

From fairy tales to smart concepts: Storytelling for VR

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Abstract

What we see around us and how today will affect tomorrow is all depending on our creativity. Our intelligent life is inspired from our imagination. Since the world exists the main source of ideas has derived from the fairy tales and fables that humanity learned in its infancy. These brainstorming sources of ideas are constantly used by the science and technology to move our life forward through embodying our dreams for freedom, justice, democracy and sustainability through smart concepts and solutions. The future is here inspired by myths and legends and represented by Michio Kaku in his futuristic visions. Our proposed work is to visualise some of these ideas into smart concepts for the future. Our panel will discuss and demonstrate how an idea can transform storytelling into a VR concept and will shed light onto the rise of some of the most ground-breaking emerging technologies.

Keywords: storytelling, smart concepts, virtual eality.

1. Introduction

In a world of constant evolution, it is not simply a matter of technical development that drives the way we live and the differences that technology makes in shaping our lives. Rather it is the creativity and innovative design as it relates to the viewer that sews the seed of possibilities within the convergence of new technologies. The living world such technologies inhabit, in turn, shapes our emotional responses and the development of our values and connections with our reality. Indeed, creative artistic visions serve as the genesis of new ideas opening possibilities that shape our present and our futures. Today we have technologies that permeate every aspect of our lives within all we embody dear to us as human beings, and although it may not be seen as such, our responses to these developments influence our multi-dimensional approaches to justice, freedom, democracy, and sustainability as human beings.

We are in a world that constantly expands as do the methods through which we imagine the future. Our lives pass through the physical, the digital and the emotional, and it is vital that we acknowledge not simply the rules that shape the framework of our thinking as we conventionally understand it, but that we design our digital experiences understanding the impact we can have in the way we shape our communications, entertainment and learning in an increasingly converging environment of global communication. A failure to understand the power that we as creatives have in the development and direction of our world and subsequently the values of those within it, both in terms of current and future leaders and policy makers, can pose serious questions for the future of the world we live in. The research compiled within this series of presentations provide an example of how we must consider such design implications. This work highlights the processes of creatives in guiding the design of stories in a world of infinite possibilities within the expanding medium of immersive entertainment and storytelling. We hope the results of this research can help inform and inspire those involved in the development of technologies and ideas within this field and others.

1.1 Strength and weaknesses of VR as a storytelling medium

With Virtual Reality emerging quickly as a new and popular media, storytellers have had to learn quickly on how to utilize this media to its potential to deliver a memorable and engaging experience for the audience. Looking at examples from over the years, we can learn about how this media has greater advantages than others and have an idea of the steps that are needed to translate a story into a VR experience.



Figure 1. Terra Terra! (2020) 3D Previz by M. Babington.

For this article, I will be using “Terra Terra!” childrens’series (Figure 1) as a case study example for the exploration that takes place when making a VR experience. “Terra Terra!” is an animated TV show for a family audience that is a Sci-Fi comedy with a focus on entertainment and education. The show is about an alien family moving to earth where hijinks ensue as they adapt to life on earth. With that premise and context, the next phases would be to explore the various avenues on how to make it into a VR experience. However it is important first to understand the overall strength and weaknesses of this medium.

While looking at VR as a medium, I believe it is important to keep what Marshall McLuhan (Philosopher and media theorist) once stated in mind, that “*The Medium is the message*” [1]. Simply put, you can only receive a story or idea through a medium. It is not the idea or the story that is being expressed but the medium, thereby the medium should be the focus of the study. Furthermore, Linda Hutcheon also expresses that “While no medium is good at one thing and not another, each medium like each genre has different means of expressions and can so aim at things better than others” [2].

With those statements, the questions when approaching VR is a) what is the goal of VR? and b) what are its strengths and weaknesses as a medium? The goal of VR is immersion, putting the audience into a story or world, leading into “*The role of the viewer can be passive, observant, active, or interactive. The whole purpose of virtual space design is to achieve an immersive and interactive experience between the viewer and the world*” [3]. This depends upon what the creator wants to express and with differing outcomes.

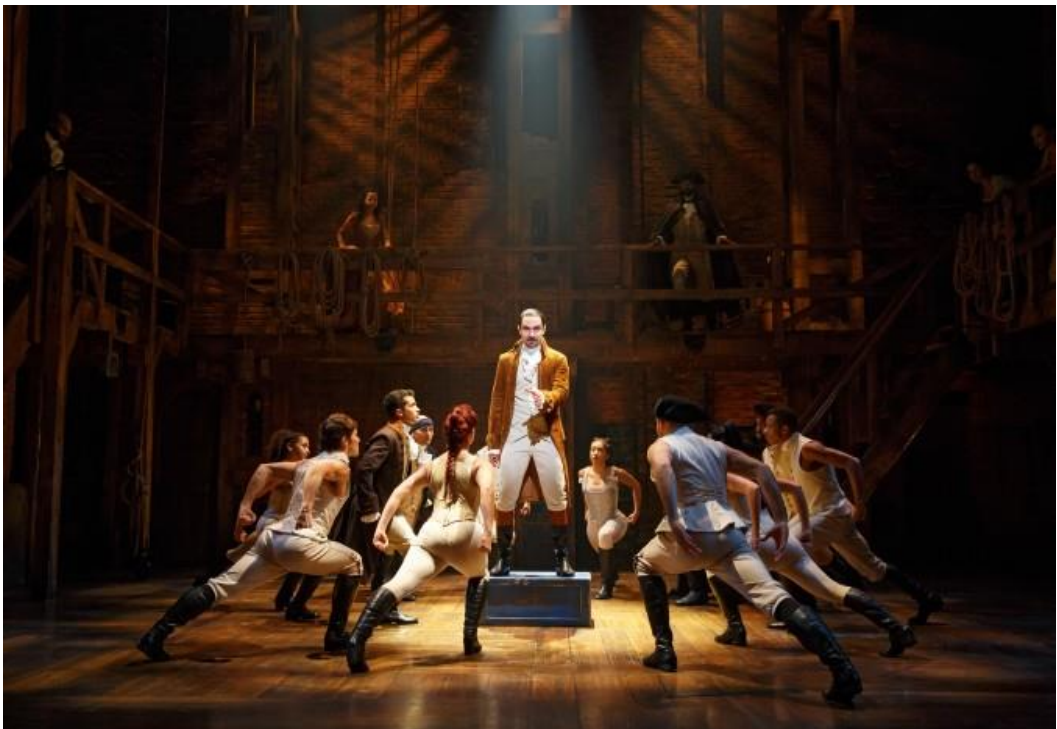


Figure 2. Theater Mania (2017) Javier Muñoz stars in Hamilton on Broadway.
(© Joan Marcus) [4]

With that in mind, when we compare VR to previous mediums, it is easy to attribute it with its similarities to traditional TV or cinema as a visual and audible medium, however, I would argue that VR is more alike to theatre. While both mediums use their respective media to direct the audience's attention both visually and audibly, film and TV have the advantage of using framing, composition, focus, blocking and lighting to direct the audiences. However, VR offers a more unique immersive experience, more akin to theatre with methods it uses to direct the audience's eyes on a stage. For example, in this picture from "Hamilton" (Figure 2), there are multiple elements that help draw the audience's eyes on what is considered a busy stage. There are multiple people looking and leaning towards the main actor, who is lit center stage by a spotlight. The audience's eyes follow not only read and follow their pose like an arrow, but naturally look where people look (in this case at the centre) and the spotlight illuminates what we want to bring attention to and darkness the area around him. This is helped by how well it uses all the visual and audio elements to direct the audience's attention. This is thanks to the guiding action and to the audience's cone of focus.

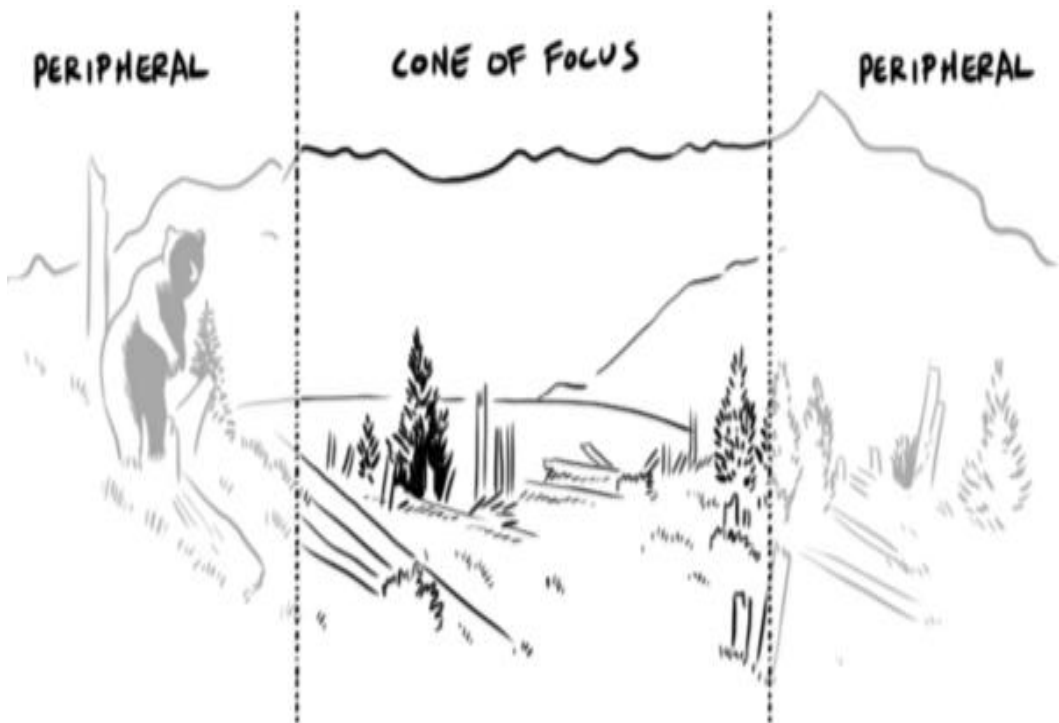


Figure 3. Sundstorm(2015) Cone of Focus.

However, since VR is a 360° experience, it is a frameless environment, so it is up to the director to suggest framing. *“Dramatic shifts in action, lighting, and/or sound within that space will pull the user’s attention in that direction”* [5]. As seen in the above graphic (Figure 3) from Logan Dwight's article, Film and TV and Theatre are usually/ typically in an audience's cone of Focus. In a 360° stage/ environment, more techniques are needed to direct an audience to look beyond the initial 90° in front of them.

One of VR's strengths is that it has been regarded as an Empathy Engine/machine. Although, while that term has faced backlash and accused of being a buzzword [6], however there is plenty of evidence of the medium getting a more unique empathetic reaction out of the audience compared to other mediums by creating Presence: "It's the mind and body trick when the viewer makes a Virtual experience a real one" [7]. For example, "Richie's Plank experience" [8] is regarded as a simple but effective VR experience, using the goggles, sound, some space for movement and (optional but recommended) a plank of wood. The experience puts users' fear of heights to the test. A high majority of its users have reported that the experience felt like a real one, with the VR experience tricking them into thinking and recalling it as a real one.

However, a known obstacle/weakness is the tech itself, with a majority of VR devices are not made equally. Different VR headsets require more set up time like the HTC VIVE which requires sensors in the room, while the Oculus does not, but then there is the Google Box which is cheaper than the previously mentioned examples, but it doesn't have controllers and is just a phone in an easily produced headset for the user's phone. These various headsets offer a range of interactivity, the HTC VIVE and Oculus providing some movement and controls while Gogglebox does not. Furthermore, there is camera quality if the VR experience requires current not widely adopted as a household device, so fewer potential audiences, with YouTube's 3D camera compatibility being the most accessible.

It is important to keep in mind who your audience is and what experience do you want to give them. Are the audience a Passive or a Participant? If it is a passive experience it follows more of what Anthony Geffen describes as an "On the Rails Experience" [9] much like the medium of Film/tv and theatre where the audience watches the events unfold before them with no input on the story.



Figure 4. Legendary Pictures (2015) Warcraft: SKIES OF AZEROTH.

In the early days of VR being a publicly accessible experience in 2015, VR was used as an extension of other work rather making them as original content at first. VR was used as a marketing gimmick, these can be seen in the earlier examples, in "Warcraft: SKIES OF AZEROTH" [10] which was posted onto YouTube when it implemented its VR capability in 2015 (Figure 4). While it was recommended to watch this on your phone, it was possible to view this on a standard YouTube page, the viewer having to drag the screen to look around in the 3D environment. However, as one of the first publicly released VR

experiences that allowed users the unique experience of flying over Storm wind on the back of the mythic gryphon, it is a very On-rails experience as it only required the viewer to look around. Furthermore, since there was little story or key points of interest that the audiences are directed to look at, they are left to their freedom to look around at their own leisure.



Figure 5. Warner Bros. Entertainment (2017) [11] The Lego Batman Movie | Batmersive VR Experience.

Of course, creators have learned since then, as seen in “The Lego Batman Movie | Batmersive VR Experience” which utilises the VR medium and creates a presence by having a Batman interact and enter the audience space directly and encouraging them to look around by guiding their attention through movement, pointing or verbal suggestions (Figure 5).



Figure 6: ACM Digital Library (2020) Disney's "Myth: A Frozen Tale".

“Myth: A Frozen Tale” [12] utilizes the VR medium to its potential and tells a story, using the environment changes to the various elements in which a tale is being recounted to the viewer (Fig. 6). The tale in question is about the main spirit characters. The story is told around them but to get that idea of immersion, they have the various spirits approach the viewer and give a sense of scale. For example, the Earth spirit is a giant rock creature, and the audience has to look up to see its face, giving the audience an immense sense of scale that theatre or film could not provide. They have each spirit brightly colour coded, so they are easy to spot and follow in the environment. At the same time, the audience is narrated the story since the experience is under the guise of a bedtime story, as if the child has closed their eyes to imagine what is being described to them.

However, while the previous examples (and a majority) VR experiences were extensions of other products, there were a handful of original stories. In 2015 when YouTube implemented its VR capability, created the Google Spotlight Stories studio to create original short content. These early shorts were “360° Google Spotlight Stories: Pearl” [13] and “360° Google Spotlight Stories: Help” [14].



Figure 7. Google Spotlight Stories (2016) 360° Google Spotlight Stories: Pearl.

“Pearl” is an excellent example of demonstrating guiding attention (in a passive experience) through the orientation of objects, following people’s eyes, a common film language/technique to guide an audience’s attention. However, “Pearl” remains in a comfortable field of view, with all the action taking place in the front and back seats, not encouraging the audience to look around 360° but instead at the 180° in front of them (Figure 7).

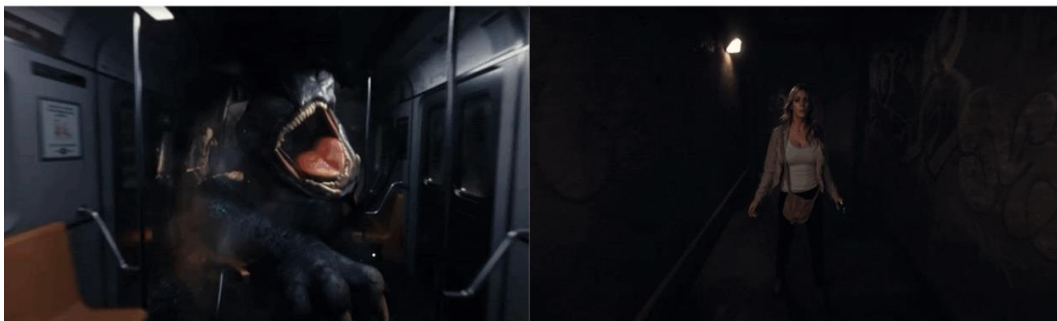


Figure 8. Google Spotlight Stories (2016) 360° Google Spotlight Stories: Help.

“Help” is a unique VR experience that implants real life actors into a 3D environment (Figure 8). This VR short illustrates the challenges of using live action actors and cameras, since it depends a lot on the pixel quality of the camera. If the image is low quality or if the people are out of focus, it would start to strain and hurt the audience’s eyes, it more forces the audience to look at a certain thing rather than encouraging the audience to look. Furthermore, the use of live action actors in a 3D environment that is not completely photorealistic, it creates an unfortunate case of uncanny valley and further disconnects them from the story happening around them.



Figure 9. VR Scout (2019) Disney's "Cycles" [15] .

Jeff Gipson created an original VR experience for a passive audience in the VR short animation "Cycles" [16]. Much like "Myth: A Frozen Tale", the story unfolds around the viewer, following the characters and story counter-clockwise in an open plan house (Figure 9). In a way, it addresses the issues that the previously mentioned "Pearl" (2016) which was that it utilizes the whole 360 environment. His intended goal was for the audience to have the same experience as character in the short "They get into this space and get a sense of it and then the story unravels around them", since it revealed at the end that the audience is watching from a character's perspective, recalling/ remembering the events of the home, from when they first moved in to when they finally have to move out.

Another popular passive VR experience are the ones for Education and Workplace. These experiences are more of a teaching tool, rather than one that plays off the audience's empathy. For example, it would present the object of interest, be it a piece of equipment or a dinosaur, and there would be a narration giving facts or instructions about the subject. With the main goal of becoming a strong example of a passive experience.

However, when the VR experience calls upon the audience to interact with the experience, the approach to storytelling resembles the approach needed when designing a story for a video game. Creating a story for a video game can come in various styles, depending on the type of game, but as Christ Marx [17] puts it, they generally come in two different forms. They are either material that is added for background flavour that does not interact with the gameplay, or it is interwoven with the structure and gameplay. If it's the latter, it can be further broken down into a classic 3 act structure. Act 1: Set Up (Exposition), Act 2: Conflict (Complications) and Act 3: Resolution. This 3-act structure can apply to various stages of the game, be it the overall story structure of the game, the structure of each level, and the structure of each encounter.



- ❑ Act 1: *setup (exposition)*
- ❑ Act 2: *conflict (complications)*
- ❑ Act 3: *resolution*

Figure 10: Valve Corporation (2020) “Half-Life: Alyx” Chapter 7: Jeff.

“Half-Life: Alyx” [18] is a VR game that is an excellent example of this 3-act structure, with the overarching story interwoven into the game and in its individual levels/chapters (Figure 10). In Chapter 7, the game has the player in an abandoned distillery trapped with a blind Monster “Jeff” who, despite being blind, has a heightened sense of hearing, we have our Act 1: Set up. Act 2: conflict, quickly follows with the player having to navigate the distillery and avoid Jeff. Then we have Act 3: Resolution, where the player is able to deal with Jeff and progress to the next level/chapter. This is when the VR capabilities really start to show their strengths, especially during the 2nd Act of the chapter which takes up the majority of the level. With the set up establishing the location as a distillery and that Jeff is blind, the player is surrounded by various bottles which they use to distract Jeff. Unlike a traditional game where the player has to press a button to throw an object, the VR controllers have the players perform a familiar throwing motion recognition, reaction and agency.

However, while VR games like “Half Life Alyx” encourages a lot of player movement as well as simulate walking, another popular type of VR games are escape rooms where the player can be seated. A successful escape room game is “I Expect you to Die” [19], in which the story is interwoven and puzzles (Figure 11).



Figure 11. VR Focus (2016) Schell Games I Expect you to Die.

Following simple game design, they allow the player to explore the environment 360° for clues and the game will acknowledge their action and provide a response, allowing for player feedback that players look for in a game.

However, games targeted to a younger audience, with more of a focus on gameplay, the story material is background flavour and set. This can be seen in popular VR games such as “Rec Room” [20] and “The PierHead Arcade” [21] where there is a simple set up of location and theme, but the story is non-existent.

To bring it back to the start, when it comes to adapting this exercise’s example “Terra Terra” into a VR experience, several options present themselves. Firstly, it is an extension of an existing content, in this case a TV show, that is targeted to a younger audience. Additionally, to make sure that this product reaches out to as many of the targeted audience as possible, the VR experience will need to be available on most accessible VR devices/players as possible.

With those developments, the “Terra Terra” VR experience leans towards a more passive experience. Furthermore, with its unique story and Sci-fi setting with a family friendly comedic tone, this gives the creative opportunity to have the experience set during the family’s journey through the Solar system on their way to Earth, allowing the audience to have both an educational but entertaining experience. For example, the audience can watch the family have comedic interactions, a roller coaster experience as the family dodges asteroids, and education as they fly past notable planets, and the characters can deliver facts about them. For example, “Mars might be red but it’s actually really cold, its average temperature is -63°C , so cold that water would freeze there” [22].

In conclusion, by deconstructing various VR experiences from the last few years of its rapid evolution as a medium, we can see its various strengths and weaknesses and how to make it an effective storytelling tool. That it is important to recognise who your target audience is and how much you want them to interact with the story, as passive or active agents. Furthermore, it is important to guide an audience's attention naturally through various visual or audible techniques to not only utilize the VR’s immersive capabilities as well as provide them with enough engagement and acknowledgement that they have a presence. As seen with our case study example of “Terra Terra”(Fig.12), by recognizing the audience, the experience we want to provide for them and utilizing the VR’s 360° [23] capabilities,



creating a story for VR has become easier when knowing the possible building blocks. Figure 12. Terra Terra! (2020) Poster by A. Gurova

1.2 The influence of emotion on storytelling: the very first steps to create appealing stories

If we think about the last decades, every type of media has become much more story centric. Digital media, visual media, written media, even journalism or advertising use stories to help sell better. But why are stories so relevant, why do we need them?

We as human beings are sociable animals, we feel the need to be part of a community, we have an urge to be understood and loved. Stories enable us to share our feelings and thoughts, our passions, fears, joy and sadness, we use stories to connect and understand others and ourselves. Stories enable us to empathize, and mankind strives for emotions [24].

When watching movies and reading books, audiences can not always resonate and explain what made a story particularly good or bad and often may be wandering about what made a story attractive to the audience. For those not knowing anything about storytelling and cinematographic techniques understanding human psychology can help to find the answer to the earlier question. Studying the human mind can be of extreme help in the professional world of making stories; also, because “the material of story is life itself “ [25].

One of the most useful concepts in human psychology that can be related to story making is the craving that humans have for appreciation. It is not just a desire or a wish, it is craving! It is important to remember that humans are creatures driven by emotions and often motivated by pride, the same rule applies in storytelling for any content created for audiences. Audiences are smart, they learned stories for centuries and they can quickly spot a story that lacks sincerity.

In order to be able to somehow touch the audience, it is fundamental that they believe in what the story tells. Faith can move mountains, history shows us that power, money, or brute force, sooner or later, have always been overpowered by faith. People want to believe, to have faith, faith in you, in your goals, in your success, in the story you tell. The duty of a storyteller is to create something worthy of people's trust.

So, the first step towards building trust in your work is to create a story that gives justice to an audience that is incredibly sensitive and open to the story that they are about to watch or listen, an audience that does not defend their emotions, welcoming laughter, compassion, love and tears. But only saying this probably does not help much; what we understand from our research, not only about storytelling, but also about life through the studies of psychologists such as Albert Bandura, John Watson, Sigmund Freud, or the writer and lecturer Dale Carnegie's books [26], but also philosophers such as Confucius, Lao Tse, Socrate among many others, is that before creating stories that are able to give justice to their audience, a storyteller needs to understand what is the message that he or she wants to deliver. And it better be something that the person really believes in, because creating stories tests the maturity and the insights of the storyteller, the knowledge he has of the society, of the nature and of the human heart; all stories from any part of the world, of any genres and styles mirror their creators, exposing their humanity, or lack of it [25].

The goal for a writer is to never stop learning, never stop being curious, to bring to life a vision full of the storyteller insights, coupled with deep knowledge of the created characters and the world they are living in. And with all of this, a lot of love. Most of the people prefer to hang out with somebody positive. And this is a natural choice. If one has nothing else than hate to bring in this world, they will never obtain any success, whatever they do. Especially when creating content for people. The deepest desire of mankind is to be important and appreciated, that is what will catch their attention, a story that makes them wonder if the author is reading their mind. Love is fundamental. First, love for humanity, the audience, an enthusiasm to empathize with them, the willingness to see the world through their eyes. When creating stories, one must sincerely understand how people feel, that is what they will sense through the story.

But the main question is: How to create a good story? And what makes it good? Drowning in a sea of movies of all genres and kinds, a storyteller may come to believe that anything can become a story. In fact, if we observe carefully, each of the stories may be unique, but getting to the core of them, in each of these stories the essential form is alike, and it is to this deep universal form that people react positively [25]. A story is not made only out of moments of conflict, the personality of the characters or their emotions. It represents a strategic sequence of life events of its characters, that are included in the story

to arouse certain kinds of emotions in the audience, and to convey a specific point of view on life.

The life represented in a story should not be as obvious as some chronological facts, rather it should be truthful to what the storyteller thinks about it. This process of self-inner understanding is fundamental before starting to study all the various storytelling techniques and structures. The world of cinematography and storytelling is so vast, that without taking time to understand what the message for the people is, one can risk drawing in all its possibilities.

1.3 Script writing for virtual reality

When we first think about script writing, we tend to imagine that of a screen play or feature film; TV or Advertisement. We don't often think towards gaming, or the virtual world.

This thesis aims to explore exactly that. How does the process of script writing change when applied to virtual reality? Are there similarities to current gaming processes, and if not, then how does our process adapt when working in a 360 space?

In a UNCSA article, they discuss 'Slam', a virtual reality poetry experience. They mention how script writing for virtual reality consists of six different planes, as opposed to the traditional two-dimensional film [27].

Which begs the question. How do we utilise the flexibility of a virtual world?

Writers of 'Slam', Tische and Cooper, discussed their process of writing for VR, and how they broke their scripts down into quadrants, even going so far as to colour co-ordinate them for ease of understanding localisation in the virtual space. (Fig .14)

INT. VOID - NIGHT

The Experiencer notices a 3D neon title floating in a void: SLAM. The title grows brighter then floats away as A SINGLE narrow beam of light slashes across the darkness in front of us -- reminding us we're not blind --

An ETHEREAL SHIMMERING sound from above and -- WOOSH -- THE BEAM slides right and swells into a spotlight that SWINGS around behind us and eventually finds -- THE POET, standing some distance away, turned away, inhaling, exhaling.

The Poet takes a breath, opens her eyes, makes eye-contact with and AN UNSEEN AUDIENCE MEMBER somewhere in the void in front of her.

POET
I know I made you upset
but please—
don't walk out on me.

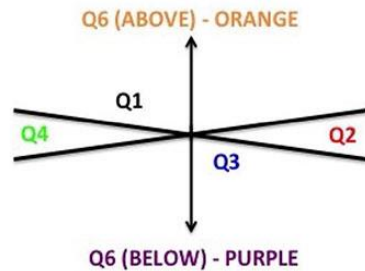
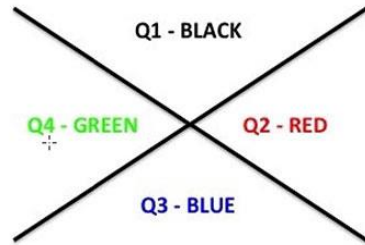


Figure 13 – ‘Slam’ sample page, Aja Cooper and Gary Tieche.

The example from Fig. 13 is a sample script from Slam, a VR poetry experience and a proposed method of script writing for VR. It utilised the idea of colour coordinated quadrants to make it apparent where things were happening in the 360-degree space, includes of above and below. On the other side of the page, we have a template proposed by Vargas [28] who wished to standardise the writing process for VR. She argued that the quadrant method would impede the momentum in creating an industry standard. Well, the quadrat method uses 6 quadrant San multiple colours to highlight space and location and direction boxes would only use purple to indicate interactive elements.

Both methods hold their pros and the cons, the foremost being Accessibility. Neither of these methods are particularly friendly to visually impaired writers. Purple is remarkably close to black and the multiple colours can be quite jarred focus on. But this does not say that they do not have their merits after all. Although, these methods can be used by the majority of writers, there is still a need for new ways in which to explore how to write for a virtual world. From across a variety of creative interviews authors have been reminded again and again that this is a new age of technology, one it is here for the long haul. Because of that we offer the argument that standardised writing process this early on is rather short sighted. Within the creative industry and in the market of new technology it is imperative to continue to push the boundaries. Quotes available from a variety of angles as seen with Slam VR is not just a field for education or game development, it is now an avenue to explore poetry, to explore theatre and storytelling in all its forms. But one thing remains key with the virtual world: when the user puts on the headset, they become part of that

world. So, autonomy is a huge part of the virtual experience, it is how humans interact with every element of the world in which they are now in. This gives the ability to writers to redefine their understanding of story structure.

Of course, ideally everything has a beginning a middle and end but where do we have that? Whose perspective are we seeing the story through? If we interact with one element does that close or open a door to another element? And how can we make an immersive world that feels tailored to the audience that provides them the autonomy to make choices and to influence the part of the story? And from this, how do we direct them without shoehorning our audience into a set narrative? Well, we already have those answers. They are in the way that we use our senses and the environments we provide stimulate that. These are our focus when directing the story and planning out our scripts. It is also why we have found bias for the quadrium method: it utilised the idea of things happening in space as opposed to just a set of interactive point listed. We can plan as writers where are directions will guide from. In this sense our writing is a guideline for a multitude of outcomes, and we would argue that this is something we can easily call “like a dungeon master mentality”. In “Dungeon and Dragons” it is the players who guide the story. Of course, it is virtual world built on story writing and coding, so not every outcome can be randomly left to chance. It does not work that way, but we can plan it in our design; we can plan where triggers lay, we can plan which interactions will lead to another and should that interaction get interrupted, we can lay down tracks but diversions in that story. This is a method we can use to direct story whilst maintaining an illusion of autonomy.

So how does this apply to “*Tera Tera!*”? The story was designed for a television production and was adapted to test if it was possible to produce for a VR medium, and to see how we might explore this process that meant re-imagining how we would approach this. What was the aim for the story to be? A game and educational experience and a massive story where the players are part of the family on their journey. In this case it came down to a few elements: 1) what was the story, 2) where was it set, 3) what was that stage, and 4) whose point of view will the players experience the story through, and as such 5) how do we cater that point of view being of their own or one of the characters?

Well, that became something easy to simplify using the trailer as the introduction. The story would be the intro; it would allow the player or audience to enjoy a cut scene through space and give them a settling period in which to adjust to and learn their VR controls when the character scores within the scene; it would keep setting tide within the bounds of the spaceship and that defined whereas staging would be and what was available to interact with at the start of the experience during the settling. At the start of the experience during the settling period the story would allow the audience a choice - whose point of view did they want to experience the story through, and as such how would the direction cater that for point of view being their own or one of the characters? This was something that could only be learned through trial and error. The decision was to test this through writing up for a couple of different point of views, the individual and the character the one. The individual point of view is the audience view; in this we tailored interactions and dialogue options to fit those point of views as an individual – the user would be part of the family but on the essence, in the world that they could explore; user dialogue options would have more

choices which in turn could alter certain interactions. Should the user approach their mother or father it had the ability to trigger a scene that would take one on a short detour around an interesting planet. Which planet that would be randomised for a unique experience each time. Should one interact with their siblings they have the chance to bicker or scheme or play a mini game within the story like they might play on a long road trip in the car. On the flipside, should the user play from the point of view of one of the characters, in this case Calvin, they would be given the chance to learn more about who this character is that one is embodying. And the user dialogue options would be true to the character with room for natural choice. The interactions available to user would also be more character driven. This continued the idea of autonomy and flexibility much like we get from RPG games as they focus heavily on the narrative and less on the game mechanics.

When writing this we tried to utilise the best aspects of the two script writing methods shown earlier rather than having each line of text multi coloured and kind of hard to read. Those quadrants were highlighted for brackets Q1, Q2 and so on. Also, the interactive elements were highlighted in a similar way to the proposed standardised method. However, instead of relying on purple we opted to just create clarity using them as action titles. They would list interactive options below clearly on one line to avoid cluttered paragraphs. This was only a small piece of exploration into how one could direct and stare this story for players' eyes. There are boundless ways to improve and develop these ideas further, but we leave an open question: is this a practical method of storytelling?

We have seen the world of VR open up avenues to so many creative walks of life, writers from TV documentaries, poetry and more. So, what expertise can we bring to the table? With so many perspectives in hand we have the largest sandbox in which to explore. We have been handed a variety of tools to grab hold of and push forward to keep developing the way in which we can tell a simple or complex story. Remember the first time you went to a theatre and you learned how the whole room was used to tell a story: the music, the lighting, the stage was never just a stage, it extended beyond that into the audience seating and into the rafters. And that is what VR brings to us in the digital setting - the ability to guide our audience, that players are new creatives into a story they are part of.

Having said this, we would like to reiterate but to shackle our methods of writing so early on in a brand-new field will only serve to stifle the limitations on our creative development. In conclusion, with the encouragement that we should all keep testing these boundaries VR gives us an unlimited potential for development and for our direction for our scripts and the breakdowns outbuilding we can truly build an immersive narrative.

1.5. Storyboarding and storytelling in VR

Since we are investigating the VR medium from storyboarding and previsualisation perspective, we would like to discuss tools and methods that we can incorporate in our exploration of VR storyboarding. Before we get into the meat of storyboarding with and four VR, we need to outline the purpose of storyboarding. The main aspect to consider in storyboarding is that it is used to communicate and translate the visuals from script to screen. These visuals are used to pitch ideas to the director and different departments to communicate the base level of pre-production work required for any given scene.

Storyboarding as a tool for quick iterations not only helps in pre-production but can also be used as an effective method to pitch for projects' funding.

Here are the key elements of storyboarding that remain universal even in the VR workflow:

- Storyboarding is efficient in speed and economical being a useful tool for planning.
- It identifies the major beats and plans for continuity in storytelling.

Using these characteristics, we can move on to identify the requirements for VR. What makes storyboarding and storytelling in VR different?

Since the very beginning of film making our means of communicating visuals was captured within a simple 2D plane. This is called *framing*. Using the fixed frame, we can easily compose a shot showing the audience exactly what we want them to see and convey depth in creating the illusion of 3D within this fixed two-dimensional plane. However, in VR we can only suggest framing through composition since the user is given free rein in three in a 360-degree frameless environment. Before we find solutions to framing, here we point the difference between games and films and what VR has to offer in relation to these two genres. Conventional film involves a more passive form of consuming and entertainment, whereas in both games and the use of VR it always requires a certain level of interactivity. Interactive films and VR films attempt to combine the two. However, I would like to discuss the potential options for VR games without involving too much interactivity from the user.

The main problem with VR film is attention. How can we have as phone makers control what the viewer sees so as to not miss pivotal story elements? Logan Dwight [29] pointed out that “film is all about controlling the viewer’s attention by framing subject matter” however, we lose this control entirely giving the viewers control over what they focus their attention on. To grasp the users’ attention, one must understand the different types and learn about the psychology of attention. Selective attention is obtained by intensive changes in the environment. Dividing attention suggests that a user requires directed attention only ones at a time, whereas a sustained attention as a combination of previous types to involve the viewer for a long period of time.

Let us begin with some of the solutions of obtaining attention. The first idea is a cone of focus. Understanding that focus in VR is broken up into primary, secondary, and tertiary will allow to choreograph actions according to their importance. Primary action is what film makers want the audience to focus on. Secondary action are areas that support and keep the user involved in primary attention. Tertiary represents the extremities of low interest. To keep the viewer immersed in primary and secondary zones is important to note that the angle of view is also difficult in this area as we will later discuss. Guiding action is within the primary and secondary that takes a user into different areas of focus. If the viewer shifts their position the primary action, another zones shift accordingly. Here is an example from the film Pearl [30]: a simple shift in alignment of objects in the case of the film’s characters can increase and divert areas of attention (Figure 14).



Figure 14. Pearl (Osborne, P., 2017)

As seen below, (Fig.15) with the image of the baby most attention is focused on the babies face however, changing the alignment towards the text causes the area focus to spread into the words.



Figure 15. Attention focus changes with alignment.

Tiding action and shifting attention also depends on comfortable viewing angles. Comfortable fields of view vary from 90 degrees to 154 degrees; however, this may vary depending on whether the user is seated or standing. Distance also plays an important role in attention since humans have evolved to pay more attention to objects closer to them.

The sweet spot in VR space ranges between 0.5 to 10 metres; beyond 20 metres objects become almost entirely unnoticeable. One major aspect of grasping users' attention through VR or points of interest (POI) for monotonous image as evidenced in the Icelandic Rocks have zero points of interest which encourages the viewer to look around for areas of focus whereas in the Japanese Tram scene there are several points of interest: the people, the environment, the conductor, etc. (Figure 16).



Figure 16. Japanese Tram

It is important to note that too many points of interest can cause zero POI effect. Moving on to the types of storyboarding for and with VR there are several combinations that can be encouraged depending on what is being produced but few of which are presented in this article.

Despite the ever-growing variety of tools and software one universal aspect of storyboarding remains right and true: Thumbnailing. It covers most important elements and will remain in use to Neuralink, replacing the efficiency and speed that it provides. Conventional methods of storyboarding despite many attempts to keep 2D relevant in this storytelling space seems unreliable at this point. Too many efficient tools are on the rise to depict important elements of primary secondary and tertiary action within the VR space; therefore, in this space it is important to note that these tools remain only relevant within the first iteration of visualising during thumbnailing, or immediately from script. Software like Blender combining efficient methods of 2D sketching and 3D modelling allows users without a VR headset to involve themselves in the creation of VR or 360 stories.

Creating a combination of blocking out 3D assets while sketching performance allows a mixture that is extremely powerful, not to mention the accessibility of cameras and animation tools to create animatics. However fascinating, several aspects of this method can and will be replaced by VR technology.

1.4.1 Previz Photography

Apart from utilising sketches in both the conventional and hybrid methods, movies such as *I Am Mother* [31] have taken to VR previsualisation to photograph and prepared images before production or building sets. Despite the cumbersome activity of both blocking out 3D in a realistic manner for live action this allows the story artist and film maker to fit the boards to an almost accurate version to the set being built.

Storyboarding in VR increasingly replaces the hybrid in pre-visualisation methods utilising tools like Anim VR and storyboard VR directly. The only shortcoming is that a creative requires an expensive piece of equipment to involve themselves in VR, but this is becoming more and more accessible to people every day.

Here a showcase is presented discussing the recent storyboarding project Terra Terra [32]. The idea here is to accommodate for various viewpoints within a given scene that allows the audience the choice of different perspectives. Lighting cues and action will be planned in accordance with the primary action within a scene. Traditional storyboarding method has been used for thumbnailing in Photoshop. (Figure 17)

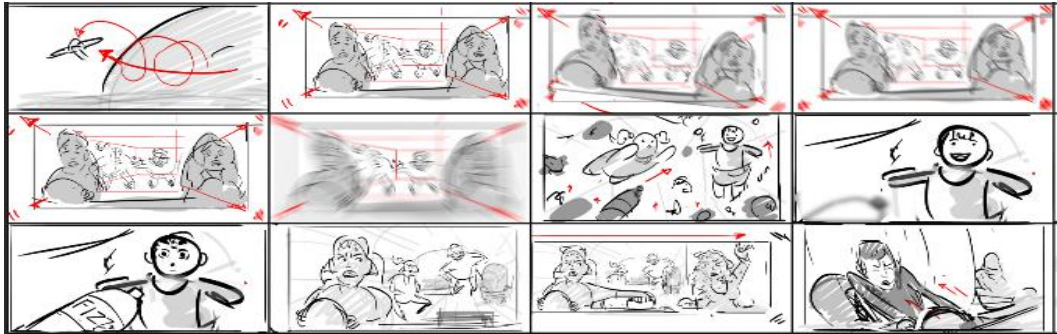


Figure 17. “Terra Terra” (2020). Storyboard by Leroy Dias.

In conclusion, storytelling in VR will heavily depend on understanding the psychology of people and learning more and more as film makers and entertainment artists to adopt the methods of design that will actively capture user’s attention. Since film poses many difficulties in allowing a fine balance between active and passive engagement the story artist and film maker must actively participate in identifying the key elements of story efficiently and effectively to then proceed in developing and employing methods that support guiding the user’s attention in VR. In the next chapter this paper will discuss the different types of immersion in VR.

1.5 What creates the sense of immersion and how important is fidelity for creating immersive experiences?

The immersion is defined as a unique experience giving the feeling of involvement of the viewer in a virtual world intelligently designed by experts. The three-dimensional world of virtual reality creates a believable illusion of the real world [33].

Virtual reality, or rather its concept has potentially been around for a long time:

Baltrušaitis and Strachan pointed that *“The exact origins of virtual reality are disputed, partly because of how difficult it has been to formulate a definition for the concept of an alternative existence. The development of perspective in Renaissance Europe created convincing depictions of spaces that did not exist, in what has been referred to as the “multiplying of artificial worlds”. Other elements of virtual reality appeared as early as the 1860s. Antonin Artaud took the view that illusion was not distinct from reality, advocating that spectators at a play should suspend disbelief and regard the drama on stage as reality. The first references to the more modern concept of virtual reality came from science fiction”* [34].

However, despite this, it is depicted as a relatively new toy due to the headsets that have been released at a more affordable consumer price. For the first time ever, virtual reality has become an accessible tool for artists and designers alike. These new headsets currently offer a wide range of interaction within the virtual world in the form screens and controllers allowing the player to look around and participate in the digital domain.

Telepresence, devised by Jonathan Steuer, is a form of interaction between and with simulations. *“Thus the user forgets about his real world scenario, forgets his present identity, situation and life and immerses him in a world of imagination, adventure and exploration. He gets more focused about his newly created identity inside the Virtual Reality world”* [33].

We have been looking into the types of gesture controls from a design perspective learning that they fall into two main groups: semantic and responsive. Semantic gestures are defined as common movements which we are familiar with in real reality such as walking, running, sitting, etc. Responsive gestures are how we interact with objects in our environment. *“Designing responsive gestures is harder because you also have to account for the specifics of an object, like weight or maybe aerodynamics. For the most part, your goal is to duplicate reality, so try to rely on as many natural gestures as possible. The less “controls” your user must learn, the easier it will be to immerse themselves.”*

Immersion itself can be broken down into different elements. It is important to understand the differences as to create the appropriate experience for the target audience:

- **Tactical immersion:** Tactical immersion is experienced when performing tactical operations that involve skill. Players feel "in the zone" while perfecting actions that result in success.
- **Strategic immersion:** Strategic immersion is more cerebral and is associated with mental challenge. Chess players experience strategic immersion when choosing a correct solution among a broad array of possibilities.
- **Narrative immersion:** Narrative immersion occurs when players become invested in a story and is similar to what is experienced while reading a book or watching a movie.

Staffan Björk and Jussi Holopainen, in *Patterns in Game Design*, divide immersion into similar categories, but call them sensory-motoric immersion, cognitive immersion and emotional immersion, respectively. In addition to these, they add a new category: spatial immersion, which occurs when a player feels the simulated world is perceptually convincing. The player feels that he or she is really "there" and that a simulated world looks and feels "real" [35].

Whilst this describes different types of immersion, it is also important to understand that there can also be different types of data to create different types of immersive experiences, thus affecting the overall level of immersion and impacting the final experience. The two classifications I will cover are Depth of information and Breadth of information.

“Depth of information can necessarily include anything and everything starting from the resolution of the display unit, the graphics quality, the effectiveness of the audio and video etc” [33].

Jonathan Steuer also defines breadth of information *“as a number of sensory dimensions presented simultaneously. Any virtual environment can be designated as having a wider breadth of information whenever it stimulates all the human senses. The user should get fully focused onto the new identity and world he explores. The audio and visual effects are the mostly researched area in creating a good virtual environment. These are considered as the main factors that can stimulate user’s all sensory organs. The sense of touch has been given more and more priority as it has become the dominating factor to stimulate a human. Those systems that allow the users to interact through touch are known as Baptic Systems” [33].*

Psychology can also play an important role in how much a user can be immersed. Despite covering everything discussed prior, some users are just more susceptible to accepting virtual reality as a new reality than others.

‘Of course, players have some say in how immersed they get in a game. Some people just have more spatial ability and can build those mental models of game worlds more readily and make them more vibrant. And researchers have found that people have an "absorption trait" which means that they're quicker to get fascinated by something and drawn into it - something I like to think of this as "the fanboy gene"’ [33].

When creating virtual reality experiences, we are asking the viewer to accept a lot of sensory information that may not make any sense. Whether this be story, setting, or simply the fact that the player can still walk around despite the user being stood perfectly still or even be sitting down.

‘Other times the player takes a more active role. Some players simply want to believe in the illusion and will induce their own bias towards accepting the "I am there" hypothesis. In this state, they will require less confirmatory information to accept that hypothesis and less disconfirming information to reject it. This is also similar to the idea of "suspension of disbelief" where players wilfully ignore stuff that doesn't make sense (like thunderous explosions in space or the fact that enemy soldiers can soak up a dozen of gunshots without going down) in order to just have a good time’ [33].

Some users willingly accept this fantasy purely down to a personal desire to be as far away from reality as possible. They do not search for realism but instead believability so that they may live, for a moment, in a world not their own with the freedom to make their own decisions.

“A concept they call "involvement" which is a media user's desire to act in the make-believe world, to draw parallels between it and his life, and to effect changes in it according to their own design. To me, this seems like an overly fancy way of saying "some people like to role-play" which leads directly to greater immersion” [33].

For our exploration into virtual reality and to discover for our experience what creates immersion, we decided to study two games; Half Life: Alyx [36] and The Elder Scrolls: Skyrim VR [37].

We chose to compare these two games as within the huge variety of VR games available we wanted to select two that were rather like one another. We felt these games were both trying to achieve the same thing; deliver an ultimate immersive experience by having the player feel like they are within a new world. One aims for a futuristic dystopia and the other a historical fantasy. Both try to give the player freedom by providing plenty to interact with as they progress through the story attacking enemies with a variety of weapons. Both games also utilize large, beautiful levels that feel immense and endless from the point of view of the player. One game we feel manages to create an immersive experience, while the other we feel falls just short. This will enable us to also explore the importance of fidelity in games and whether or not it directly affects the immersive experience as a whole.

We tested the experience in ‘Half Life: Alyx’ [36] in an Oculus [38] Rift headset. The headset includes two controllers, connecting hands to the in game virtual hands. The game starts with POV (Point of view shot) standing on a balcony in a futuristic city looking out over rooftops as spaceships and advanced drones flying around. Pedestrians and robots alike walking around below and the mother of all alien ships on the horizon in front of the viewer. The view was overwhelming with a lot to take in.

The first instinct was to test the interactive capabilities. The controls of the Oculus were so intuitive that one doesn’t have to think about which buttons to press. The user is able with a gesture to touch, manipulate and interact with objects in the scene.

What made this experience so unique is how much surprise it can offer and feels like the user is there, really there not only because of the beautiful environment but the opportunity to be able to reach down and grab things, to hold them, inspect them, then launch them into the air as if they are right in front of the player. This was unexpected.

A little further into the game, we encountered some enemies. Men in suits pulled out their guns and ordered to raise hands where they could see them. We felt immediately obligated to do so as if someone was really there.

So vivid was the experience they did not feel like 3D models on a screen but living and breathing humans that were threatening. The experience felt the thrill of adrenaline as though the user was really in danger. What makes Half Life: Alyx [36] totally immersive are the following features:

- Incredible graphics that make the environment look real.
- Beautiful sound design that surrounds you and gives you a sense of space.
- Advanced physics, giving objects some feeling of weight as you lift them and throw them.

- Large amounts of objects to interact with that allow the environment to behave as you would expect it to.
- Clever level design that allows the levels to feel dense and populated with no visible borders to better simulate the real world.
- Attention to detail within the textures and materials to aid the imagination into imagining what they would feel like.
- The game is made for VR so the experience is catered for it (Not too much moving around, not too fast paced, plenty to see and pick up, detailed environments)
- Strong linear storytelling that drives each scene forward

What makes 'The Elder Scrolls: Skyrim VR' [37] not as immersive?

- The game is not made for VR (lack of interactable objects, poor mechanics)
- Limited interaction with the controllers (Can only hold a sword, shoot bow and arrow, cannot open doors etc.)
- Lower quality graphics detract from the realism and remind you constantly that you are in a game not the real world
- Poor sound design that does not give you a surround sound experience
- Poor storytelling (many characters and locations do not drive the story/plot forward in any way creating a feeling of disconnect) which is a common issue in open world games
- Many bugs and glitches

So, is fidelity important for immersive experiences? The aim of these games is to create the most immersive experience possible. The personal touch of the headset, allowing players to look around and interact with their environment in such an individual way is in essence the goal. Fantastic games have been created for computers or video game consoles, the goal here is not to replicate what has been done prior but to reinvent a new way to participate within the context of a game. The current technology requires a certain amount of suspension of disbelief to be truly immersed, and the goal of fidelity is to aid this. If the goal is to be immersive, the best way to start is to be realistic. If the headset creates the realistic feeling of standing within the virtual environment, then what better way to compliment that feeling than with realistic graphics. If the goal is to be immersed, then by making the environment as realistic and believable as possible adds to that experience as the player feels they are really there. I experienced this myself when playing 'Half Life: Alyx' as the high-quality textures and realistic environment gave us the most immersive experience we would ever felt.

1.5.1 “Terra Terra!” Project

Following our analysis the findings tested with our own projects, “Terra Terra!”. We created our own immersive experience by combining the techniques we found. The focus was on writing for VR, hybrid storyboarding, 3D assets creating and setting up the scenes in Unreal Engine. We used Unreal and Maya as these are industry standard software, with Unreal Engine especially becoming more and more popular due to its real-time technology. Blender was also used for some tasks such as assigning materials due to its speed, efficiency, and easy compatibility with Unreal. We had put together an animatic for a teaser, and developed previz according to that animatic. We chose one scene from the teaser to demonstrate a proof of concept for how the VR experience would work.

The research into data types, such as depth of information and breadth of information proved to be invaluable as it demonstrated the need to provide as much interaction and stimulus as possible. To achieve this, the idea was to allow the player to switch views around the scene, so they can either observe from around the ship or in the perspective as one of the characters. Therefore, providing a slightly different experience each time and allowing the player a certain freedom to explore. As for fidelity, of course this project is not realistic in that it is set within a cartoon environment. However, we were able to introduce elements of believability by adding items such as the surrounding planets and stars. In the future we also hope to texture the environment to convey the feeling of real surfaces and to add to the overall look and feel of the scene. So, the goal is not realism here, but to create an environment that is believable.

In our final product inside Unreal Engine, the player/user can look around and switch the view camera to see the scene from different points of view. We hope to develop this proof of concept in the future by adding further interactivity and educational elements to allow the user to learn about the planets through the characters.

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