiences such as, movies, literature, cartoons, dreams and online environments like Second Life or Facebook. According to Blascovich and Bailenson it is this contrast that "*allows us to avoid being mired in the unending debate over what constitutes reality (Blascovich & Bailenson 2011)."*

Blascovich and Bailenson further state that people have a disposition to accepting illusionaries as real. For example, if someone wears *"prism glasses"* that invert the physical environment, that person will see everything upside down at first, but after some time his brain will adapt to it and interpret the world as normal as before. Accordingly, if he takes the glasses off again he will regain normal sight after a short time of having interpreted things upside down (Blascovich & Bailenson 2011).

The point is, that humans are *"neurophysiologically wired to subjectively "right" sensory stimuli according to previously established expectations (Blascovich & Bailenson 2011)."*

Considering the "*prism glass"* experiment, showing us humanity's skill set to adapt and reconsider our reality, we slowly begin to understand why people engage easily with Virtual Reality (Blascovich & Bailenson 2011).

Market Analyses

With the HTC Vive, the Oculus Rift and Sony's Playstation VR hitting the consumer market, 2016 represents an exciting and innovative year in Virtual Reality. Universities, researchers, scientists, and storytellers all over the world are experimenting with the new technology and are trying to implement VR in the wide fields of healthcare, education, sports, science, politics, military, architecture, arts, entertainment industry, etc.

The 2016 VR/AR Innovation Report presented by the Virtual Reality Developers Conference (VRDC) provides useful insight into the kind of platforms developers create new technologies for, how they get funded, and how they see the future of this fast-growing new industry. They gathered their information by surveying over 500 professionals who are developing for Virtual Reality experiences, with the following results (VRDC 2016).

Developers were asked to choose the VR platform that they are creating content for and 48.6 percent identified the HTC Vive, 43.2 percent are developing for the Oculus Rift, and 33.8 percent for Samsung's Gear VR headset (VRDC 2016).

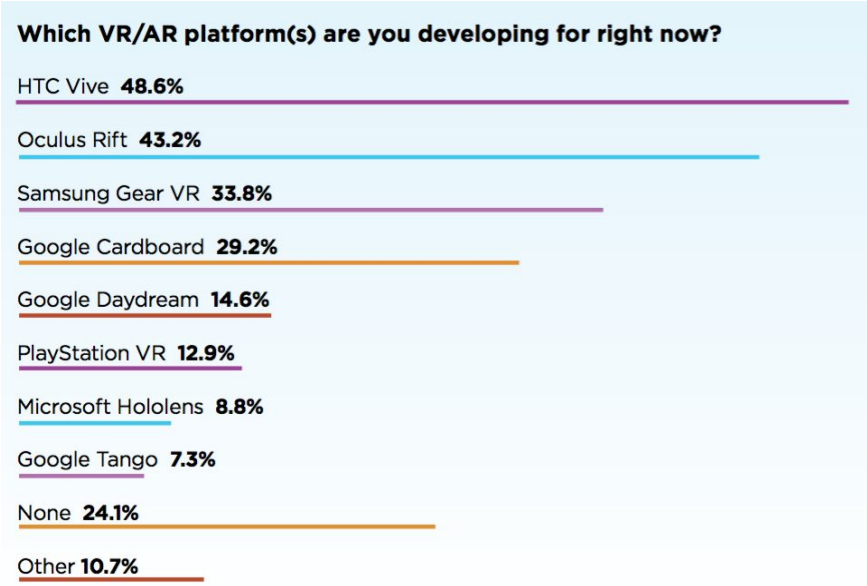

Figure 1. Current VR/AR platforms (VRDC 2016).

Other platforms that developers named include the Smartphone-based Google Cardboard (29.2 percent), the mobile-driven VR platform Daydream (14.6 percent) and the new augmented reality mobile device Tango (7.3 percent), all of which are owned by Google. Those surveyed also said they were developing for Sony's Playstation VR (12.9 percent) and Microsoft's HoloLens (8.8 percent). 10.7 percent stated they were developing for other platforms, while 24.1 percent do not develop for VR/AR at all.

Developers also admitted that their main interest was in developing their next title for HTC Vive (34.6 percent) and the Oculus Rift (23.4 percent), followed by Google's *"do it yourself"* Cardboard (14.0 percent), which seems to be more attractive for the developers than the

Samsung Gear VR headset (10.3 percent) (VRDC 2016). Based on these figures HTC Vive will most likely be the prefered VR platform competing with the Oculus Rift.

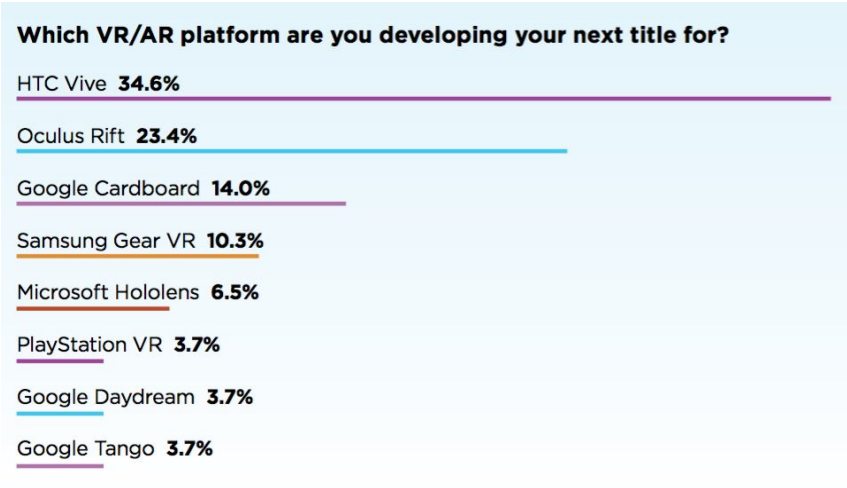

Figure 2. VR/AR platforms for next titles (VRDC 2016).

At the Tribeca Film Fest, I had the feeling that the degree of immersion depended on the quality and features of the technology. Apart from the fact that the HTC Vive is currently the most used VR platform, it is ranked as the best VR product on the market by most professionals who I spoke to at the Tribeca Film Festival, which I can also support based on my own experiences. It allows the viewer to pan, tilt, and roll your head in order to find orientation within the VR experience, comparable to the Samsung Gear for mobile phones, or the Google Cardboard.

– "You are a ghost anchored in your seat and you can only turn your head to look around (Naimark 2016)."–

But what sets the HTC Vive apart form the Samsung Gear or Google Cardboard is that it also tracks the movement of your whole body in the space around you and translates it into the virtual world (Naimark 2016). Oculus and Playstation offer the same features, except that Playstation's headset has a lower resolution. However the tracking technology needs a powerful, high-end computer and with the numerous cables connected to the clunky VR gear, the VR experience is less "free." Playstation VR does have an advantage here if you already own a Playstation 4, as it allows you to connect your VR gear to the console sparing you from the high end computer.

It should be noted that VR/AR developers are still mainly using their personal (49.7 percent) or company's (33.4 percent) funds for their projects. 16.7 percent stated they get funded by clients and 13.3 percent by Angel Investors. This is followed by 10.6 percent who receive funds out of Venture Capital and 4.7 percent named External Publishers. Developers also raised money over Crowdfunding (3.6 Percent) and Alpha Funding (2.3 percent) and 7.8 percent stated other sources (VRDC 2016).

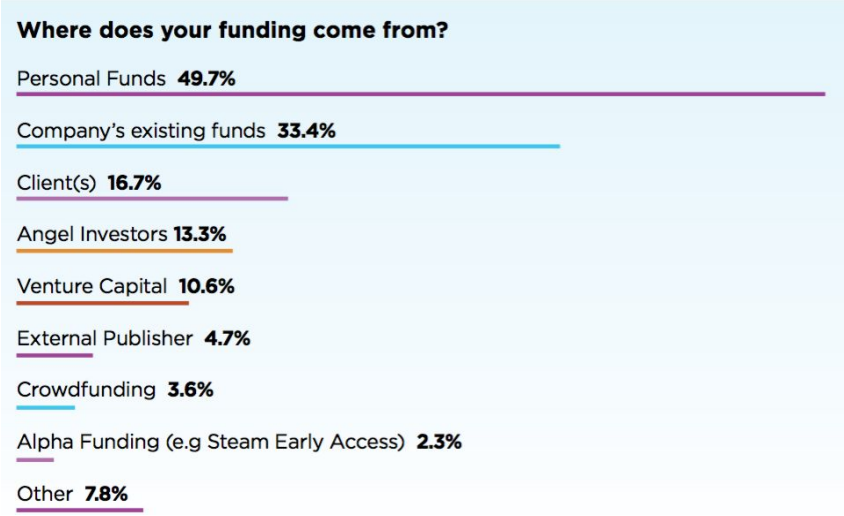

Figure 3. Where does the developers funding come from (VRDC 2016)?

In the survey they also asked the developers how they see the future of the new technology and *"the vast majority of VR/AR Devs believe VR/AR is a long-term sustainable market (VRDC 2016)."* In fact 95.5 percent answered the question with "yes" and only 4.5 percent did not believe in a long-term sustainable market (VRDC 2016).

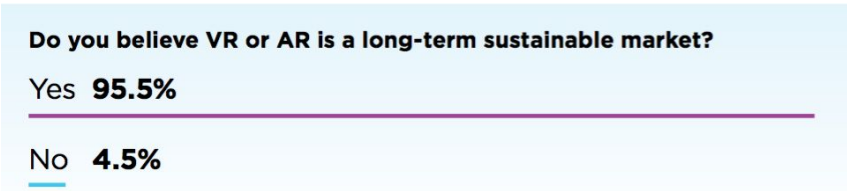

Figure 4. Is VR or AR a long-term sustainable market (VRDC 2016)?

Despite the optimism of the developers surveyed regarding the VR/AR technology, they also named obstacles that need to be overcome to reach the mass market on a successful consumer level (VRDC 2016).

Recurrent concerns among developers are:

"'Nausea-when someone has a bad experience you have lost them forever,' wrote one respondent. 'Too easy to have [a] bad experience (VRDC 2016).'"

"'Cost. Bringing the price down low enough that more people can afford a quality head-mounted display will be a big hurdle,' wrote another. 'Products like Playstation VR is a move in the right direction (VRDC 2016).'"

"There is still yet to be a 'killer app' for VR/AR, outside of gaming (VRDC 2016).

"Once you have it in people's hands they need to be able to use it as something more than a novelty. Trying to push the tech before it's useful may result in consumer apathy (VRDC 2016)."

Based on those concerns VRDC asked the developers in their survey how best to approach these hurdles. Several developers referred to pre-built standard computers like the Sony Playstation VR, making it easy for consumers to access VR in an affordable way. Furthermore, as their concerns suggest most of the developers want to see technical improvement in order to solve phenomenons of making people sick. Naming dizziness, motion-sickness and nausea as key symptoms (VRDC 2016).

"The latency of the graphics, which results different kind of illness as motion sickness, nausea (VRDC 2016)."

"Freedom of movement without motion sickness, […] the problem of effectively simulating movement in VR experiences, even those that are room-scale (VRDC 2016)."

Another developer identified the most significant problem as the lack of available genres enabling immersive VR experiences. Therefore VRDC asked developers in their survey to point out unique projects and games which they thought were groundbreaking VR experiences for them. It turned out that the game *"Budget Cuts"* ranked highly among developers' most popular applications, because of its novel approach of moving in virtual space in form of teleportation (VRDC 2016).

"'Budget Cuts: the teleporting mechanic that also allows you to preview from the viewpoint of the destination via a portal in your hand,' wrote one respondent. 'Budget Cuts. Definitely the ability to 'hide' in virtual space,' wrote another (VRDC 2016)."

Besides games several developers mentioned Google's Tilt Brush *"as their favorite demonstration of innovative VR experience design (VRDC 2016)."*

"I think the most innovative use of AR/VR I've seen is Tilt Brush, […] It's a simple concept, basically transposing a modeling and painting software to 3D but I think experiences that allow people to change their environment and create work for others will ultimately be the most enduring experiences (VRDC 2016)."

Narrative Virtual Reality

If we take a look at major tech and entertainment events like FMX, SXSW, Sundance, Tribeca, GDC, VRDC we can see that developers are experimenting in different ways in order to create narrative for Virtual Reality.

Andrew Cochrane, a Digital and Interactive Director for Mirada – an independent creative studio co-founded by Guillermo del Toro – classified Narrative VR into three categories. 360° Video, Immersive Cinema, and "True" VR. However, he classifies that we obviously have not reached the state of "True" VR like we see in the movie "*Matrix*" yet, but that we have become closer to what we think of VR as an interactive experience where people feel embodiment and agency (Logan 2016).

360° Video

360° Video gives the audience the chance to see a 360-degree environment from a perspective and position that is not easily accessible or is far away. The inside of a cockpit of a fighter jet, a front row seat in a stadium or a beautiful scenic outpost at a national park. 360° videos are something that we can find largely in the Google Cardboard app (Logan 2016).

Figure 5. 360° Video from a cockpit of a fighter jet (Logan 2016).

Immersive Cinema

Immersive cinema extends the idea of a 360-degree environment with the element of implementing the purpose of a first person. This means that *"Immersive cinema is one in which there is an intentional first-person narrative being told, being created […] When you put on a headset, you are in a narrative world, you are in a story (Logan 2016)."*

Cochrane sees a lot potential in this approach of Immersive Cinema and says that even without interacting with the virtual environment and the lack of the ability to move, you still get the feeling that you're part of a story. *"You do exist […] You're not being ignored. You're actually being addressed and, later, attacked (Logan 2016)."* This is demonstrated in Mirada's own VR live action experience which they developed for the FX show *"The Strain"* (Logan 2016).

Figure 6. Immersive Cinema, *"The Strain"* (Spock 2015).

"Help" directed by Justin Lin and created by Google Spotlight in collaboration with The Mill is another impressive cinematic live action experience, where you follow a young woman in downtown Los Angeles on her escape from an alien (Lin 2016).

Figure 7. Immersive Cinema, *"Help" (Lin 2016)*.

A truly astonishing example of Immersive Cinema is *"Allumette"* from Penrose Studios. What makes *"Allumette"* unique is their approach to create the virtual environment as a miniature rather than a photorealistic world. The developers from Penrose shrink you to a size as if you would be standing within a dollhouse with *"every piece available in its entirety (Robertson 2016a)."* Within this beautiful world lives *"Allumette,"* a little stop-motion character. Through positional tracking we can move around the scene and look through windows and examine the world of *"Allumette"* (Moynihan 2016) (Robertson 2016a).

Figure 8. Immersive Cinema, *"Allumette" (Robertson 2016a)*.

Similar to *"Allumette"* is *"Henry,"* a Pixar-like 3-D animation where you follow the story of a hedgehog's birthday as an observer. As in *"Allumette,"* positional tracking makes it possible for you to move around in his house. *"Henry"* won the 2016 Emmy Award for Outstanding Original Interactive Program (Feltham 2016a).

Figure 9. Immersive Cinema, *"Henry" (Feltham 2016a)*.

"True" VR

"True" VR is the idea of giving the experiencer total agency to explore and the feeling of full presence and independency. The user gets to choose one's own path in a responsive environment in order to create an individual narrative *"but whose outcomes have already been determined by the 'creator' (Desowitz 2016)."* It will be crucial for developers to find a way, that allows the user to be part of every important step along the experience (Desowitz 2016) (Logan 2016).

One example of an experience that indicates the feeling of narrative in "True" VR is Valve's *"Aperture Robot Repair"* a virtual robot repair center where you work as a mechanic to repair broken robots (Keller 2016).

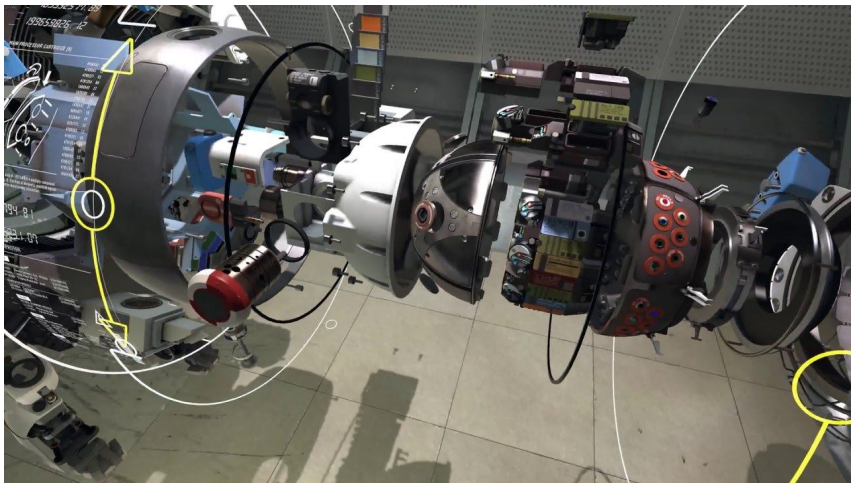

Figure 10. "True" VR, *"Aperture Robot Repair"* experience *(Keller 2016)*.

Developers expect another big step towards "True VR" through full-body applications such as Google's *"Tilt Brush,"* the digital painting application which lets you create digital art in virtual space with total freedom using drawing techniques that would be impossible in the real world (CNN 2016).

"The things people are making with Tilt Brush are just crazy […] They're doing stuff that Tilt Brush was never designed to do. It's like they're using Microsoft Paint to make a Pixar movie (Baker 2016)." says Timoni West, principal designer from the Labs VR team at Unity[1].

[1] Unity is a development platform and game engine to build 3D and 2D games, as well as applications for VR and AR (Unity 2016).

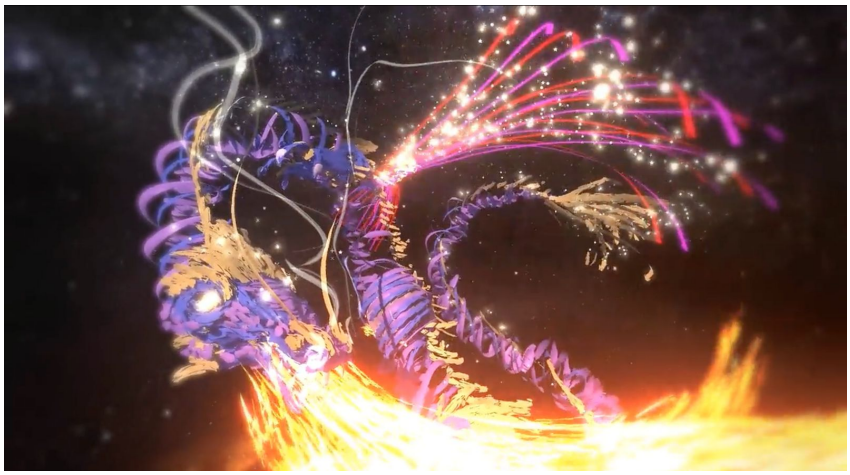

Figure 11. "True" VR, Google's *"Tilt Brush"* experience (Google 2016).

New Rules for a New Medium

Despite different approaches on how to use narrative VR, developers agree that VR symbolizes a new immersive medium coexisting with traditional media like film, TV, games and literature. Experts agree that we are still in the early phase of experimenting with the new technology, as we have had to learn the rules for traditional storytelling such as filmmaking, which has evolved from theatrical and static looking movies – with the camera functioning as the viewer of the scene from the best seat in the front row of the theatre (Baker 2016).

"They are having to learn the rules of a completely new medium, and unlearn some of the rules they've carried over from others. We've been here before. Every new art form goes through an initial awkward phase of trial and error. […] Filmmakers gradually learned to use camera positioning and close-ups and lighting and editing to heighten the drama (Baker 2016)."

Andrew Cochrane names Georges Méliès's *"The Black Imp"* from 1905 as an example to identify how far along we are in the VR development phase at the moment (Logan 2016).

"It was a huge leap in filmmaking, despite the fact that there was no earth-shattering advancement in technology. It was all application – figuring out how to use the tools available to tell a story that was evocative and a dramatic departure from what was basically an extended GIF in 1891 (Logan 2016)."

Figure 12. Georges Méliès's *"The Black Imp"* from 1905 (Logan 2016).

Eugene Chung, founder of Penrose Studios, a virtual and augmented reality startup based in San Francisco and creator of *"Allumette"* also states that experimenting with the new medium is key (Penrose 2016).

"One of the earliest films, by the Lumière Brothers, was 45 seconds long. Then we had The Great Train Robbery at 12 minutes. Eventually, the feature was born, but it required experimentation. Thus, in the early days, filmmakers had to invent and define the language as they went along. This led to great innovations, such as D.W. Griffith pioneering the Close-Up, one of the most important inventions in cinema. We're excited to learn and grow with this medium in the future (Penrose 2016)."

Cochrane does not see a reason to wait for a more advanced technology in order to get better results in VR storytelling. More importantly, he sees the experience and the way we create the narrative as the key to a successful VR experience (Logan 2016).

"[…] it's not frame rates and resolution that are going to make VR impactful, but the experiences that people are going to have inside of headsets that will forever change the way that we perceive stories (Logan 2016)."

Cochrane also argues that *"Storytelling is dead in VR (Logan 2016)."* What he means is that in Virtual Reality it is not about telling a story to an audience anymore, but rather about creating an experience for them. He also points out that *"Story Worlds"* is a better word to describe the created VR experiences. When we take a look at the traditional storytelling

forms like books, TV, theater, music, film – writers and directors are pulling you through a predetermined story, so that you view it the way they want you to see it. In VR this is not the case anymore, because the experiencer will be able to move around freely and look at different things in this world (Logan 2016).

"Whenever someone puts on a headset, they're immediately filled with a bunch of questions: Who am I? What am I doing? Where am I? Can I move? Who is that (Logan 2016)?"

Cochrane points out that the audience is the most crucial element in a VR experience and that it is necessary to create the experience around the viewer (Logan 2016). *"[I]f the audience is not literally the most important thing in that story that you've created, all of that is for naught. It's a waste (Logan 2016)."*

He suggests that we should look into other mediums and areas like haunted houses, amusement parks, cinema, and game design to find out how to direct an audience's attention in VR – same as cinema adapted techniques from variety entertainment and photography (Logan 2016).

"[…] video games are excellent at directing attention, cinema gives us light and effect cues, and amusement parks are experts at what he calls 'on boarding and off boarding what is bringing us into a story, giving us a character, and, once the ride is over, ushering us back into the real world (Logan 2016).'"

Shawn Layden, the chairman of Sony Interactive Entertainment Worldwide Studios describes deciphering the code of creating immersive VR as studying a new language (Baker 2016).

"'We talk about grammar and the syntax a lot,' he says. 'We're starting to create the lexicon of VR to describe these things, because it won't be the same as the words we use to describe current experiences (Baker 2016).'"

When we look at the 3D games available today, it is evident that similar to filmmaking, computer games have come a long way. They also had to figure out how to tackle the conversion from 2D to 3D games and how to move around and navigate in this new three dimensional environment. Developers gradually learned from their failures and through work and progress figured out how to navigate the player character and the camera in a satisfying and intuitive way (Baker 2016).

"[…] what if I don't feel compelled to move the way I would be in a traditional game? What is progression like in a virtual reality world where you can just stand there to experience it? VR just completely blows up the whole traditional idea of narrative (Baker 2016)."

Eugene Chung also suggests that we should get inspired by other traditional media segments of film, theater, or games, but also warns that there are conflicts between narrative and action (Penrose 2016).

"[…] when I'm in the zone in a game, I sometimes want to skip the cutscenes and go straight back to the action. VR narrative will have to balance the competing interests of Presence & Storytelling, and I'm excited to see how the art form will evolve in the future (Penrose 2016)."

Robert Stromberg, the director of 20th Century Fox's *"The Martian VR,"* recognizes the enthusiasm but also frustration dominating among VR developers around the globe: *"We're building the plane as we're flying it – we may die (Failes 2016)."*

The Future of VR Storytelling

Problems of VR Storytelling

Presence vs. Storytelling

Eugene Chung from Penrose Studios sees the conflict between storytelling and the feeling of presence as one of the major issues that needs to be solved in creating narrative for Virtual Reality (Chung 2015).

His theory is, that once we are told a story in the traditional way – in form of a movie, book, or by a person sitting around a campfire – we genuinely engage with the narrative and disengage with the physical factors surrounding us that are not relevant to the story (Chung 2015). *"If someone in the theater sneezes or if a cell phone goes off, we are jolted out of the experience (Chung 2015)."*
Whereas in real life we are truly present – e.g. on our daily commute to work – and our brain is differently engaged.

"We experience the sights and sounds as a present individual, but we don't feel like we're being told the story of our own commute outside of our own bodies (Chung 2015)."

According to Chung, we experience similar phenomenon in VR. As the definition of *"Presence"* suggests *"the unmistakable feeling of being someplace else (Chung 2015),"* we are being placed intuitively in a very different world, and because we engage with it like we would in the real world, classic storytelling causes problems in VR and has to be reconsidered (Chung 2015).

"To enhance storytelling, we might conduct tricks such as darkening the stage or darkening areas behind and to the side of us, but this consequently decreases the sense of Presence (Chung 2015)."

Chung does not think that storytelling and being present are mutually exclusive, but definitely points out that there is a conflict between the two. He suggests that we should start to ask

questions of deeper meaning, especially in terms of our identity within the VR experience (Chung 2015).

"[…] who are we supposed to be in the VR experience? This Identity Question is a lot harder to answer than on first inspection (Chung 2015)."

Mike Woods who founded the VR Studio at Framestore in New York City shares his experience with *"Henry,"* the cinematic VR experience from Oculus Story Studio. He says that the immersive world is being created around you while the scene plays beautifully right in front of your eyes (Woods 2016).

"The rear 180 adds to immersion, the front 180 tells the story. It's like having a cinema kitted out with all the props from the film around you (Woods 2016)," but that is also when he realised the problem that comes with this approach to VR storytelling (Woods 2016).

"I loved Henry, and for the first 7 minutes of the 'film' I was happy to sit as his dining room table and watch events unfold like a ghost. But then Henry suddenly looks at me. And having ignored my existence for the first part of the experience, he can now see that I DID TURN UP FOR HIS PARTY! Fourth wall obliterated. It's a great moment, but I'm convinced it was a moment Saschka Unseld put in as a coded message to all budding VR film makers. This changes everything doesn't it? If Henry is now aware of my existence, then the 'Swayze Effect' kicks in. I can't talk back to Henry. I'm dumb and mute. Illusion blown. If I could talk to Henry, would not VR then require a level of AI not imaginable for 50 years yet? Difficult. Pleasurable and invigorating to creative minds, but very difficult (Woods 2016)."

Swayze Effect

As already mentioned above and as what Penrose Studios discovered, Oculus Story Studio experienced a similar conflict between *"Presence"* and *"Storytelling"* – generally referred to as the *"4th wall"*– in their VR production *"Henry (Burdette 2015)."*
They wondered, if narration and presence could exist at the same time. Their thought was that when we are focused on a narration that we are completely absorbed by, we are less likely to pay attention to our surroundings and therefore will reject the idea/concept of being

transported to another place. On the contrary, if we are too absorbed by an intriguing virtual environment it is also possible that we won't pay much attention to the narration. They had to deal a lot with the question of how we can be present in an environment and invest ourselves at the same time in the characters and the story in front of us. This was difficult to comprehend for the team at Oculus Story Studio especially when comparing to a play at the theater, where the actors perform right in front of the audience. They even considered the idea of the *"4th wall"* being a necessity for storytelling, but that would make storytelling in VR even more difficult and so it continues to be an ongoing deliberation (Burdette 2015).

Figure 13. *"Ghost,"* the 1990 film starring Patrick Swayze (Burdette 2015).

Oculus Story Studio subsequently started to work on solutions to adjust the level of narration and presence to settle the feeling of this disruption. In the case of their VR experience *"Lost"* they arranged the leaves closer to the experiencer, to make him look around these objects bringing up a more intense feeling of immersion. It turned out that this approach had counterproductive effects (Burdette 2015).

"Obstructing the view made following the action feel like work. Plus, objects that exist in your immediate proximity are really fun to look at in VR. If we weren't paying attention to the story before, we were paying even less attention now (Burdette 2015)."

Figure 14. *"Lost,"* the VR experience from Oculus Story Studio (Burdette 2015).

Their next step was to give the experiencer more time in the beginning, as they found out that people often had to orient first to become familiar with their surroundings and the Virtual Reality environment. Although this led to improved results, they still were not satisfied and so proceeded to direct the attention of the action towards the observer, making him more active (Burdette 2015).

"Suddenly, we noticed viewers seemed more connected with the character and reacted to the Hand's closeness. The reactions viewers were having began to reflect curiosity instead of ambivalence. Many even leaned forward as though they were looking at another person. Now, this felt like a step in the right direction (Burdette 2015)!"

As a result, Oculus Story Studio and their team came up with two theories (Burdette 2015).

"A. The mind has a limited capacity to interpret and process stimuli (Burdette 2015)."

Theory A represents the simultaneously evolving story and stimulation of the environment which creates a conflict in your brain about what to focus on first. Considering the limited human attention span, VR storytelling might be asking too much from the experiencer (Burdette 2015).

"Why does it matter how the main character feels about his dog if you can't get over this coffee cup sitting right here in front of you […] it's right here and oh man, look at it. It's

right THERE, you can just reach out and pick it up and — there you go. You've lost the narrative (Burdette 2015)."

"B. The absence of viewer agency creates an invisible wall between you and the virtual environment (Burdette 2015)."

Theory B explains that although you are digitally present in the virtual world, your surroundings, actors or creatures do not acknowledge you – bringing back the theory of the *"4th wall."* Besides their achievements with theory A, the team from Oculus Story Studio decided that in order to make progress they had to conduct further research to find more out about the theory of the *"4th wall"* – the absence of feeling connected with the VR environment, characters and the story – which they identified as the *"Swayze Effect (Burdette 2015)."*

The *"Swayze Effect"* explains the feeling of not having a palpable relationship with your environment even though you are present in it. The name Swayze comes from the 1990 crime-romance film *"Ghost"* in which Patrick Swayze acts in the role of Sam, a disembodied spirit who is invisible to the living world, but fighting for his living friend's attention.
This essentially reflects the feeling of *"'I'm here! I'm here!' when no one or nothing else around seems to acknowledge it (Burdette 2015)."*

Figure 15. *"Ghost,"* starring Patrick Swayze (Burdette 2015).

Oculus Story Studio has had different experiences with the *"Swayze Effect"* within their VR projects. In *"Lost"* there is a big robot approaching the experiencer, not paying any attention to the viewer's existence until later, when the huge robot bends and welcomes the

experiencer from a very close distance with equivocal intentions. The viewer does not know how the robot will react when it realizes the presence of the experiencer (Burdette 2015).

"We started thinking that maybe things felt off not because we were too wrapped up in looking at leaves and the moon, but because we were too wrapped up in the whole 'GIANT ROBOT. GIANT ROBOT HERE. GONNA KILL ME. GONNA DIE.' element (Burdette 2015)."

This brought the team of Oculus Story Studio to a crucial finding:

"*the viewer is an entity in the scene (Burdette 2015).*"

While working on *"Henry"* they created two opposite experiences and found out that people in the VR experience who received attention from Henry through occasional glances, reacted mostly positively to it (Burdette 2015).

"It showed us that, despite our hypothesis, many people didn't need to have their identity in the world explained. Lots of people are just happy to be there and to take part in the experience (Burdette 2015)."

Regardless of their positive experiences, they still had disputes on whether Henry should actively direct the viewer or not, which is why some team members of Oculus Story Studio still find *"Henry"* as a *"flawed"* narrative VR experience (Burdette 2015).

"There was still a dissonance between presence and story: why is Henry so lonely if I'm sitting right here with him (Burdette 2015)?"

Figure 16. *"Henry,"* the narrative VR experience from Oculus Story Studio (Burdette 2015).

Oculus Story Studio went onto consider allowing the experiencer better interactivity with their digital environment to increase the immersion for her in the VR narrative and to enhance the feeling of being present. Although this train of thought arises another universe of questions for them (Burdette 2015).

"If there are interactive elements, how do we convey that to the viewer? How do we convey a visual language that doesn't feel hokey or obvious? Furthermore, how do we demonstrate the limits of interactivity? How do we keep them from constantly trying to rustle the bushes and pet the dog when there's a story being told in front of them (Burdette 2015)?

Despite the fact that the increased interactivity through altering the environment would significantly improve the experiencer's time in the VR space, it does not solve what Oculus considers as the main problem (Burdette 2015).

"The problem we want to solve is to establish relationships between the narrative, environment, and the viewer that creates a sense of being there (Burdette 2015)."

From their experience with *"Lost"* they concluded that it all came down to the situation when the virtual character in the VR experience recognized you as being an entity within the same world (Burdette 2015).

"That fleeting moment where a character acknowledged your existence is what allowed presence and the narrative to come together (Burdette 2015)."

Among the struggles they had to face to find the right balance between feeling present and storytelling, the *"Swayze Effect"* was one that challenged the Oculus team from the very beginning, and because of their contrasting experiences they are still trying to find out what the essence of their findings is (Burdette 2015).

"Lost showed us that not acknowledging the viewer can create a considerable gap in connecting with the story and action. Henry showed us that acknowledging the viewer is powerful but can contradict the intent of the story being told (Burdette 2015)."

The team of Oculus Story Studio is convinced that the *"Swayze Effect"* is crucial and a key element to VR storytelling that needs to be researched much further (Burdette 2015).

"Armed with this knowledge, we hope to keep pushing VR as a space to tell great stories with the added dimension of your presence being an element in the world (Burdette 2015)."

Audience's Perspective

The experience designers Katy Newton and Karin Soukup collaborated with Stanford's d.school media experiments, the National Film Board of Canada, and independent filmmaker Paisley Smith to research for ten weeks on the audience's perspective in Virtual Reality to find answers to the question *"How do we tell a story for the audience when the audience is present within it (Newton & Soukup 2016)?"*

They came up with three experiments, with 40 probands participating and held interviews with professionals from a wide array of creative fields including design, architecture, science, journalism, film, theater and gaming (Newton & Soukup 2016).

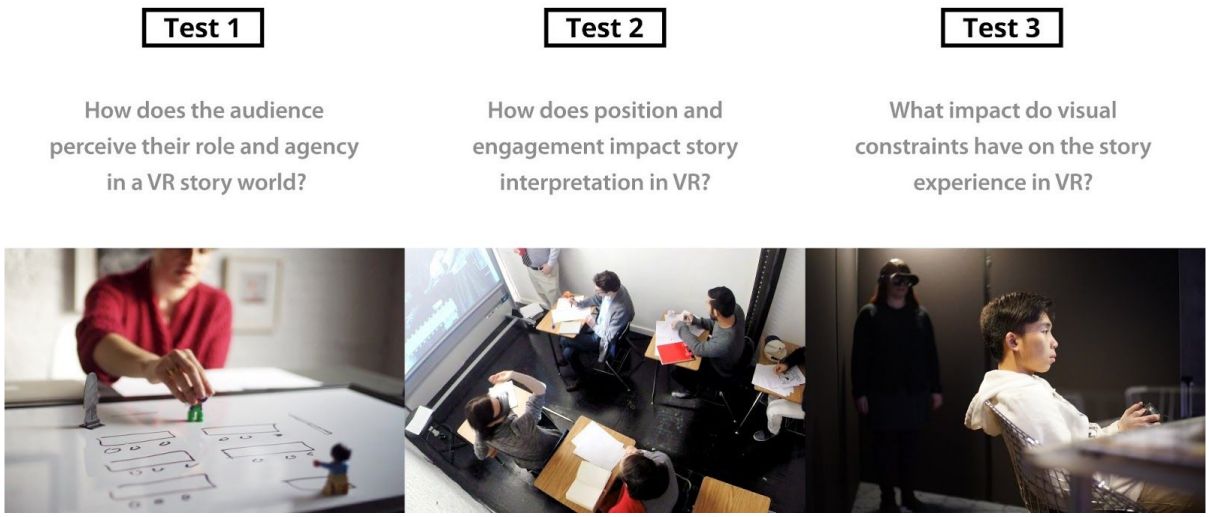

Figure 17. Experiments about the audience's perspective in VR (Newton & Soukup 2016).

For their experiments they drew on locations and scenes from the VR documentary *"Taro's World"* by Paisley Smith, which explores the impact of Taro's suicide on his loved ones and investigates the death of the Japanese exchange student (Newton & Soukup 2016).

They kept their experiments simple and used analog prototypes which enabled them to react quickly and adapt to new demands if necessary. They followed a technique called *"experience prototyping"* where they created a physical experience while using real people in a real environment. This human-centered design approach made it possible for them to study the experiencers behaviour in a cost-effective, fast and flexible way, discrete from artists and VR developers. They simulated the restrictions of the VR technology by limiting the probands in their movements and interactions to emulate the constraints of the Google Cardboard. For their prototypes, they used paper and plastic to make the goggles, onto which they mounted a front-facing camera to record the head movements of their probands while limiting their vision to the side (Newton & Soukup 2016).

These were the outcomes of their experiments:

Reality is constructed

In one of the tests the experiencer had only a limited visual range of 90°. As a result the experiencer was looking for purpose in every particular object and would put even more effort into investigating his environment. If something felt off to him and did not meet his expectations, it would disconnect him from the experience and put him into *"detective mode,"* taking him more out of the experience than it would immerse him on an emotional level (Newton & Soukup 2016).

"When you're depicting the environments, ask yourself: 'Is the story-world consistent and will the audience place the intended significance on the objects within it (Newton & Soukup 2016)?'"

Figure 18. Experiment for meaning of objects in VR (Newton & Soukup 2016).[2]

[2] *"Participants default to 'detective mode' and spend extra energy trying to interpret the meaning of objects in the scene [...] even when there is none inherent to the object. Photos: Karin Soukup and Alexandra Garcia (Newton & Soukup 2016)."*

Figure 19. 3rd Experiment in research for audience's perspective in VR (Newton & Soukup 2016).[3]

Having a body means being somebody

The experiments indicate that a *"neutral observer"* does not exist in a Virtual Reality experience. The audience needs to have a purpose within it to feel immersed in their surroundings (Newton & Soukup 2016).

"To feel bodily present, these tests suggest, the audience should understand who they are in the scene (even if who they are is a 'fly on the wall') as much as where they are (Newton & Soukup 2016)."

Figure 20. Audience positioning test for audience's perspective in VR (Newton & Soukup 2016).[4]

[3] *"In the third experiment, participants watch a scene play out in Taro's bedroom wearing headphones with 360° sound. The participants were divided into three group with three varying degrees of restriction on what they could see. Photos: Alexandra Garcia (Newton & Soukup 2016)."*

[4] *"Our second test, which explored how audience position affected interpretation of the story. Here we see an audience member in three different positions in a classroom scene with Taro. Photos: Alexandra Garcia (Newton & Soukup 2016)."*

Looking is doing

Humans do not have the ability to see in 360°, which means they have to decide when and where to look at. As a storyteller we need to find out how we can get the attention of the experiencer to indicate the crucial points in the story at the right time. As a result of this, two viewers will never experience the same story because they will not look at the same objects within the same sequence. (Newton & Soukup 2016).

"Looking gives the audience agency, not to change or affect the story in VR, but to choose which pieces of the story they take in, make meaning out of and combine with other information to form a story in their minds (Newton & Soukup 2016)."

Figure 21. Experiment of audience's sense of *"missing out"* (Newton & Soukup 2016).[5]

The more there is to see, the less the audience remembers

Katy Newton and Karin Soukup discovered that experiencers with a 90° view range remembered more details than audiences experiencing the same scene with a full 360° vision, which suggests that in 360° the audience seems to be overwhelmed with information (Newton & Soukup 2016).

"As the storyteller, you need to consider how to combine audio and visual elements without overloading the audience (Newton & Soukup 2016)."

360° is more than full circle

The 360° environment feels so complete that the sense of being present makes it more likely to be sensitive to your surroundings and pick up on feelings around you. Whereas being in

[5] *"Alexandra Garcia demonstrates the 360° live prototype state, that explored the tension between two focal points and the audience's sense of "missing out" on story information. Photo: Karin Soukup (Newton & Soukup 2016)."*

"detective mode" lets you focus more on the details and storystrings, and at the same time you are more likely to ignore your environment (Newton & Soukup 2016).

"With each new bit of information you add to the VR storytelling experience, you should ask yourself, 'Does this information lend to feeling present, or will it send the audience into their heads – and which mode do I want them in right now (Newton & Soukup 2016)?'"

The team around Katy Newton and Karin Soukup originally had the idea of the audience as being an *"observer"* rather than the more active role of an *"influencer"* (*"having impact on the story, but not changing the outcome of the narrative (Newton & Soukup 2016)."*)
However, after taking their findings into account they now think of observing more as an active condition. *"Looking is doing, and it requires a lot of work from the audience (Newton & Soukup 2016)."*

They suggest that the storyteller should think of himself more as an *"influencer"* instead of a *"director"* (Newton & Soukup 2016).

"we can't frame the shot for them; we can't cut away. Instead, storytellers have to behave like a ***matador,*** *waving the red cape in the direction they want the audience to run, knowing that the power ultimately lies in the audience's hands to see what they want to see, hear what they want to hear and form their own stories about what they have experienced (Newton & Soukup 2016)."*

Similar to what other professionals from the VR realm had mentioned, Katy and Karin believe that we should find inspiration in other media forms like film, design, art, and theater to get the attention of the audience. For them the key to tear down the *"4th wall"* is to *"put ourselves in the audience's shoes and understand their cognitive, emotional and physical experience. We need to embrace human-centered design lens of 'audience experience,' and let that guide our choices (Newton & Soukup 2016)."*
For them, one of the fundamental factors to achieve this is to overcome the hurdle of designing an interactive attentional experience (Newton & Soukup 2016).

"[...] if we can influence the audience's choice of where to focus without overburdening them with that choice. Then the audience will feel as though they are living inside the moments we create (Newton & Soukup 2016)."

We as the storytellers might then become as unseen to the experiencers as the technology (Newton & Soukup 2016).

The Letting-Go

The team of Oculus Story Studio shared their insights about the VR experience *"Lost"* from the audience's perspective as well. Even though they do not consider their findings as absolute, it should still be of assistance to others who are entering the realm of VR storytelling (Unseld 2015).

"One of the most powerful aspects of film is the total control over the shot. We talked endlessly about how to regain that control. How could we make sure the viewer always looks in the correct direction? We tried guiding the audience's view through audio cues. We had a bird fly by the viewer to capture their attention and guide their gaze towards a point in the scene. We also tried to design the set in a way that guides the viewer's gaze to the right areas.

However, each time we implemented one of these dictatorial tools too heavy handedly, the storytelling started to feel forced, staged, and artificial (Unseld 2015)."

They ascertained that having total control over the experience is misleading as they would not use the full potential of the VR medium. They decided to allow the audience more space to give them the chance to find out more about their environment and their role within it. They proceeded to name the process *"The Letting-Go" (Unseld 2015).*

"By not forcing the viewer to look somewhere and making the surroundings interesting in all directions, we invite the viewer's curiosity in the world. And through this curiosity, have them take a more active role in experiencing the story (Unseld 2015)."

They grant the experiencer some time to become familiar with their surroundings and the world they are in. After some time – just enough so that the viewer feels relaxed with his environment – they initiate the action of a flying bird in the scene (Unseld 2015).

"[...] because we gave them time to settle in, they are willing to listen to us (Unseld 2015)."

Spatial Story Density

"If only one thing happens in VR at any given time, as is the case in film, the world quickly starts to feel empty and strangely fake. In life there is rarely ever just one thing happening around us. To truly have a VR experience give us the sense of reality, and thus a sense of presence, we need to go beyond singular storytelling (Unseld 2015)."
Ultimately the team at Story Studio questioned the overall connection behind the story, listener and the storyteller, based on the premise that even though time evolves in a linear way, the exploration of the story does not necessarily do the same. The result of these discussions is the concept of a three dimensional story space referred to as *"Spatial Story Density (Unseld 2015)."*

"In VR there should never be just one interesting story related thing to look at. Stories and storytelling should be as three dimensional as the space around us. At any given moment we need to make sure that there is a certain amount of density of story elements that fills that space (Unseld 2015)."

Jessica Brillhart, the principal filmmaker for VR at Google's Creative Lab supports the statement that the experiencer is the actual storyteller within the new Virtual Reality medium. And to create the best individual experience, we would need to built a complex experiential world, so that when that person comes out of the experience her mind will create a powerful and extensive story based on what she just experienced (Brillhart 2016).

"Nothing will compel a visitor to do something more than the inner desires of the visitor, and if we can speak more to those desires, the better we'll understand how to craft experiences. To understand not just the whats, but the hows and the whys (Brillhart 2016)."

Eugene Chung from Penrose Studios is also convinced that the biggest priority for a successful VR experience is to create the best experiential world for the audience. They think

of their virtual worlds – created with richness, details and full of possibilities – as the narrator of the experience (Belz 2016).

"[…] if we can create these better worlds, then in some way form or fashion, we can go and elevate people to these transcendent worlds that they can't participate in in real life. But that then they will come back to real life, and it will impact them in a positive way, here (Belz 2016)."

Reconsideration of Interactive Storytelling in Computer Games for VR

In this thesis we found out what problems VR developers are being confronted with in terms of VR Storytelling and have repeatedly heard the issue that people are looking for experiences which lead to individual stories. It is necessary to create the VR experience around the audience acting as the central element and *"to understand their emotional and physical experience (Newton & Soukup 2016)"* (Logan 2016). We learned as well that *"Story Worlds"* is the more appropriate term to use when we create VR experiences (Chung 2015). We have to reconsider traditional storytelling for VR storytelling because we are being placed intuitively in a very different world, and want to engage with it like we would in the real world. Classic storytelling as we know it from theatre or cinema does not apply in VR and causes problems (Chung 2015). As Katy Newton pointed out that there should not be only one story string going on in VR, we should also see the space around us as a three dimensional space that we equip with story triggers from which stories can evolve. At the same time we should not exaggerate the experiencers choices so that the offered possibilities and options still feel natural (Newton & Soukup 2016). We have to create a sophisticated world that allows the person's mind to create an intriguing and comprehensive story when they come out of their experience (Brillhart 2016).

"Understanding a world deeply enough in all of its aspects that stories spring almost effortlessly from that baseworld (McDowell 2015)."

It turned out that one of the toughest problems VR developers face, is the balance between the competing interests of *"Presence"* and *"Storytelling"* (Penrose 2016). *"When we truly engage with a story, we begin disengaging with physical stimuli around us […] (Chung*

2015)." This brings us to the *"4th wall"* and the effect of not being able to interact with the world we are in – Oculus calls it the *"Swayze Effect." "The problem we want to solve is to establish relationships between the narrative, environment, and the viewer that creates a sense of being there (Burdette 2015)."* To make progress here, it will be crucial to find answers to the question about our identity – who and what we are supposed to be in the VR experience (Chung 2015)? This leads us to the importance of complex characters, ones who offer a broad spectrum of possibilities in branching and upcoming narratives, with whom we feel and care about (Machkovech 2015). Furthermore how do we naturally translate the interactive elements and the visual language to the viewer? How do we show him the limits of the interactivity and how do we draw his attention to the story without blatantly fighting for his attention (Burdette 2015)? Based on general perceptions from the VR/AR Innovation Report of 2016, *"There is still yet to be a 'killer app' for VR/AR, outside of gaming (VRDC 2016)"* the opportunity arises to look into interactive game development to see what we can learn here for the future of VR storytelling.

Legendary Designer Sid Meier:

"Games are a series of interesting decisions (Bryant & Giglio 2015, p.41)."

Video Game Researcher Jesper Juul:

"Game is a rule-based system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels emotionally attached to the outcome, and consequences of the activity are negotiable (Bryant & Giglio 2015, p.41)."

Iconoclastic indie developer and critic Anna Anthropy defines a game as *"An experience created by rules (Bryant & Giglio 2015)."*

Keith Giglio and Robert Bryant explain in their book *"Slay the Dragon",* the writing process for the interactive medium computer games and they give writers from traditional storytelling mediums guidance to understand the challenges that come with the medium. Their theory is that games and stories are based on a rule system where player and characters affect the

outcome through their individual choices, and those resulting outcomes then influences the player for future decisions (Bryant & Giglio 2015, p.44).

"It's a feedback loop: Rules create consequences. Consequences create feelings. Those feelings affect the player's next actions, and those actions are again judged by the rules (Bryant & Giglio 2015, p.44)."

According to Jesper Juul – acclaimed game theorist and game developer – the difference from linear storytelling to interactive storytelling is that the player/experiencer steers *"the half-real zone between the fiction and the rules (Bryant & Giglio 2015, p.56)."*

Game writers constantly focus on blending the gameplay[6] and the story together so that the player's actions and emotions merge with each other. As a result they wish to establish *"a feeling of participation/immersion into the game"* for the player to make him feel emotionally satisfied (Bryant & Giglio 2015, p.60).

"Games place the players in the world, enable them to make choices that influence the outcome of the narrative, and then experience the consequences of those choices. They get to be the hero (Bryant & Giglio 2015, p.60)."

Bryant and Giglio state that the elements for a successful story in games are the complex combination of narration, story, setting, world as well as gameplay, character, design, art direction, music, and sound effects. They further argue that games – even with weaker plot lines – can pull a player into its world under the condition that it consists of a rich and inhabited environment. Role-playing games (RPG) like *"Elder Scrolls"* or *"Fallout"* as well as massively multiplayer online games (*"World of Warcraft," "EVE Online"*) are composed of tremendous worlds where their players get absorbed by its backstory, characters and the saga of the world. They see the key factor for Blizzard's success with *"World of Warcraft"* in these rich and thorough world that players can explore. They provide the ground for the player to grow with their character and their astonishing quests. Bryant and Giglio argue that the story in a videogame is equivalent to the world of the game. Backstories – which game creators refer to as *"lore"* – made it possible for the player to understand what happened before his quest began (Bryant & Giglio 2015, p.67).

[6] The way a player overcomes the challenges in a game by using the tools/tactic defined by the game rules.

"*It is in the midst of that lore that we as players engage in our own private stories through our avatars. […] The world of Skyrim is so rich that players craft their own adventures, finding their own 'stories,' setting their own goals within that world […] Storytelling in games is more often a task of world building rather than plot writing (Bryant & Giglio 2015, p.67).*"

It is necessary to create an *"emotional arc"* in the game so that it does not feel arbitrary. The writer has to carefully think through each mission and adventure – *"all in the context of the world (Bryant & Giglio 2015, p.59)."*

Even if most of the players would ignore these stories, developers would still spend tremendous time on the game narrative, because they believe that *"whether consciously or unconsciously – players will develop a deep emotional connection to the game world that will keep them coming back again and again (Bryant & Giglio 2015, p.59)."*

There is a common ground between the challenges of VR storytelling and game writing. The ultimate aim is to make use of the player's/experiencer's feelings to intensify the narrative experience, which is referred to as the fusion of narrative and gameplay – the *"storytelling alchemy (Bryant & Giglio 2015, p.44)."*

"A story is a journey of emotion, a game is a journey of action (Bryant & Giglio 2015, p.44)."

In the following chapters we are going to take a deeper look into the pillars of game development to find out how we can learn and adapt from their rules, structures and elements for VR storytelling.

Story Formula

Similar to the grammatical structure of sentences

Subject + Verb + Object = Sentence

story structure can be described as

Protagonist + Goal + Conflict + Obstacles + Resolution[7] *= Story*

[7] *"Sometimes game stories suspend resolution indefinitely, or have variable outcomes (Bryant & Giglio 2015, p.61)."*

If we try to match this formula with the video game *"Asteroids,"* an arcade space shooter from 1979, we can see that it has all the ingredients for a functional story (Bryant & Giglio 2015, p.61).

Player Ship + Survival + Rogue Saucers + Asteroids +Inevitable Player Death = Asteroids

Let us go a step further and adapt the formula to VR storytelling by only substituting the *"Protagonist"* with *"Experiencer"* and *"Story"* with *"VR experience,"* because like the player in a game – in a VR experience, the experiencer *"get to be the hero (Bryant & Giglio 2015, p.60)."*

Adapted formula for VR experiences:
Experiencer + Goal + Conflict + Obstacles + Resolution = VR experience

The following simple maxim seems to apply to conventional narrative, game narratives as well as VR experiences: *"Somebody wants something and is having trouble getting it."* According to Bryant and Giglio, creators should always ask what kind of quest the player/protagonist has to deal with and what goal and/or mission he has to achieve, while writing a story of any kind. Metaphorically, there must always be a dragon to be slayed (Bryant & Giglio 2015, p.90). A dragon is even more compelling when he is surrounded by a huge castle, beautiful princes or gold treasure giving the knight greater motivation to slay the dragon.

"Every game needs a 'dragon.' Even games that are so-called mindless stand-alone experiences: endless puzzle games like Tetris and Bejeweled, racing games, sports games like Madden or FIFA, and casino games – all these are richer and more engaging to more players when set in a compelling story context or world (Bryant & Giglio 2015, p.90)."

Bryant and Giglio's principle is that the story always comes first and that it builds a *"more immersive experience"* in the game world. Even though, the way in which the player overcomes the challenges using tools/tactics defined by the game competes with the story for the player's attention, Bryant and Giglio's principle maintains that the story always comes first and that it builds a *"more immersive experience"* in the game world (Bryant & Giglio

2015, p.70). This conflict between storytelling and interactivity triggers the phenomenon of the *"4th wall"* – or *"Swayze Effect"* (Oculus) – with which both, VR developers and game designers, have to deal with.

In an interactive dialogue scene there has to be a response from non-player characters to keep the narrative going. For example, if a quest adviser in a role-playing game (RPG) starts to repeat his exact words in a conversation over and over again, the *"4th wall"* kicks in and the player gets kicked out of his experience. The reason for this is, that through repetitive dialogue (Figure 22) the non-player character does not seem human and therefore we can not take him seriously anymore (Bryant & Giglio 2015, p.179).

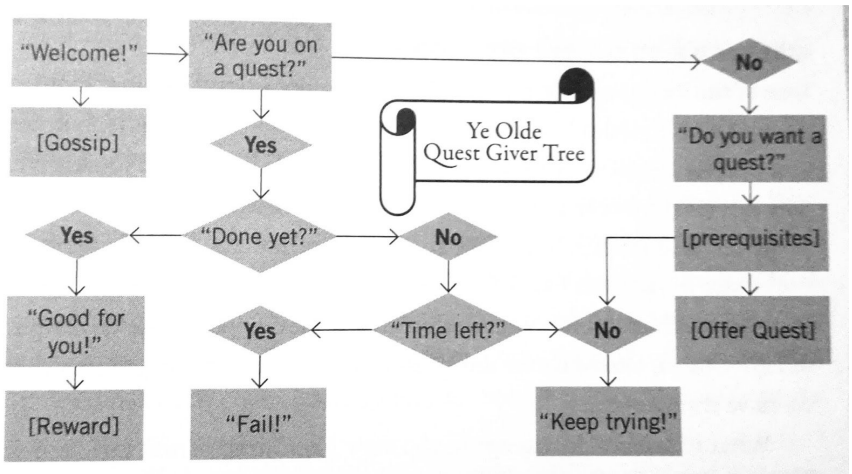

Figure 22. Dialogue concept non-player character (Bryant & Giglio 2015).

Xbox Live's Larry Hryb said at the Future of Digital Media symposium at the S. I. Newhouse School at Syracuse University that game stories are *"3D storytelling."* This means that it is a narrative medium possessing the potential to involve an audience like no other (Bryant & Giglio 2015, p.85).

Video games are nowadays created with the involvement of writers from traditional storytelling mediums where they analyze what movies and television do well and what games could co-opt. *"Quantum Break,"* is a perfect example of this where we can see the potential of interactive storytelling within a game (Bryant & Giglio 2015, p.87).

"Quantum Break blurs the line between television and gameplay, integrating the two into one seamless, uniquely immersive experience. It's a revolutionary entertainment

experience that weaves the cinematic action of intense gameplay with the tension and drama of scripted television, creating a world where each has a direct impact on the other (Bryant & Giglio 2015, p.87)."

Giglio's and Bryant's opinion is, that conventional storytelling practices and games can indeed complement each other to grow as an interactive medium and as a form of art (Bryant & Giglio 2015, p.87). We will focus on how to tackle the conflict between storytelling and interaction and the benefits of gameplay in a later section.

Structure

"Structure is what holds the story and the game together (Bryant & Giglio 2015, p.91)."

Game developers successfully started to adapt the traditional three-act structure into video games. Sam Lake, creative director of Finland's Remedy Entertainment who created *"Max Payne," "Alan Wake"* and "*Quantum Break"* states that they need many drafts, iterations and feedback loops to produce a video game. Therefore they use the traditional screenwriting workflow: pitch, scene outline, synopsis, and screenplay. David Jaffe game director of *"God of War"* even compares producing a game with creating a screenplay (Bryant & Giglio 2015, p.96).

3 Acts

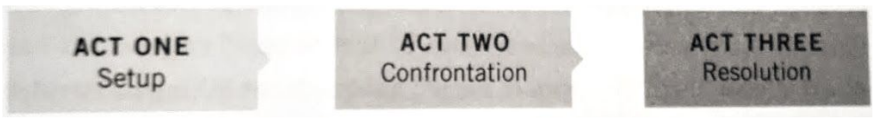

Figure 23. Three Act Structure (Bryant & Giglio 2015).

"Boy Meets Girl. Boy Loses Girl. Boy Gets Girl Back (Bryant & Giglio 2015, p.93)."

Act One is the premise, the setup in which the who, when, what and where of the story are introduced. Followed by **Act Two,** the part where the protagonist has to overcome his obstacles. His conflict, where things have to go wrong and where everything seems to be

doomed symbolizes the lowest point in the story. In **Act Three**, the protagonist has to face his antagonist and *"slay the dragon,"* so he can go back to his life or start a new one (Bryant & Giglio 2015, p.93).

5 Acts

The media blogger Film Crit Hulk believes that film and television shows and dramas (*"Fringe," "Lost"*) are nowadays structured in 5 acts, like the old Shakespeare plays (Bryant & Giglio 2015, p.97).

Act One establishes a pre-existing conflict. This concept is also used for game narratives because it allows the player to skip long expositions and to jump right into the middle of the conflict zone where one can team up with the main characters (Bryant & Giglio 2015).
Act Two is where we get to know the *"dragon"* and where we learn what the player needs to achieve. *"A turn or reversal which deeply worsens the main conflict (Bryant & Giglio 2015, p.98)."*
Followed by **Act Three,** symbolizing the midpoint, turning point or twist that demands from the player/protagonist to change or rethink his plan. *"A Surprise that Makes Things Worse (Bryant & Giglio 2015, p.98)."*
In **Act Four –** *"The Spiral"* – conflicts string together, and things occur quickly towards an outcome (Bryant & Giglio 2015, p.98).
Act Five is the part where things resolve, where we see an accelerated plot, more acts and a climax in the story (Bryant & Giglio 2015, p.98).

8 Acts – The Sequence Approach

In the sequence approach the three acts are divided into eight sequences, each containing its own objective that leads toward the prime objective. Every sequence carries a beginning, middle, and end, each having its own dramatic conflict. The end of every sequence symbolizes the start of the following sequence. In every sequence the protagonist has to achieve an objective in order to move on to the next sequence. It should be noted that even though there are similarities in the levels of a game, we are not restricted to only eight levels,

as there can be an unlimited number of levels, missions on quests. Just like there can be infinite episodes in a TV show. The only limits are the budget and time appointed for the project. The only requirement though is that the consecutive acts complement each other logically. "*Because of level A, level B must happen (Bryant & Giglio 2015, p.99).*"

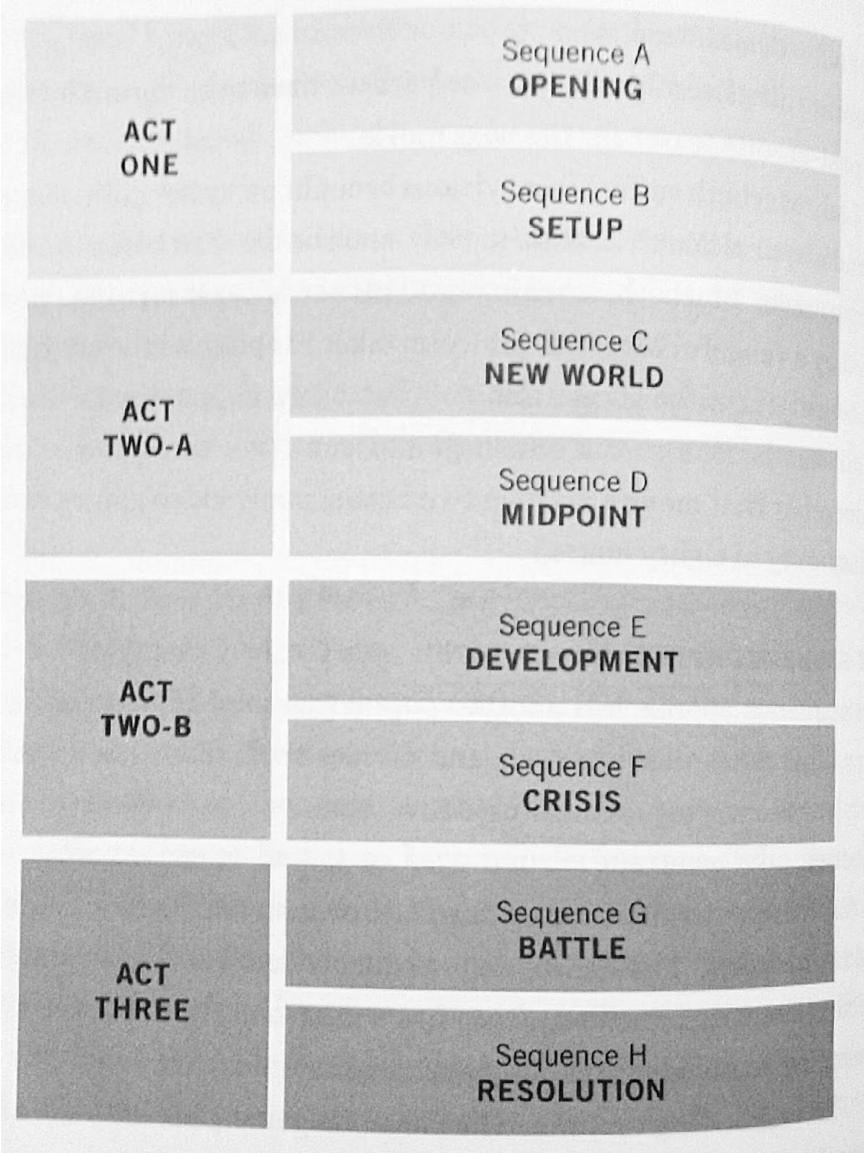

Figure 24. 8 Acts – The Sequence Approach (Bryant & Giglio 2015).

Serialized Storytelling

TV shows like *"The Sopranos,"* or *"Breaking Bad"* are using a *"what happens next"* structure in form of cliffhangers or unexpected revelations to keep their audience watching episode after episode. It is this *"potato chip"* storytelling that introduced the golden age of television. You start with one chip and soon you can not stop anymore. This long-form TV series structure had influence on video game creators as well. They are inspired by the story-arc that can last for an episode, season, or complete series. Telltale Games did a good job in developing the successful episodic video game *"The Walking Dead"* which is based on the comic book series by Robert Kirkman (Bryant & Giglio 2015, p.101).

"The hero(es) has a goal and sets down the risk-laden path to achieve that goal. Along the way there are many adventures, each with its own beginning, middle, and end (Bryant & Giglio 2015, p.101)."

Moreover, with the latest generation of game consoles and a powerful internet connection we have the potential to download content that extends a game. Through post-released spin-offs or new episodic adventures further chapters can be added to the game or make other areas of the game world more accessible (Bryant & Giglio 2015, p.101).

No Act Structure

Microsoft Game Studio's lead designer, Richard Rouse III, and Tom Abernathy from Riot Games have a concept that suggests that the user experience and the character we play in the game have a more important role in games than the story itself does. They believe that games should not follow any structure. Bryant and Giglio only partially agree with this, as their mantra is that

"Plot is there so the character can change (Bryant & Giglio 2015, p.109)." For them, all writers have to deal with the dilemma of deciding whether the plot or the character is more important.

"*You need plot. You need characters running around in your plot. Structure is what you use to craft the story so the characters(s) has somewhere to go, something to do and ultimately can change (Bryant & Giglio 2015, p.109)."*

Most importantly, the character has to be in constant motion, so that the audience or player can see or feel that the protagonist's abilities advance, and the challenges become more difficult to tackle (Bryant & Giglio 2015, p.109).

Behind these narrative frameworks, Bryant and Giglio found some interesting ideas and innovative storytelling opportunities. It is worth taking a closer look at what we can do within these structures (Bryant & Giglio 2015, p.102).

Narratives

Parallel Narrative

In a parallel narrative, all protagonists/players have the same objective following the same route, and the narrative moves on with them as part of the story. In the game *"Heavy Rain,"* the player is able to play the exact story fragments through the eyes or bodies of various characters, each time pushing the narrative forward (Bryant & Giglio 2015, p.102).

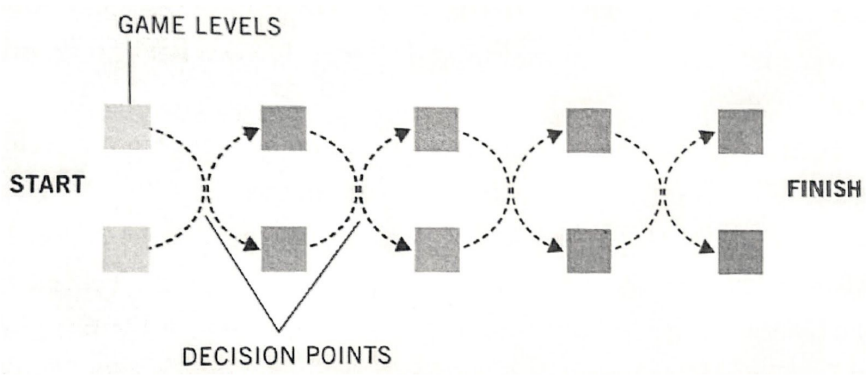

Figure 25. Parallel Narrative Structure (Bryant & Giglio 2015).

Branching Narrative

If we think of branching narratives we can imagine it as follows: beginning, middle, multiple endings. In the 1970s and '80s, we had Choose Your Own Adventure[8] paperbacks that were based on the same concept; today, with e-books and touch-screens through which we can

[8] In Choose Your Own Adventure books the reader takes the role of the protagonist and makes choices that determines the main character's actions and the plot's outcome (Wikipedia 2017).

easily navigate back and forth, interactive fiction has even more potential to grow. As there is an increase in numbers of readers growing up with video games – and thus feeling more comfortable with the idea of participating actively in game narratives – it is only a matter of time before we see the first blockbuster in the new medium of interactive fiction. Bryant and Giglio believe that good game writing skills are fundamental when it comes to writing for interactive fiction (Bryant & Giglio 2015, p.103).

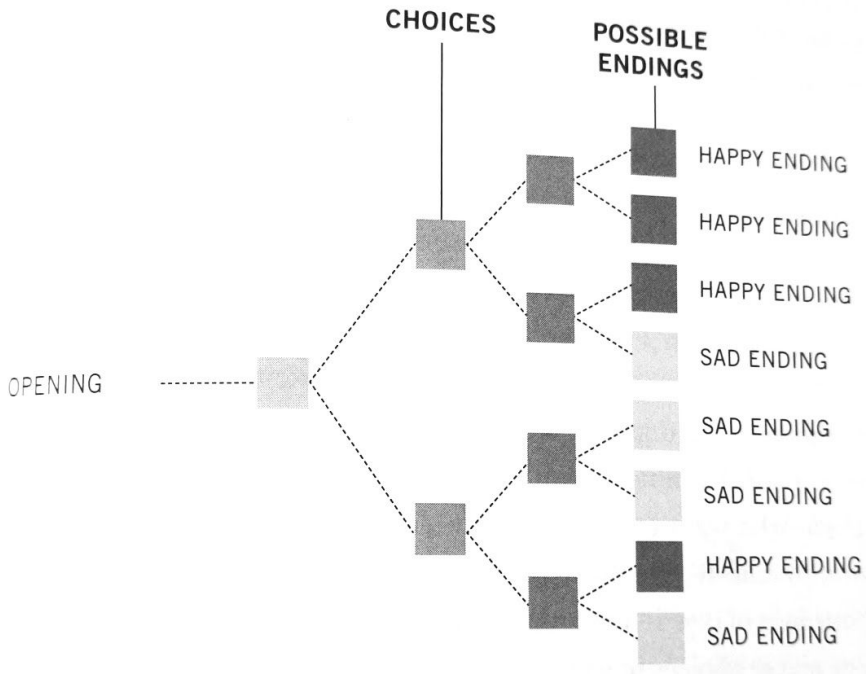

Figure 26. Branching Narrative Structure (Bryant & Giglio 2015).

However, producing for branching narratives with different story paths is expensive. Animation, script writing, sound effects, etc. costs a lot of money. It goes without saying that there will be game levels or paths that might be left out/skipped by players who take a different track. Therefore it is a valid argument to say it is not worth it to create expensive extra story paths and outcomes if only a few players will ever see them. Another problem with multiple endings is that if you play as long as 40 hours, you surely want to have the *"good"* ending eventually and you do not want to play another 40 hours just to see an alternate ending. One strategy is to create moral choices for the player throughout the storyline, but to experience the good and the bad storyline you often would have to replay the entire game or load from saved files in order to get to the critical decision points where you could choose the different path (Bryant & Giglio 2015, p.105).

We are still in the learning process of writing for branching narratives. Despite that, there are far more people out there who want to write for interactive fiction than people who want to consume it, and we still have not seen the interactive fiction *"blockbuster"* that would serve to bring the genre new customers. Branching narratives demand that the choices of the player will form their experience – an experience that reverberates with the subject of the game or that triggers an emotional reaction.
It will be a tightrope walk to find a meaningful way of telling interactive stories without wanting the experiencer to *"[open]all the boxes in an advent calendar all at once,"* where what matters is not what the rules are but rather the act of opening them to see what is inside. For Bryant and Giglio it is important that we have *"good free tools and a growing body of very good content to study,"* if we want to improve in creating interactive fiction (Bryant & Giglio 2015, p.105).

Non-Linear Narrative

Films like *"Memento," "Rashomon," "Betrayal," "Timecode," and "Pulp Fiction"* use storytelling methods such as repetition, shuffling, or inversion – combined, or simultaneously – and teach the audience that stories do not necessarily have to follow a linear storyline. Game design adopts this scheme to create stories that allow the player to follow her intuition. These games are called *"sandbox"* or *"open world"* games, and are created in a way that make the player feel like she can do whatever she wants, wherever, and whenever she wants to (Bryant & Giglio 2015, p.105).

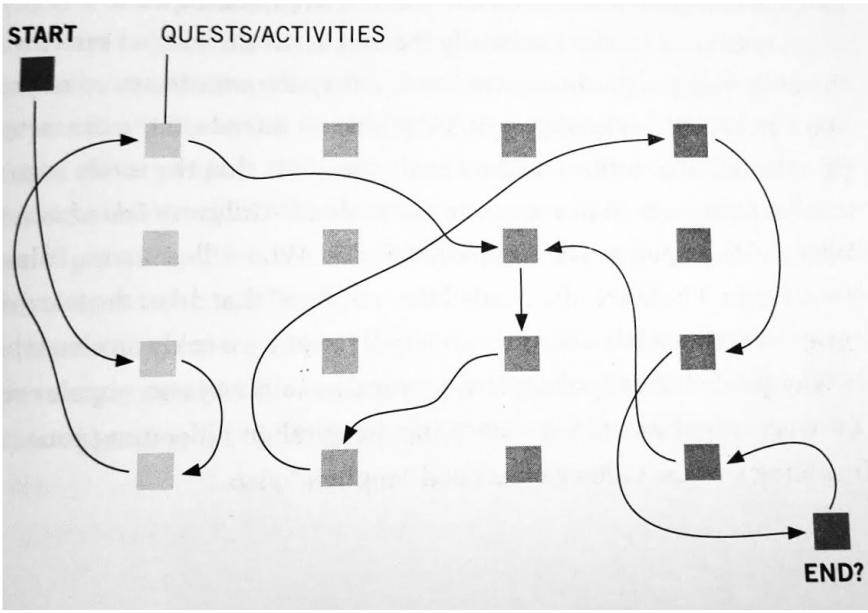

Figure 27. Non-Linear Narrative Structure (Bryant & Giglio 2015).

In general, these games seem not to be created within a three-act structure, but their individual missions do tend to fall within a three-act structure. Role-playing games like *"Skyrim," or "Dragon Age"* have a linear story structure, but the player does not necessarily have to pursue it. One is more likely to be encouraged to discover the world and explore the various side missions and adventures. As an example *"Dragon Age: Inquisition"* offers over 125 hours of extended content. This is more than all *[how many]* seasons of *"The Sopranos,"* and more than the seven *"Star Wars"* movies combined; even if you put all of the Marvel-universe movies together, *"Dragon Age: Inquisition"* would still be longer (Bryant & Giglio 2015, p.106).

Levels

We expect as game players to make progress with every new level – either in the form of getting closer to the endgame or improving as a player in some way or another. Without rewards for performance, the player might get the impression that she is doing hard work. Similarly, if we are not making progress with every new scene in a movie, we tend to blame the film as episodic or a waste of time – certainly a negative reception in the film industry. As mentioned earlier, the key is to find the engine for our story/game, the arc, goals, conflicts of

our characters and lay them out piece by piece – or in games, level by level. For writer and producer Sam Lake, it is essential that a story consists of various levels – featuring the internal conflict and the external action of the character. He tries to think of level design as narrative design. First, he finds out what pushes the story, and later, he figures out what action is needed within the levels (Bryant & Giglio 2015, pp.155–156).
As levels symbolize the chapters of a story in a game, Bryant and Giglio suggest that it is best to start small and constantly grow bigger. Subsequently, the drama can evolve with the gameplay. Every level needs to have a meaningful and noticeable goal. Without that, it would only be a concatenation of activities without any purpose. As discussed in the structure chapters, every level, mission, or quest can have its own little act structure, containing a start, middle and end (Bryant & Giglio 2015, p.157). The link between the levels, however, should never simply be *"and."* It is better to use *"therefore"* – suggesting that once the level is finished there are going to be surprising consequences, and *"but"* – concluding that the next levels contain further information that is going to lead to new complications. As a result, the story keeps making progress. Bryant and Giglio advise that it is best to lay out the journey of the character as a map and plan whom our hero will run into on his way. They stress thinking about how the hero deals with new situations in the context of his emotions and the overall gameplay. What's important is that the *"events"* that affect the story are more significant than the players *"activity (Bryant & Giglio 2015, pp.157–160)."*

Basically, storytelling is like solving problems. If we take a look into movies, protagonists are usually confronted with a series of problems they have to solve over the course of the film. In *"Gravity"* for example, Dr. Ryan Stone (Sandra Bullock) has to overcome many hurdles to get back to Earth. To make the conflict even more dramatic, the writers featured the character of Dr. Stone with an aversion against space. We can find those sequences of problem solving in games in the form of levels (Bryant & Giglio 2015, p.163).

"What makes the action dramatic are the stakes involved and the emotions at play in the characters we are rooting for (Bryant & Giglio 2015, p.163)."

VR developers often say that one of the toughest challenges when they develop for VR experiences is to keep *"the balance between the competing interests of presence and storytelling (Penrose 2016)."*

Bryant and Giglio also recognize this conflict between narrative and being present.

"There is an inherent conflict between storyteller and audience when you give the audience some control over the narrative (Bryant & Giglio 2015, p.75)."

But as previously mentioned, Bryant and Giglio propose the idea that classic storytelling and interactive mediums can grow together to create a new art form (Bryant & Giglio 2015, p.87), and maybe we can define this new form of art in Virtual Reality.

To Bryant and Giglio, creators for interactive mediums should always ask questions of what quest the player/experiencer has to deal with, what goal he has to achieve or what mission he is on. Therefore, they always see structure as key – *"it holds the story and game together (Bryant & Giglio 2015, p.91)."* It is important to say that each story, game, experience, or even each environment has its individual demands to the structure and narrative. But there are enough established, successful structures/narratives to choose from, that mixing them, or refining them all together, is only a matter of adjusting a story to its right story structure. Movies and television series have come a long way, and they initially evolved over decades from stage drama to their current form. It will be crucial for VR storytelling to constantly make progress to conform to structures in the same efficient way that Hollywood scripts follow a specific format (Bryant & Giglio 2015, p.109).

In a movie script, there is a distinct format used for each page. One minute in the final film reflects approximately one page in the script. The beginning/act one consists of about 30 pages/minutes, just as act three does. The middle takes up about twice as much space with 60 pages/minutes. Therefore, it is fair to say that films are balanced. These are general principles, and not all movies will follow these guidelines, but there is definitely a trend for balancing a movie in this way. The pilot episode of a TV series symbolizes the first act. The second Act starts and continues with episode two and the continuing episodes. For a television series, it is essential to have an *"engine"* that fuels the audience's attention and interest in the upcoming episodes. A good example is a hospital show, where incoming

patients can always create new stories. Video games do not follow that construction. In the game *"The Last of Us,"* act one takes around twenty-five minutes of game time, but to finish the entire game would take many more hours (Bryant & Giglio 2015, p.107). With a potential of sixty to eighty hours of play time, computer games can have a large narrative span (Bryant & Giglio 2015, p.98). Similar to games, VR experiences could vary in its duration. There should be an easy way for the experiencer to interrupt or continue anytime. It could be helpful to design the VR story as a thread of consecutive experiences that seamlessly blend into one long experience. This would reinsure that the user reaches stopping points in short intervals and on the other hand one would have the option to continue as long as the experience remains enjoyable. This might be something comparable to location change or jumping in the timeline of the experience.

In order to keep the balance between interaction and storytelling, Bryant and Giglio recommend thinking of interactive storytelling as *"3D storytelling."*
For that reason, they visualize the construct of a game in three dimensions and call it the Pyra-Grid. Their theory is that by considering missions, levels, or the game as a whole in those three dimensions, your gameplay and narrative move on together (Bryant & Giglio 2015, p.108). A story should consist of various levels where the character's internal conflicts and external actions can develop. Level design should be considered as narrative design where we initially identify the engine of the story, and subsequently find out what action is needed inside these levels (Bryant & Giglio 2015, pp.155–156). The principal of *"3D storytelling"* can be of great use to VR storytelling as well. It is important to think about the narrative structure, and to determine the purpose of each character and final outcome of the experience, even if we have multiple endings (Bryant & Giglio 2015, p.107).

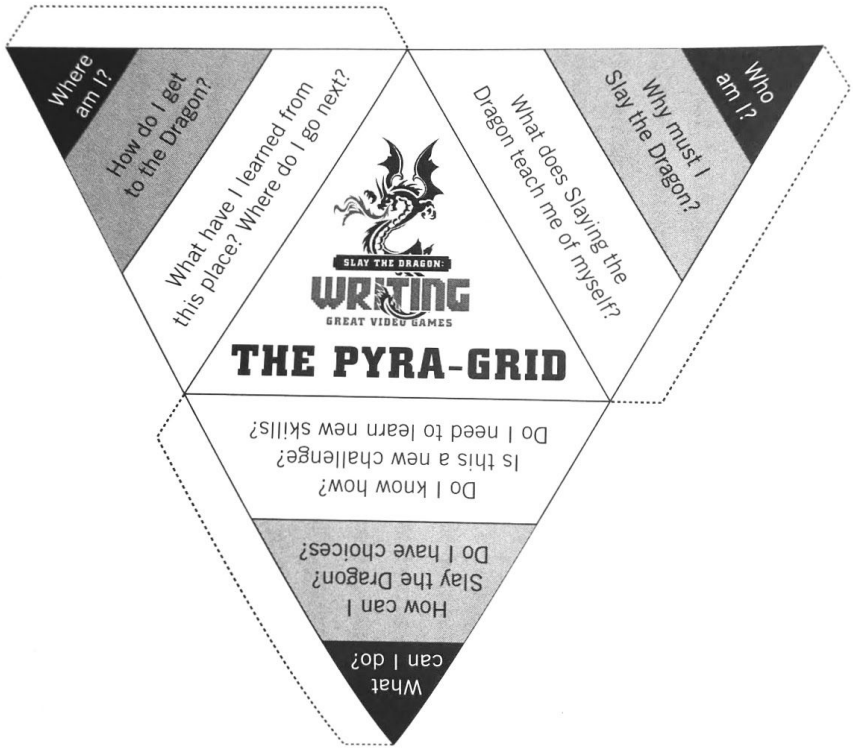

Figure 28. The Pyra-Grid (Bryant & Giglio 2015).

Character

VR developers also frequently mention the importance of complex characters. In other words, characters we care about and feel with, *"ones who offer a broad spectrum of possibilities in branching and upcoming narratives (Machkovech 2015)."* In this chapter we inspect what makes a great character and how we can build up emotion for the experiencer.

In a good story, the character is as important to the storyline as good structure is. If the player or viewer does not empathize with the hero, then it's obsolete how well-constructed our story is. In the universe of video games, the protagonist is always the player-character (PC) controlled by the player (Bryant & Giglio 2015, p.109). In a VR experience, the experiencer is the protagonist.

As Bryant and Giglio already stated, in order to create a good functional storyline, the protagonist has to experience an emotional development. *"A story is a journey of emotion and a game is a journey of action (Bryant & Giglio 2015, p.116)."*

The key in a game is to find a way that both *"emotion"* and *"action"* work together to transfer the emotions from the player character to the player.
The foundation for that is crafting the storyline *("action")* so that it affects the player character *("emotion"),* forcing the player to change. An immersive movie, series, or game brings the protagonist face to face with his weaknesses, confronting him with his anxieties that can later result into a story arc (Bryant & Giglio 2015, p.116). Similarly in VR, where the experiencer is the protagonist, we have to find a way to confront the experiencer with his individual anxieties. We must thus be aware of who the experiencer is supposed to be in the VR world (Chung 2015). We also learned from the Oculus Team and their work on *"Lost,"* that clarity about our existence can also be helpful in solving the problem of the conflict between narration and interactivity. *"That fleeting moment where a character acknowledged your existence is what allowed presence and the narrative to come together (Burdette 2015)."*

As previously mentioned, well-executed dramatic writing should be done backwards. The writer should know – in any medium – where and how he wants to end to create the right story arc for the protagonist. Bryant and Giglio came up with a formula to summarize what in their opinion is important to writing a well- and deeply-constructed character. They call it *"The Five C's of Character (Bryant & Giglio 2015, pp.116–118)."*

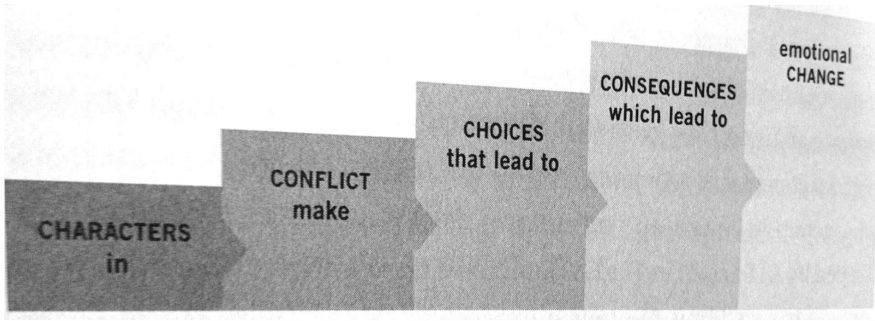

Figure 29. The Five C's of Character (Bryant & Giglio 2015).

"As you develop your main character, or choose your main character, flesh him or her out with these five C's. We don't want to play as an ordinary thimble or shoe. We want to know who that thimble really is. What its hopes and dreams are. What was its most severe childhood trauma? Who am I when playing this game? Why am I here? What do I want? What do I need? One side of the Pyra-Grid (Bryant & Giglio 2015, p.119)."

Characters

In his movies, Alfred Hitchcock always puts ordinary people into extraordinary circumstances. In this manner, his characters always have to overcome a long emotional journey in the story. Bryant and Giglio recommend drafting a character with opposite characteristics you create the game world the story is set, guaranteeing that you give your player/character the toughest time feasible (Bryant & Giglio 2015, p.119).
Empathy is another important factor writers should keep in mind, as an audience or experiencer always relates to characters that seem to be like themselves. It is therefore helpful to equip them with as many flaws, fears, and preconception as possible. The more messed up a character seems, the more we can relate to him as we sense him to be more human (Bryant & Giglio 2015, p.120).

Conflict

The best way to create a flawed character is to equip him with an *"internal conflict."*

"Internal conflict comes from an emotional dilemma that results in the opposition of want and need (Bryant & Giglio 2015, p.122)."

This means that what a character wants and needs should always be in conflict with one another. But internal conflict can also arise from the background story of the character. *"The ghosts that haunt our protagonist (Bryant & Giglio 2015, p.122)."* Basically, these are things he or she experienced earlier in life that continue to come back to haunt them.
The external conflicts appear later in the game, as obstacles are placed in the way of the character as he is trying to pursue his objectives (Bryant & Giglio 2015, p.125).
It is important that we use the same principles for our villains that we use when we equip our hero. What is their conflict? What do they want and need? The villain also has his own goals to pursue, and to him, the hero is the bad guy (Bryant & Giglio 2015, p.125).

On their journey through the game world, the characters will also encounter non-player characters (NPCs). We need them to make the game world feel more life-like. They help to provide company, hints, background story, or clues. The stronger and more complex the

NPCs are designed, the better they challenge or build up the player character. Well drafted non-player characters can both surprise and frustrate us. NPCs are the supporting cast of video games (Bryant & Giglio 2015, p.127).

Choices

In every genre, stories are in one way or another always about characters that make choices, and those choices consequently form the character. If a firefighter drives home from work and sees a building on fire, he would not have much of a choice but to rescue the family inside – it is his job to do that. Whereas if a bank robber would decide to save that family – without any obligations whatsoever – that could form the basis of an interesting story. We have to make it hard for the character to make his choices in order to create drama and a story to thrive. Other important qualities a character should posses are primal emotions – basic emotions such as: temptation, hatred, revenge, the will to survive, saftyness. *"If you can reduce your game to a primal emotion, then the player can relate on a visceral level (Bryant & Giglio 2015, p.134)."*
In general, stories are more powerful when characters are driven by primal emotions. Audiences engage with what they comprehend emotionally. It can be the reason why people enjoy your game and subsequently spread the word to friends and colleagues. A well-crafted story is constructed in such a way that when the narrative begins, the player/character has no alternative but to commence his quest; we have to proceed so that the story can evolve (Bryant & Giglio 2015, pp.134–135).

Consequences

The special thing about games is the fact that players get to make real choices and experience an immediate consequence. What is important for the future of interactive storytelling is the development of better artificial intelligence (AI), that enables the player to see the story unfold as a direct consequence of his choices. We have not reached that day of truly interactive narratives yet, where players influence the game world in exactly the way they want to, but we are getting constantly closer; especially with the help of technologically advanced computers that are increasingly faster and sophisticated. The ultimate aim is to find

the *"holy grail"* of narrative games, *"where true choices leads to true consequences (Bryant & Giglio 2015, pp.135–138)."*

BioShock creator Ken Levine is at the forefront of developing an innovative interactive story system, which he calls *"narrative Legos."*

"narrative elements that are non-linear and interact with each other […] all narrative elements trigger of player action (Bryant & Giglio 2015, pp.137–138)," meaning that every decision made by the player should unleash and affect individual narratives within a deep narrative construct (Bryant & Giglio 2015, pp.137–138).

Gameplay

In VR storytelling, creators still have not figured out how they can manage the experiencer's attention. VR developers need to find a way to align experiencers actions with the timing of the story line. *"How do we naturally translate the interactive elements and the visual language to the viewer? How do we show him the limits of the interactivity and how do we achieve to get his attention for the story without obviously fighting for his attention (Burdette 2015)?*

Game developers solve this problem via gameplay, by introducing and defining tools and tactics that give the player limited abilities to overcome challenges. This way we avoid the player being overwhelmed by endless opportunities/possible approaches. At the same time, gameplay gives the player the opportunity to engage actively and thus captivates and guides the player's attention (Bryant & Giglio 2015, p.142). This is helpful in navigating the experience through a VR world and elevating the feeling of being present.

"[…] if we can influence the audience's choice of where to focus without overburdening them with that choice. Then the audience will feel as though they are living inside the moments we create (Newton & Soukup 2016)." Katy Newton, VR developer

Figure 30. Christmas Tree of Player Expectations (Bryant & Giglio 2015).

As we can see from the *"Christmas Tree of Player Expectations,"* gameplay is the base of our game. Which means that without good gameplay there is no game at all. It is also the reason why players take on a game in the first place. If they only wanted a story, they would watch a movie, or read a novel. Gameplay is the ingredient that extends the story and initially captivates the player, making him an active protagonist in the course of the story plot (Bryant & Giglio 2015, p.143).

Because gameplay has such an important role in interactive games, it is worth taking a closer look at how gameplay functions and what determines the rules in order to find inspiration for VR storytelling.

Gameplay Balance / Narrative Balance

Desirable gameplay should strongly test the player's abilities of staying in the game, but only to the point where the player does not get overwhelmed – otherwise he might stop playing out of frustration. Game designers are working incessantly to improve the degree of difficulty and find the right *"Gameplay balance."* Game writers follow a related idea to improve the involvement of emotion with interactivity, which they call the *"narrative balance."*

"*In other words, keeping the player involved in the story while they play the game – as opposed to merely between gameplay levels. Otherwise, they're just watching a movie in chunks. (Bryant & Giglio 2015, p.145)."*

The development of narrative balance is still very new and we still have a long way to go to make it perfect; similar to learning how to walk. *"We're going to scrape our knees a lot as we discover how to navigate this new narrative playground (Bryant & Giglio 2015, p.145)."*

Gameplay vs. Narrative / Story vs. Gameplay

"The essence of drama is conflict. What is the essence of fun? […] Surprise! Many game mechanics center around surprise. It is the challenge, the difficultness, the uncertainty of outcome, that makes gameplan fun." Theory of fun (Bryant & Giglio 2015, p.145).

Bryant and Giglio recommend constantly awareness of the question: Are the player's feelings a result of the *"gameplay"* amplified by the *"story?"* Situations in a game that reflect the feelings of fear, anger, or suspense, like a fight in a shooter game or a race in a racing game, might go well with story impulses that resonate these emotions. If the player is discovering a wonderful new world, impulses reflecting love, promise or joy may be a good idea, the point being not to force the player into these emotions. If *"story-feelings"* and *"player-feelings"* are in unison, *"the combined experience can be greater than the sum of the two parts (Bryant & Giglio 2015, p.147)."*

Gameplay = Story of the Game

The motive of the game and the story should always be influenced by the player and intertwine with the narrative. In this, we can once again look to the medium of film, where screenwriter and directors are using *"active verbs"* to navigate the scenes. It always comes down to the question of *"Who wants what in this scene?"* According to the acclaimed director Mike Nichols, there should be a fight, negotiation, or seduction in every scene where at the end someone eventually has to prevail – it is this idea that game levels want to adapt as well (Bryant & Giglio 2015, p.147).

In every scene the protagonist has something to achieve. Cobb (Leonardo Dicaprio) in the movie *"Inception,"* for example, has to *"incept"* an idea into somebody's conscious mind.

"Incept" is here the active word the writer chose and the *"action"* is being *"translated"* into the story as a verb. Gameplay mechanics can be described as active verbs. A gameplay designer, for example, can create a concept of dancing by using system algorithms that can be compiled via code so the player can indeed dance in a dancing game. Despite that game mechanics on their own are worthless. It is the content of the game, and the reason why we need exactly this mechanic to play this content, that makes it interesting. *"Super Mario"* is only fun because we use the mechanic of *"jumping"* to defeat enemies and smash bricks to conquer the world. If *"Mario"* would jump without any reason, it would be boring. If *"hammer"* is the mechanic, nails would be our content. In general, anything meaningful in the environment of the player can be referred to as content (Bryant & Giglio 2015, p.149).

"Just as game mechanics are player actions, the key to narrative design is coming up with a context for those player actions that make story sense, that happen in an intriguing world, and that make the player want to continue to explore the world through those mechanics (Bryant & Giglio 2015, p.149)."

Bryant and Giglio suggest that we need to provide the *"context"* for the *"gameplay"* in order to include the story into the game in a meaningful way. For them the gameplay needs to be the crucial part within the context of the story, otherwise nobody would bother playing the game (Bryant & Giglio 2015, p.149).

Mechanics & Context

By implementing the game mechanics naturally into the story, the narrative designer has the power to create the content that evokes the emotion of the player. Important is that the scene is always *"active*,*"* that there is a motivation that leads to something meaningful; otherwise it is only motion. Ernest Hemingway once said: *"Never mistake motion for action,"* meaning that we should never take the viewer out of his experience. *"Empathetic immersion"* only happens if the action of the game reflects the emotion of story – allowing the player to build up an emotional affiliation with the narrative (Bryant & Giglio 2015, pp.149–151).

"This connection of emotion and action is what game creators should constantly be striving for, difficult though it may be. It's where the player and story become one; where the players are so absorbed in the game action they don't want to stop playing. They don't want

to stop watching. They want to stay in the world because they feel they can help to decide the outcome (Bryant & Giglio 2015, p.151)."

Emergent Gameplay and Emergent Narrative

If the player finds a way to use the game mechanic or system to play the game in a way that the developers have not intended, then we speak of *"Emergent gameplay". "Emergent narrative"* then is a result of the stories you create by yourself, which reciprocally motivates the *"emergent gameplay."*

"You, the player, are writing your own story. Players are in control of their own experiences (Bryant & Giglio 2015, pp.194–195)."

When the player reaches the point of completely being "*emotionally present"* in your game, "*I'm in the game. I, the player, am doing the things that I want to do. I own the emotional results of my actions"* then we have reached the highest form of interactive storytelling (Bryant & Giglio 2015, p.195). This is exactly what VR storytellers are looking for. In a Virtual Reality experience, a person wants to go after her individual desires and do what pleases her, and she wants to be responsible for the emotions caused by her own doing.

"[…] so when she comes out of it, her memories craft a story both profound and powerful. Added bonus on the creator-front if she is emotionally and spiritually on point with what the creator had hoped (Brillhart 2015)."

World Building

We have now established that in developing VR experiences, it is extremely important to create stunning, detailed worlds. The appearance of the world plays an important role in the immersive experience, because it is one of the significant ingredients that makes the player yearn to come back to become part of the world (Bryant & Giglio 2015, p.174). The priority is to make the surroundings as interesting as possible and to guide the visitor naturally through the experience, triggering curiosity for the world one is in and engaging with the story (Unseld 2015). There is much to learn from world building in games and how we can create these worlds.

When we talk about the game world, we think of game-design, play style, and world design (Bryant & Giglio 2015, p.174).

"At every turn, you should be asking yourself why you want to bring players into your world. What do you want to show them that you feel they should see? Ask yourself, do you want to reflect our world as you think it is, or as you wish it would be? What are the physical features of your world? What does it look like? Sound like? What is in the environment? What can a player do? What resources are there to hunt for and fight over? Is it a magical world? What is the technology (Bryant & Giglio 2015, p.174)?

Bryant and Giglio suggest creating a chart of the world where we can see what the character is supposed to do next. It functions like a *"game board,"* so we understand how the story unfolds. We should also think about who else is living in that world besides our character, and if the player can choose between several characters. Are there NPCs? Do we have allies? Villains? What are the relationships between all of the characters? Who and what is our main character? Are there different races/species or genders? Do we have a command structure, or any other rules/laws? All of this has the potential to add history and context that can enhance and deepen the world and its story (Bryant & Giglio 2015, p.175).

Shuffled Nuggets

We discussed how gameplay can help us to demonstrate to the experiencer the limits of his interactive experience, and how we can acquire his attention without overburdening him (Bryant & Giglio 2015, p.142). Shuffled Nuggets are another helpful storytelling tool to find answers to the question of *"how can we convey a visual language to the experiencer that it doesn't feel hokey or obvious to him (Burdette 2015)?"*

Top priority must always be to keep the player in the experience. It is therefore important not to give him information too easily. If the story unfolds in front of his eyes, through his own conclusions – *"2+2=4"* – we will achieve the highest form of storytelling (Bryant & Giglio 2015, p.175).

"When you drop what seem like random bits of information throughout a level or throughout the game, it becomes a puzzle for the player to piece together of the information to understand what has come before. You're telling the backstory in shuffled nuggets. The players assemble the story in their heads, so it becomes storytelling as gameplay, which can be much more satisfying, even though it seems chronologically disjointed (Bryant & Giglio 2015, p.175)."

Hitchcock was a perfectionist of that concept. He let the audiences assemble the images in their mind in order to create disturbing scenarios – which is far more effective than just showing the horror. A story should always feel in some way like a mystery and constantly raise questions for the audience. What is happening next, and why? What are the real reasons for this and that? As the player or the audience follows through the story, they have to pick up the *"breadcrumbs"* on their way to solving the secret of the story by themselves (Bryant & Giglio 2015, pp.175–176).

Multiplayer, MMO's and Sandbox Games

We know that interactive storytelling through world creating plays a key role in VR experiences (Brillhart 2016). Another powerful tool we can use from these game worlds and implant into VR experiences are multiplayer environments, where the writer and the players are creating social experiences that combine to push the degree of immersion.

"When you have multiple players coexisting in the same environment, competing agenda are inevitable. In a multi-user environment, players are not controlling protagonists; they're playing avatars of themselves (Bryant & Giglio 2015, p.193)."

According to Bryant and Giglio, a lot of players state that virtual worlds and multiplayer games have more potential for creating immersion. Players get the feeling that they themselves are in this world, and not just their avatars. The reason for that is that multiplayer worlds aim to boost ***"Competition and Aggression –"*** because the player has more fun defeating an unpredictable human being than an easy-to-predict computer controlled character. Humans tend to fight for revenge; artificial *"bots"* do not (yet). But it also builds up ***"Social Connection –"*** where players can talk about the narrative with teammates, or trash-talk about the opposing team (Bryant & Giglio 2015, p.193).

In these scenarios, the work of a game writer is more to throw a party, or plan a playground for the player, than to form a story. It is similar to a theme park attraction.

"*You're setting the table and creating a bunch of engaging content that gives player a reason to come in and mingle with each other as they play with the toys you've laid out (Bryant & Giglio 2015, p.193)."*

The Walt Disney Company calls its employees *"Imagineers,"* because they design every corner or attraction of the park with a theme, so it can reflect the story of this world or land. It is the detail in every object that makes the visitor come back over and over again. Disney parks have already been around for half a century and they constantly keep creating new themed attractions. Similar to Walt Disney's *"Imagineers,"* it is in the job of the narrative designer to fill the story, world, or level with that imagination. *"Otherwise your game isn't a Disneyland–it's a Six Flags (Bryant & Giglio 2015, p.193)."*

In sandbox games, the player has the choice to either follow the game narrative, interact with other players, or to stroll freely through the gameworld. Sandbox games do have multiple side quests or missions besides the main quest that the player can interact with and decide to experience. It is that diversion, and the feeling of variety, that richens the experience for the player (Bryant & Giglio 2015, p.193).

As already mentioned, the writer is throwing a party more than writing a story. *"EVE Online"* and *"World of Warcraft"* are perfect examples that follow that concept of the story acting as the theme of the attraction. These games are made to be interacted with, where players ally with each other to go on missions, level by level.

"The story is in all side quests. These comprise the lore of the game world. Players often learn as much or more about the game world from other players as they do through direct interaction with the game. The narrative designer's job is to continue to come up with story-based ways to make the repetitive tasks seem not so repetitive (Bryant & Giglio 2015, pp.193–194)."

"World of Warcraft" is constantly enhancing its world to increase its user count, and they have been successfully following that model for the last ten years (Bryant & Giglio 2015, pp.193–194).

Summary of Character, Gameplay, World Building, Multiplayer

VR storytellers often state the importance of sophisticated characters, ones who provide a vast range of opportunities in entangled storylines (Machkovech 2015).
Bryant and Giglio suggest endowing them with flaws and preconceptions that come with being human, essentially memories and experiences that return and affect our character in his life. Primal emotions such as greed, fear of death, and hatred drive characters and make audiences engage with them emotionally; the key is to create real choices for the experiencer resulting in an immediate outcome, which means that every decision made by the participant has to have an effect on the character's story, assembled inside a deep narrative construct (Bryant & Giglio 2015, pp.109–138). We must make use of the experiencer's anxieties in VR, because in Virtual Reality the experiencer is the protagonist. Furthermore, clarity about our identity in the VR experience (Chung 2015) is useful in order to address the conflict of narration and interaction.

VR developers have still not figured out a way out to control the experiencer's attentiveness and to coordinate his actions with the timing of the narrative without pushing too hard for his attention (Burdette 2015).
Game designers remedy this issue by establishing techniques and tools that confine the player in his capability to surmount the demanding situations. Through this so-called concept of gameplay we avoid the player being crushed by endless possibilities to approach the hurdles. Bryant and Giglio wanted us to keep in mind that the emotion of the player should always be a result of the gameplay emphasized by the story. If, for example, the player is exploring an astonishing environment, stimuli that resonate love or joy might help building up the emotion. A key factor is not to force the player into his emotions, allowing feelings transported by the story and feelings experienced by the player to get in harmony. The architect of the story has the ability to develop content that nurtures the feelings of the player (Bryant & Giglio 2015, pp.142–195).
In the light of VR storytelling, gameplay gives the experiencer the opportunity to engage actively with his environment and as a result captivates and guides him through his VR world, raising the feeling of being present. The VR architect needs to implement this content

in unison with the gameplay, giving the experiencer the feeling that he's responsible for the emotions he caused by his actions.

The creation of rich worlds is another helpful approach in fighting the conflict between narration and interactivity, as it might as well guide the experiencer naturally through the environment (Unseld 2015). Inspired by Bryant and Giglio's *"Shuffled Nuggets,"* it is important for VR experiences not to give information away too easily, as the experience needs to unfold in front of the participants eyes as a result of his own conclusions. The experiencer should roam through the world and pick up the *"breadcrumbs"* on his way (Bryant & Giglio 2015, p.142). Furthermore the world of the experience is a key element that makes the experiencer want to come back and immerse himself in the environment. Especially the concept of multiplayer vicinities can help a VR experience to strengthen the feeling of competition, social interaction and consequently build up a deeper feeling of immersion (Bryant & Giglio 2015, p.193). Sandbox games enhance the multiplayer concept even further with the opportunity to wander around the world, go on multiple missions and change the virtual world to the player's convenience. The diversity of the experience and the social interactivity of competing or allying with other gamers within quests is what enriches the experience (Bryant & Giglio 2015, p.193).

Conclusion

In this thesis we discovered the problems of VR storytelling; predominantly the conflict between narration and interaction – the *"4th wall"* – as well as the challenge of guiding the experiencer naturally through the experience among others. We discussed conventional storytelling tools in the film industry and the interactive game realm such as gameplay, story structure, world building, and character development, etc. – that give us inspiration for new ideas, but moreover can help us solve these problems while developing the new language for VR storytelling. It seems that VR storytelling and interactive computer games are closely related, they share common problems (*"4th wall"*) and desire similar outcomes. *"I am doing the things that I want to do. I own the emotional results of my actions (Bryant & Giglio 2015, p.195)."* We are fortunate to have the ability to draw on established conventional storytelling

practices. We need to constantly examine them through different lights, refine them, and implement them in the VR space to push the new medium further in ways we have not even imagined yet.

"The medium, the place where those stories will unfold, exists within our consciousness. We'll find ourselves having passed through our long-held, precious frames to live within those stories. And we'll carry the memory of those stories not as content that we once consumed, but as times and spaces we existed within (Within 2016)."

Henceforth I would like to take a closer look at what Virtual Reality could look like in the future and identify the existing trends.

What is going to be essential for interactive VR storytelling is the development of better artificial intelligence (AI), that enables the experiencer to unfold the story in relation to his choices. "*Where true choice leads to true consequences (Bryant & Giglio 2015, pp.137–138)."* We have seen in HBO's TV show *"Westworld"* the concept and full potential of an interactive experience. *"Westworld"* is a theme park inhabited by wealthy guests – whom the hosts (AI's) refer to as newcomers – and where they can ***immerse in any yearning they long for***. The small town Sweetwater is its center where women and men drink, eat, go on adventures and ***satisfy their primal desires*** all within the theme of the ***wild west world*** *(McFarland n.d.)*. The human guests ***interact with the hosts*** who are following ***individual scripted narratives.*** The TV series is the perfect example of the Choose Your Own Adventure concept, but with high technology artificial intelligent robots. If we refer to our adapted formula from Bryant and Giglio, we can find all the ingredients for a successful interactive experience in the example of the view of the guest (experiencer) William, one of the main protagonists.

Experiencer + Goal + Conflict + Obstacles + Resolution = Interactive experience

Experiencer (guest/newcomer William) + Goal (finding the center of the maze together with AI Dolores) + Internal conflict (love for AI Dolores) + Obstacles (bandits and villains they have to face on their way to the center of the maze) + Resolution (William turns out to be the bad guy) = William's Westworld experience

But what especially makes Westworld an astonishing concept for an interactive experience is the creation of the wild west world in itself, where different story arcs seem to "*spring almost effortlessly from (McDowell 2015).*" The creators probably realised the importance of the world they created when they decided on their title *"West**world**."*

On HBO's website we can find the narrative loop of the complex character host (AI) Dolores (Renfro 2016).

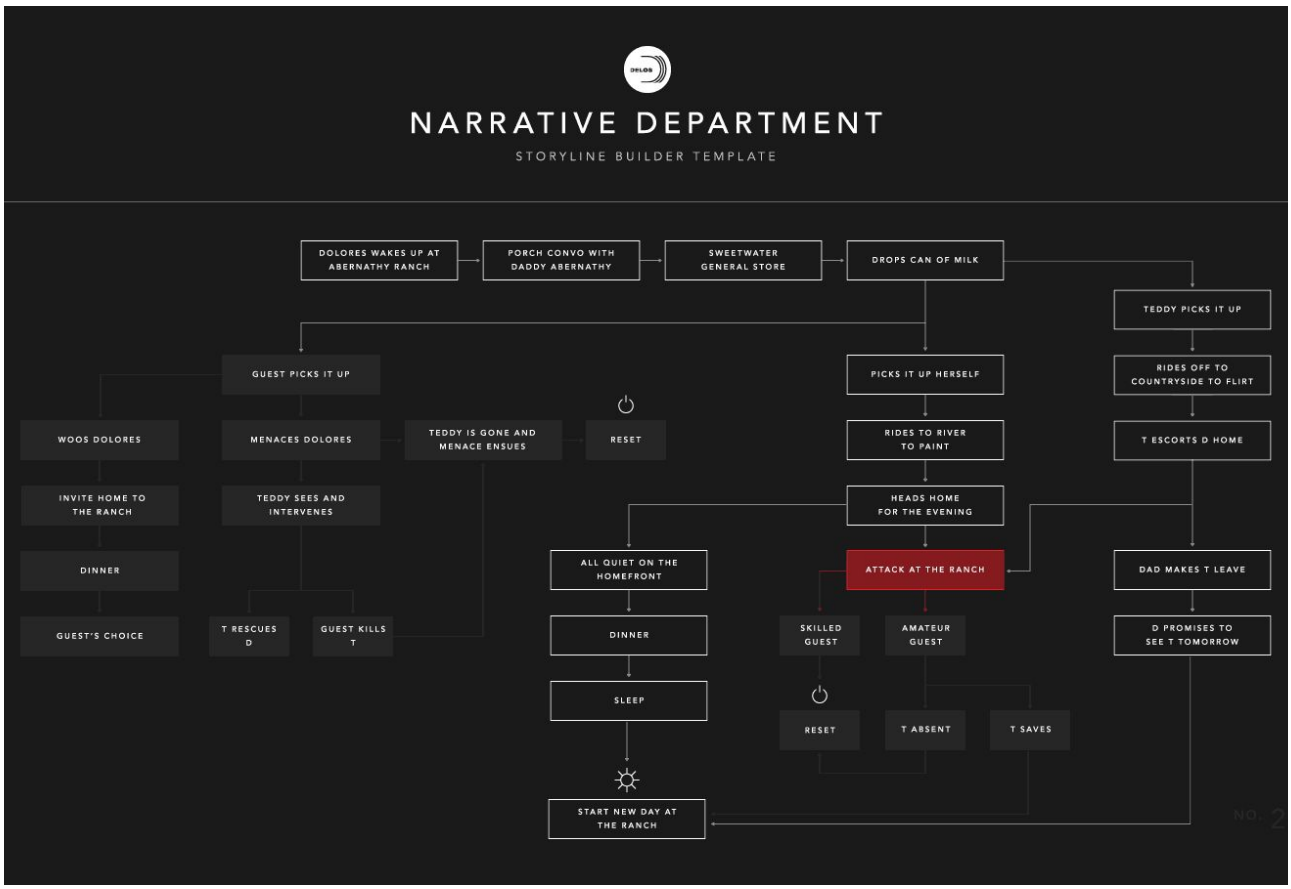

Figure 31. Narrative loop concept of AI character Dolores (Renfro 2016).

However, as Mike Woods the founder of the VR Studio at Framestore in New York City already stated, VR and interactive storytelling require a level of AI inconceivable for the next 50 years (Woods 2016). But that does not necessarily mean we have to wait that long to push the boundaries of VR content, which brings me back to multiplayer concepts. A powerful example from the game world is the sandbox game *"Minecraft."* The way teens and youngsters create constructions out of textured cubes in three dimensional worlds is

astonishing. To explore, craft and combat in these multiplayer worlds seem to be as natural as riding a bike for them (Bryant & Giglio 2015, p.203). Oculus recognized the enormous potential of world creating and social interaction and started to transform *"Minecraft"* into a VR experience (Oculus 2017b).

Figure 32. Sandbox game *"Minecraft"* (Mojang 2017).

Unity, the 3D software that is mostly used to create VR content, offers an application for VR developers so that they can use Unity to create their VR projects within VR. And it certainly looks like the way to go for the future of VR (Feltham 2016b).

"Unity doesn't know what makes the perfect VR creation tool, so it's letting everyone contribute their own ideas via Tools and seeing what sticks. The result may well be a Unity engine that one day allows just about anyone to develop their own content with the help of VR (Feltham 2016b)."

Since we do not have the technology with AI to imitate human behavior yet, we should take the opportunity to interact with other humans within a VR environment. We could create Virtual Reality within Virtual Reality – in cooperation with other humans.
We already know that VR developers love Google's *"Tilt Brush"* and admire what artists can do with the experience. *"The things people are making with Tilt Brush are just crazy […] They're doing stuff that Tilt Brush was never designed to do (Baker 2016)."* Based on their experiences with Tilt Brush, Oculus developed another VR tool, called *"Quill."* Artists can use the unconstrained space of the VR environment and the drawing tool to intuitively create concepts, paintings and illustrations with the Oculus touch controllers. *"Quill"* makes it possible for filmmakers and artists to create VR narratives and VR worlds more quickly than with traditional 3D softwares (Studio 2016).

"From the moment Wesley Allsbrook tried Quill, she said it gave her something she'd wished for all her life: to no longer be limited by the edge of the page and to be able to create an endless world around her (Studio n.d.)."

"The tool was made to create the experience, and the experience was made to promote the tool (Watercutter 2017)."

"Dear Angelica" is the first animated experience created entirely in VR. It tells the story of a young woman who is writing her mother a letter, through evolving illustrations. *"Dear Angelica"* premiered at the 2017's Sundance Film Festival and was hyped as a *"VR storytelling breakthrough (Dickey 2017)."*

"The scenes construct themselves around you as individual strokes are rendered in real-time for an interactive viewing experience unlike anything you've ever seen. As you watch 'Dear Angelica' unfold, you can pause and explore, giving you a vantage point all your own (Studio 2017)."

Figure 33. VR experience *"Dear Angelica"* (Constine 2017).

Again we get the notion that VR should not only be a medium to imitate the real world, but instead shows us its potential to create things that are unimaginable in our real world. Saschka Unseld from Oculus Story Studio: *"People always compare it to dreaming, or memories. But what lies underneath is the way thoughts in our brain work […]*
Not constrained by the reality we have, where everything is fixed in time and space, but in our mind, when we think of things, we jump from wherever to wherever (Dickey 2017)."

"Quill" and *"Dear Angelica"* could certainly be examples of good tools and content that Bryant and Giglio referred to when they discussed the creation of interactive fiction. *"We need good free tools and a growing body of very good content to study (Bryant & Giglio 2015, p.105)."*

Currently there are a lot more projects on the horizon trying to connect Virtual Reality with the social component. For example the project *"Sansar"* from Linden Lab – the creators of the online virtual world *"Second Life,"* have a decade of experience in content that is created by their users (Robertson 2016b). Sansar's goal is to democratize Virtual Reality as a creative medium. Sansar wants its users *"to easily create, share, and monetize their own multi-user, interactive virtual experiences, without requiring engineering resources. […] It will allow creators at all levels to focus on realizing their creative visions, without having to worry about issues such as hosting and distribution, multi-user access and communication systems, virtual currency and regulatory compliance, and other challenges associated with creating, sharing, and monetizing virtual experiences today (LindenLab 2015)."*
They also plan to incorporate their idea into other potential areas such as gaming, education, entertainment, art, architecture, healthcare, etc (LindenLab 2015).

Figure 34. VR project *"Sansar"* (Charara 2016).

But as already noted Linden Lab is not alone in this business. There are several projects in different stages of research. *"AltspaceVR"* who partnered with NBC sees itself as the *"premier cross-platform app for hanging out with people in virtual reality (Oculus*

2017a).” If we talk about social media platforms we certainly have to mention *“Facebook.”* With *“Oculus Connect”* Facebook has a huge VR social team, working to combine their knowledge of social media with the realm of Virtual Reality. Philip Rosedale – former Linden Lab CEO – is developing the open source software *“High Fidelity”* where people can create, host, share, and explore their VR experiences (Inc. 2017). A very interesting development is that they teamed up with the avatar developing company *“Morph3D”* (*“We are the Identity-Makers of the New New World (Morph3D 2017).”)* Morph3D lets its users create and modify their individual avatars, also known as someone’s 2nd identity. It will be very exciting to observe what effect this will have on the user especially in terms of human behaviour and their psyche, since the virtual representation of the experiencer is the main protagonist in Virtual Reality. I will elaborate on this in the following chapter *“Further Thoughts.”* The list of VR platform projects such as *“WebVR,” “Improbable,” “WakingApp,” etc.,* is almost as endless as the number of new companies that are jumping on the social VR train every day. There will definitely be a lot of movement within the next few years.

Naturally, this will come along with a need for technical improvement in a variety of fields. The improvement of high-end headsets like the Oculus Rift or HTC Vive with better resolution, field of view, depth of focus, 3D audio, and higher resolution will be critical and will demand some sort of eye tracking (Brennan 2016). It is also going to be interesting to see how much of the live action technology *“Lightfield”* (e.g. Lytro) from the film realm will play a role in interactive Virtual Reality. Among other things, the technology makes it possible to adjust focus and depth-of-field in post production, and one will be able to move further away from or closer to an object within a scene that is shot by a stationary camera (Moynihan 2015).

We still have to figure out how we can move within VR, as in reality we are still limited to a certain physical space within our four walls. The teleportation technique introduced in the game *“Budget Cuts,”* where the player uses the controller to point to a spot in which he would like to proceed towards, could definitely be a good way to figure out how to move in Virtual Reality (VRDC 2016). VR developers also conducted research on something they call *“Redirected Walking,”* where the experiencer seems to walk freely through the VR environment but in fact is only walking in circles in the real world (Baker 2016).

As in any medium we have so far, despite the technological progress, intriguing content and narrative has always been key. People have always wanted to share their experiences or memories in some way or another. *"[…] it's not frame rates and resolution that are going to make VR impactful, but the experiences that people are going to have inside of headsets that will forever change the way that we perceive stories (Logan 2016)."* The question now is if we share these experiences in VR or the real world and in what form? And have we experienced these memories in the real world, or in the virtual world, or in a combination of both? Perhaps we will find a solution like in Ernest Cline's bestseller book *"Ready Player One"* where the virtual universe *"OASIS"* functions both as a massive multiplayer game and as a virtual society (Cline 2011). Besides, when the line between real and virtual reality gets blurry, who is then to say what *is* the *"real"* world (Blascovich & Bailenson 2011)?

Further Thoughts

Virtual Reality has the potential to be a powerful medium and could therefore affect humans in ways like no other medium has done before. For that reason there should be ethical and psychological questions to be considered, with the same effort as we push the technology further and further (Pacheco 2016).
We still can not predict how we react to the need of *"immediate gratification"* – that one could instantly fulfill all his desires, wishes, urges – all within clicks or touches in VR. Why should people bother anymore to put in effort over a long time into something when they can have it right away? And how would that behaviour affect the society in general (Aboujaoude 2012)?

"[…] we have to work significantly harder to resist temptation, and we are living in a more impulsive, impatient, and immediate-gratification-oriented world, one in which it is harder to control a whole range of impulses (Aboujaoude 2012)."

Elias Aboujaoude tells us in his book *"Virtually You"* that if we spend time online or in virtual worlds we start to create an *"e-personality,"* one that is different to our personality in the physical world and one that can become infantile, narcissistic, immoral, impulsive and destructive (Aboujaoude 2012).

"First is that, online, we can pretend to be much more than we really are, as the chapters on narcissism and grandiose thinking tried to show; the second is that it is easy to close the gap between what we are in the virtual world and what we are in reality, through services that are easily available […] and that only require logging on and a credit card number (Aboujaoude 2012)."

Furthermore how do we transfer our experiences that we received in VR as our digital representations (Avatars) into the real world? Nick Yee from Stanford University conceived the theory of the *"Proteus Effect"* in his dissertation, where small changes to our avatars will consequently affect our behaviour not only in the virtual environment but also when we are back in the real world (Yee 2007).

"We found that participants who were given attractive avatars walked closer to and disclosed more personal information to the virtual stranger than participants given unattractive avatars. We found the same effect with avatar height. Participants in taller avatars (relative to the virtual stranger) negotiated more aggressively in a bargaining task than participants in shorter avatars […] I showed that the Proteus Effect persists outside of the virtual environment. Placing someone in a taller avatar changes how they consequently negotiate in a face-to-face setting […] people's perceptions of their own attractiveness do seem to linger outside of the original virtual environment (Yee 2007)."

One could argue that the benefit of the *"Proteus Effect"* is that it could lead to a better understanding of and increased empathy towards others, as we learn what it feels like to walk in someone else's shoes. How would we feel to be disabled or to have a different gender, body, or ethnic background (BeAnotherLab 2017) (Blascovich & Bailenson 2011)? The knowledge of the *"Proteus Effect"* might even be a new powerful tool for VR storytellers as it enables them them to influence the experiencer in completely new ways. On the other hand, one can only speculate about the consequences on our behaviour, psyche, and memories (virtual and real), caused by behavioral and mental manipulation for commercial, religious or political interests (Ananthaswamy 2016). Are memories from the Virtual Reality still considered *"real"* memories?

Thomas Metzinger a philosopher at the Johannes Gutenberg University in Mainz, Germany even states that there might be a danger of *"depersonalisation,"* suggesting that if we spend

too much time in the virtual world, our physical body might feel unreal to us (Ananthaswamy 2016).

"Fully immersive experiences have a bigger and more lasting impact on people's behaviour and psychology. We know from the rubber hand illusion that our brains can be fooled into thinking that an inanimate rubber hand is our own. In VR environments, we can be fooled into thinking that we are our avatars (Ananthaswamy 2016)."

If our brains can be fooled into thinking that a rubber hand is our own, it is troubling to contemplate how this ability to manipulate the mind could be misused. Metzinger also recognizes the dangers of VR games especially in immersive shooter games, as people not only get used to violent scenarios but also carry it with them out of the experience and into the real world. He is also concerned that the military could make use of that technology. *"Virtual torture is still torture (Ananthaswamy 2016)."*

There is a huge responsibility for VR researches and commercial entities on the horizon as people are already increasingly concerned about their personal information and privacy settings in today's internet age. This is of further concern in Virtual Reality where your entire body, eye movements, emotions, personality etc., are going to be tracked and this very data is going to be saved somewhere (Oberhaus 2016). If somebody abuses our avatar in VR, how would that affect our psyche? Is cheating in VR on your real partner still cheating? Does our identity live forever with an immortal virtual avatar (Blascovich & Bailenson 2011)?

It is an endless conflict which brings me to William Saletan, a New York Times reporter and his thoughts about the Internet which I want to apply to Virtual Reality along with Metzinger's query.

William Saletan: *"The Internet isn't heaven. It isn't hell, either. It's just another new world. Like other worlds, it can be civilized. It will need rules, monitoring and benevolent designers who understand the flaws of its inhabitants (Saletan 2011)."*

Thomas Metzinger: *"How do we restrict this freedom in an intelligent way so that the interests of others are not harmed (Ananthaswamy 2016)?"*

At the beginning of this thesis we learned from the prism glass experiment that humans constantly accommodate their habits and reconsider their reality (Blascovich & Bailenson 2011). We are not only growing socially and culturally but we are also increasingly influenced by and adaptable to technology. As Virtual Reality evolves rapidly, we will also learn how to adapt and potentially see a change in the *"cognitive niche"* as we expand our cognitive abilities. This will possibly lead to complex repercussions as it is difficult to predict how the mind will interact with the new technological influences (Oberhaus 2016).

References

Aboujaoude, E., 2012. Virtually You: The Dangerous Powers of the E-Personality. *Google Books*. Available at: https://books.google.com/books/about/Virtually_You_The_Dangerous_Powers_of_th.html?id=XhaT6YMWDuwC [Accessed January 26, 2017].

Ananthaswamy, A., 2016. Virtual reality could be an ethical minefield – are we ready? *New Scientist*. Available at: https://www.newscientist.com/article/2079601-virtual-reality-could-be-an-ethical-minefield-are-we-ready/ [Accessed November 3, 2016].

Baker, C., 2016. How Game Makers Are Struggling to Make VR Fun. *Rolling Stone*. Available at: http://www.rollingstone.com/culture/news/how-game-makers-are-struggling-to-make-vr-fun-w445018 [Accessed November 3, 2016].

BeAnotherLab, 2017. The Machine. *The Machine to be Another*. Available at: http://www.themachinetobeanother.org/?page_id=764 [Accessed January 29, 2017].

Belz, E., 2016. The man behind the VR curtain - WORLD. Available at: https://world.wng.org/2016/05/the_man_behind_the_vr_curtain [Accessed November 16, 2016].

Blascovich, J. & Bailenson, J., 2011. *Infinite Reality: Avatars, Eternal Life, New Worlds, and the Dawn of the Virtual Revolution*, HarperCollins Publishers.

Brennan, D., 2016. Oculus Chief Scientist Predicts the Next 5 Years of VR Technology - Road to VR. *Road to VR*. Available at: http://www.roadtovr.com/michael-abrash-explores-next-5-years-vr-technology/ [Accessed January 25, 2017].

Brillhart, J., 2015. How to Greet a Rebel: Unlocking the Storyteller in VR – The Language of VR. *Medium*. Available at: https://medium.com/the-language-of-vr/how-to-greet-a-rebel-unlocking-the-storyteller-in-vr-d40b2cc05f55 [Accessed November 14, 2016].

Brillhart, J., 2016. In the Blink of a Mind — Attention – The Language of VR. *Medium*. Available at: https://medium.com/the-language-of-vr/in-the-blink-of-a-mind-attention-1fdff60fa045 [Accessed November 14, 2016].

Bryant, R.D. & Giglio, K., 2015. *Slay the Dragon: Writing Great Stories for Video Games*,

Burdette, M., 2015. The Swayze Effect. Available at: https://storystudio.oculus.com/en-us/blog/the-swayze-effect/ [Accessed November 7, 2016].

Charara, S., 2016. Virtual worlds reborn: Can Second Life's second life democratise VR?

Wareable. Available at: https://www.wareable.com/vr/second-life-project-sansar-beta-2016 [Accessed January 25, 2017].

Chung, E., 2015. Presence & Storytelling Are in Conflict. Available at: http://eugenechung.co/2015/12/03/presence-vs-storytelling/ [Accessed November 7, 2016].

Cline, E., 2011. *Ready Player One*,

CNN, 2016. The "impossible" is now a reality. *CNN*. Available at: http://www.cnn.com/2016/05/09/arts/google-tilt-brush/index.html [Accessed November 3, 2016].

Constine, J., 2017. Oculus' new film "Dear Angelica" is the most beautiful VR yet. *TechCrunch*. Available at: http://social.techcrunch.com/2017/01/23/the-best-vr/ [Accessed January 24, 2017].

Desowitz, B., 2016. What We Learned About the Realities and Possibilites of Virtual Reality at FMX. *IndieWire*. Available at: http://www.indiewire.com/2016/05/what-we-learned-about-the-realities-and-possibilites-of-virtual-reality-at-fmx-291317/ [Accessed November 3, 2016].

Dickey, J., 2017. Finally, a VR breakthrough: "Dear Angelica" will fog your Oculus Rift with tears. *Mashable*. Available at: http://mashable.com/2017/01/25/virtual-reality-sundance-dear-angelica-miyubi-breakthrough/ [Accessed January 26, 2017].

Dredge, S., 2015. VR could change human consciousness – if we get there, says Chris Milk. *the Guardian*. Available at: http://www.theguardian.com/technology/2015/oct/16/chris-milk-virtual-reality-future-questions [Accessed January 27, 2017].

Failes, I., 2016. FMX Report #2: What The VR Future Holds. *Cartoon Brew*. Available at: http://www.cartoonbrew.com/festivals/fmx-report-2-vr-future-holds-139380.html [Accessed November 4, 2016].

Feltham, J., 2016a. Facebook Wins An Emmy For Oculus Story Studio's "Henry." *UploadVR*. Available at: http://uploadvr.com/oculus-henry-wins-emmy/ [Accessed November 3, 2016].

Feltham, J., 2016b. Update: You Can Now Make Unity Games From Within VR. *UploadVR*. Available at: http://uploadvr.com/tomorrow-can-make-games-within-vr-unity/ [Accessed January 24, 2017].

Google, 2016. Tilt Brush by Google. Available at: https://www.tiltbrush.com/ [Accessed November 3, 2016].

Inc., H.F., 2017. High Fidelity. *High Fidelity*. Available at: https://highfidelity.io/ [Accessed January 25, 2017].

Keller, J., 2016. Valve's Robot Repair Center for HTC Vive puts you inside Portal's Aperture Labs. *Android Central*. Available at: http://www.androidcentral.com/valves-robot-repair-center-htc-vive-puts-you-inside-aperture-labs [Accessed November 3, 2016].

LindenLab, 2015. Linden Lab / Sansar. Available at: https://www.lindenlab.com/releases/linden-lab-invites-first-virtual-experience-creators-to-project-sansar-testing [Accessed January 25, 2017].

Lin, J., 2016. *HELP*, Google Spotlight Story. Available at: https://www.youtube.com/watch?v=G-XZhKqQAHU [Accessed November 14, 2016].

Logan, M., 2016. VR Is Going to Change Narrative Forever. *Inverse*. Available at: https://www.inverse.com/article/14971-how-virtual-reality-could-change-storytelling [Accessed November 2, 2016].

Machkovech, S., 2015. Everybody's Gone to the Rapture review: The end of the world is a bummer. *Ars Technica*. Available at: http://arstechnica.com/gaming/2015/08/everybodys-gone-to-the-rapture-review-the-end-of-the-world-is-a-bummer/ [Accessed January 23, 2017].

Madary, M. & Metzinger, T.K., 2016. Real Virtuality: A Code of Ethical Conduct. Recommendations for Good Scientific Practice and the Consumers of VR-Technology. *Frontiers in Robotics and AI*, 3. Available at: http://journal.frontiersin.org/article/10.3389/frobt.2016.00003/full [Accessed November 2, 2016].

McDowell, A., 2015. World Building and Narrative. Available at: https://www.lynda.com/3D-Animation-Architecture-tutorials/Alex-McDowell-World-Building-Narrative/362994-2.html [Accessed January 23, 2016].

McFarland, M., More than a feeling: How "Westworld" made this gamer feel empathy for our virtual companions and the NPC. *Salon*. Available at: http://www.salon.com/2016/10/17/more-than-a-feeling-how-westworld-made-this-gamer-feel-empathy-for-our-virtual-companions-and-the-npc/ [Accessed December 20, 2016].

Mojang, 2017. Water and Sky. *Minecraft.net*. Available at: https://minecraft.net/de-de/article/water-and-sky [Accessed January 30, 2017].

Morph3D, 2017. Morph 3D. Available at: https://www.morph3d.com/?utm_campaign=Morph%203D%20Brand&utm_adgroup=morph%203d&utm_keyword=morph%203d&utm_source=google&utm_medium=cpc&utm_matchtype=e&gclid=Cj0KEQiAtqHEBRCNrdC6rYq9_oYBEiQAejvRl6Nx3NhQaJjaJpJNqLPC-eVj6WeJvNOE2_yl7T-vMKoaAmBF8P8HAQ [Accessed January 25, 2017].

Moynihan, T., 2015. Lytro Immerge: Groundbreaking Camera Will Let You Move Around in VR Video. *WIRED*. Available at: https://www.wired.com/2015/11/lytro-refocuses-to-create-a-groundbreaking-vr-camera/

[Accessed January 25, 2017].

Moynihan, T., 2016. The Stunning Allumette Is the First VR Film Masterpiece. *WIRED*. Available at: https://www.wired.com/2016/04/alumette-groundbreaking-vr-film-tribeca/ [Accessed November 3, 2016].

Naimark, M., 2016. VR Interactivity. *Medium*. Available at: https://medium.com/@michaelnaimark/vr-interactivity-59cd87ef9b6c [Accessed November 14, 2016].

Newton, K. & Soukup, K., 2016. The Storyteller's Guide to the Virtual Reality Audience – Stanford d.school. *Medium*. Available at: https://medium.com/stanford-d-school/the-storyteller-s-guide-to-the-virtual-reality-audience-19e92da57497 [Accessed November 11, 2016].

Oberhaus, D., 2016. We're Already Violating Virtual Reality's First Code of Ethics. *Motherboard*. Available at: http://motherboard.vice.com/read/vr-code-of-ethics [Accessed January 22, 2017].

Oculus, 2017a. AltspaceVR. *Experiences | Oculus*. Available at: https://www.oculus.com/experiences/rift/1072303152793390/ [Accessed January 25, 2017].

Oculus, 2017b. Minecraft Gear VR. *Experiences | Oculus*. Available at: https://www.oculus.com/experiences/gear-vr/1046887318709554/ [Accessed January 24, 2017].

Pacheco, D., 2016. When Should You Take the Red Pill? *VR Storytelling*. Available at: http://www.vrstorytelling.org/when-should-you-take-the-red-pill/ [Accessed January 22, 2017].

Penrose, S., 2016. We are Penrose Studios, creators of Allumette, AMA! *Reddit*. Available at: https://www.reddit.com/r/PSVR/comments/58ay9u/we_are_penrose_studios_creators_of_allumette_ama/#bottom-comments [Accessed November 7, 2016].

Renfro, K., 2016. This flowchart shows how the looped narratives work in "Westworld" for robots. *INSIDER*. Available at: http://www.thisisinsider.com/westworld-dolores-narrative-loop-gif-2016-10 [Accessed December 15, 2016].

Robertson, A., 2016a. Allumette is a beautiful virtual world from an Oculus Story Studio veteran. *The Verge*. Available at: http://www.theverge.com/2016/1/26/10831946/allumette-virtual-reality-animated-film-penrose-sundance-2016 [Accessed November 3, 2016].

Robertson, A., 2016b. Inside Sansar, the VR successor to Second Life. *The Verge*. Available at: http://www.theverge.com/2016/11/18/13501492/linden-lab-project-sansar-vr-second-life

-hands-on [Accessed January 25, 2017].

Robertson, A., 2016c. Our favorite virtual reality filmmakers at Sundance explain how to make great VR. *The Verge*. Available at: http://www.theverge.com/2016/1/26/10831934/felix-paul-studios-virtual-reality-interview-sundance-2016 [Accessed January 23, 2017].

Saletan, W., 2011. Website. *The Computer Made Me Do It*. Available at: http://www.nytimes.com/2011/02/13/books/review/Saletan-t.html?pagewanted=all&_r=0 [Accessed January 22, 2017].

Saucier, N., 2016. Why the Future of Virtual Reality Isn't Movies or Video Games. *IndieWire*. Available at: http://www.indiewire.com/2016/02/why-the-future-of-virtual-reality-isnt-movies-or-video-games-22048/ [Accessed January 27, 2017].

Spock, J., 2015. Mirada VR Creates The Strain Experience W/ Headcase VR For FX Fearless. *Virtual Reality & Augmented Reality Trend News & Reviews - Virtual Reality Reporter*. Available at: https://virtualrealityreporter.com/mirada-vr-creates-the-strain-experience-w-headcase-vr-for-fx-fearless/ [Accessed November 3, 2016].

Studio, S., 2017. Beyond Animation: "Dear Angelica" Premieres at Sundance. Available at: https://www.oculus.com/story-studio/blog/beyond-animation-dear-angelica-premieres-at-sundance [Accessed January 22, 2017].

Studio, S., 2016. Quill by Story Studio. *Experiences | Oculus*. Available at: https://www.oculus.com/experiences/rift/1118609381580656/ [Accessed January 24, 2017].

Studio, S., The Origin of Quill and What it Can Do—Beta Available at Touch Launch. Available at: https://www.oculus.com/blog/the-origin-of-quill-and-what-it-can-dobeta-available-at-touch-launch/ [Accessed January 24, 2017].

Tribeca, 2016. Allumette | 2016 Tribeca Film Festival. *Tribeca Film Festival*. Available at: https://tribecafilm.com/filmguide/allumette-2016 [Accessed January 27, 2017].

Unity, 2016. Unity - Store. *Unity*. Available at: https://store.unity.com/ [Accessed November 3, 2016].

Unseld, S., 2015. 5 Lessons Learned While Making Lost. Available at: https://storystudio.oculus.com/en-us/blog/5-lessons-learned-while-making-lost/ [Accessed November 15, 2016].

VRDC, 2016. VR/AR Innovation Report. In VRDC, p. 11.

Watercutter, A., 2017. "Dear Angelica" Is the Film—and Filmmaking Tool—VR Needs. *WIRED*. Available at: https://www.wired.com/2017/01/oculus-dear-angelica-premiere/ [Accessed January 24, 2017].

Wikipedia, 2017. Choose Your Own Adventure - Wikipedia. Available at: https://en.wikipedia.org/wiki/Choose_Your_Own_Adventure [Accessed February 9, 2017].

Within, 2016. The Future of Virtual Reality. *Medium*. Available at: https://medium.com/@Within/welcome-to-within-c7d3daba2b55 [Accessed January 27, 2017].

Woods, M., 2016. Why VR "Storytelling" does not currently work. And can it ever work? – Mobile Lifestyle. *Medium*. Available at: https://medium.com/mobile-lifestyle/why-vr-storytelling-does-not-currently-work-and-can-it-ever-work-728ff15efb1c [Accessed November 7, 2016].

Yee, N., 2007. *The Proteus Effect*. Doctor of Philosophy. Stanford University. Available at: http://www.nickyee.com/pubs/Dissertation_Nick_Yee.pdf [Accessed January 26, 2017].