Immersive Storymaking:

An Emerging Art Form for Virtual Reality Learning Environments

Karen Rosemin, BSc, Pg Cert, MSc

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Declaration

This thesis results entirely from my own work and has not been offered previously for any degree or diploma. The word length of the thesis of 44,528 does not exceed the permitted maximum.

Signature: Karen Rosemin

Abstract

Virtual Reality (VR) technologies are moving stories from non-participatory to participatory formats through the effects of immersion, interaction, presence and agency. The study's thesis therefore is that the shifting storytelling paradigm from teller-listener to participant-builder requires a new art form that includes a grammar of making. The study presents the concept of *storymaking* as this emerging art form. The first objective was to develop a conceptual framework for a storymaking practice, and secondly to implement this framework to determine if it satisfied the need for a new paradigm. To do this, the works of key narrative theorists such as Aristotle (2016) and interactive narrative practitioners such as Louchart and Aylett (2005) were referenced in defining a story and making grammar that resulted in the Storymaking Framework. This Framework was then applied to the creation of a 360° VR experience on traditional Trinidad Carnival characters. The method of autoethnography captured important lessons from this practical exercise through researcher-as-instrument. However, to determine the relevance of storymaking, a small group of nine participants (6 students pursuing Caribbean Studies, 2 administrators and 1 teacher) evaluated the experience. The results from pre- and post-experience surveys revealed that the experience did in fact contribute to significant levels of immersion, interaction and presence in participants. Eight participants felt immersed; all nine participants felt sure they were moving through the experience on their own and all participants indicated that they had learned something new from being a part of the narrative. This study therefore pinpointed that the key factor that justified the need for the new storymaking art form was the embodiment of the participant in the story. The inclusion of a participant moved a story from artefact to process, facilitated by narrative and technical elements for an emotional connection to the story and memory making.

Table of Contents

List of Figures and Tables

Acknowledgements

The story of my pursuit of post-graduate studies at Lancaster University is an interesting one, which began 25 years ago. Having applied to the online Doctoral Programme of the Centre for Studies in Advanced Learning Technology (CSALT), I was in the United Kingdom at that time with hopes of visiting the University. However, I was pregnant with my son and his birth led to a reorganization of my priorities. I never told him of these plans and was pleasantly surprised when he applied to the same university 20 years later to pursue his first degree. This gave me the motivation to revisit my dreams and in 2019, I joined the Centre for Technology Enhanced Learning to complete this 25-year journey. I was finally able to visit the University during my first residential session that year and had the awesome experience of being on campus with my son, both as students. This was indeed kismet! As such, I must acknowledge and thank my son, Tai Rosemin, for unwittingly getting me to this point. I have enjoyed every minute of my doctoral studies for which I must extend my sincere gratitude to all who made this possible. Financing two family members' foreign university expenses was a very huge undertaking and my family generously rose to this challenge. I extend sincere thanks especially to my husband, Kenny, my sister Wendy and my mother, Elsa Williams for this vital support and their belief in me. Without them, this would not have been possible. To my peers of cohort 12, I must say we were lucky to have met at least once before the worldwide COVID-19 pandemic. We were, however, able to establish deep collaborative connections (although I was mostly quiet in our WhatsApp group) that got us through difficulties during our studies. A special acknowledgement to Oma, Sandra, Collete and Alex who kept the group alive. To my supervisor, Dr. Julie-Ann Sime, thank you for your academic insight, which gently and consistently guided me to improve my research practice. My sincere appreciation to everyone, too many to mention, who in no small way made this journey a memorable one. I believe in the adage - if you want to go fast, go alone; if you want to go far, go together. Thank you all for the company.

Introduction

When you move people through space while telling them a story, it creates the feeling of travelling on a journey and gives the experience meaning.

(Bucher, 2017, Foreword)

The goal of this study is to develop a framework for the process of 360° Virtual Reality (VR) storymaking that can support the evolution of techniques for producing immersive stories that practically demonstrate the value of such approaches. As an educator with an interest in VR systems, I wanted to know how one goes about creating these experiences for learning.

In the last few years, the 360° video format has become quite accessible to the average person through affordable cameras and mobile devices. This has opened up many possibilities for educators to experiment with the technology to improve learning experiences. In sharp contrast, however, has been the large budget commercial cinematic VR experiences and animated three-dimensional (3D) environments produced by media studios, which are often used as examples of what immersive VR content should look like. Without access to these kinds of resources, VR in education may have an up-hill challenge. As such, I wanted to explore what could be the direction for 360° VR in teaching and learning.

The 360° VR format uses a spherical video format. Interactive and immersive content surrounds you as if you are standing in the middle of a scene. You can view the content through a handheld, head mounted or desktop digital device that allows you to look in any direction, in order to see and interact with the content as you would in real life. Participants therefore move from passive viewers to active viewers.

Virtual Reality content is highly immersive, utilising Computer Generated Imagery (CGI) or 3D modelling to construct virtual environments. However, best practices for creating 360° VR experiences are yet to be established. This is why I wanted to create a usable path through the growing body of theories, approaches, experiments and applications. According to Dolan and Parets (2016), "The path to creating virtual reality content has been identified, but has yet to be defined" (Paragraph 1).

With 360° VR, I have experienced that the feeling of being in the video is at first very fascinating. However, once you acclimate to the context, the virtual experience eventually struggles to elicit a lasting emotion. This triggered a desire in me to look for something more from these experiences. I assumed that if viewers could do something within an application this would greatly improve the experience. However, I could not quite understand how interactivity, beyond looking around, could be included in these experiences. I then reflected on narrative psychology and the ability to mentally move a listener through a story world. This then gave me the idea to explore how adding a story to a 360° video could improve the experience and create opportunities for interactive involvement. I felt that once participants had an input in the experience, they would cease to feel like spectators.

The position I have taken therefore is that **storytelling** is no longer an appropriate concept for immersive environments, as it keeps participants in spectator mode. A new art form is needed which takes into consideration participants in the story, who are no longer simply receiving the story but are also a part of it and can create their own experiences as a result.

What should be the central concern in designing immersive learning experiences is the embodiment of the participant in the story. Designers must begin to work out what will be the role of the participant in this new environment. To guide my investigations, I used the following three research questions:

RQ 1: How are the new VR concepts such as immersion, interactivity, presence and agency changing traditional storytelling formats?

RQ 2: What mechanisms, methods and approaches are useful for producing a virtual experience that could contribute to shaping a storymaking practice?

RQ 3: What are the prominent factors that contribute to making the experience memorable?

My starting position in these investigations, therefore, is that in order to create meaningful experiences, I would need to understand interactivity in stories. I examine theories, concepts and approaches that could contribute to a new concept for creating 360° VR and a Storymaking Framework.

I then apply this Framework in a practical exercise involving the design and development of a 360° VR experience. Finally, I demonstrate this experience to a small group of people to determine whether the design ideas can contribute to immersion, interactivity, presence and agency in participants.

The main contributions of this research are:

1. A Storymaking Framework to guide the 360° VR development process, which highlights techniques for shaping immersive experiences.
2. Evidence that a story can assist engagement and immersion among participants.
3. Evidence that participant interaction in immersive stories can influence memory making.

The vibrant Carnival traditions of the Caribbean and specifically Trinidad and Tobago are the focus of the 360° VR experience. The Trinidad Carnival is an extension of the traditions of African and European ancestors who used storytelling and masquerade as significant aspects of their culture.

In Chapter 1, I establish this context through an exposé on the Griot, a traditional West African historian and storyteller, whose traditions have been very influential to the Caribbean's expressive culture. This chapter provides an insight into the historical evolution of Trinidad Carnival and reveals how the new realities of West Indian society reshaped them.

To understand how these stories could be appreciated by wider audiences, in Chapter 2, I examine what I call the new experience media (e.g. VR) and the possibilities they bring to transforming traditional storytelling. I discuss the nature of the VR environment and how the new VR concepts are contributing to the future of storytelling. In doing so, I identify the key element that transforms a story from

artefact to process and one that requires a new storymaking art form to accommodate this change.

In Chapter 3, I explore the storymaking art form in more detail. As the core concept of the study, I first view it through the lens of the Caribbean perspective to determine its relevance to the empirical work. I also examine the perspectives of other researchers in the fields of virtual storytelling and narrative in VR.

The main contributions of the research begin in Chapter 4, with a review of embodiment and narrative theories and storytelling approaches to determine what would be useful to a story and making grammar for immersive experiences. From this review, I conceptualise a Storymaking Framework that could inform the creative processes of 360° VR experiences.

In Chapter 5, I apply selected approaches from this Storymaking Framework to design a 360° VR experience. I review VR projects found on the Internet for ideas on how stories are treated in this format. I also test trial versions of software that I could eventually use to build the experience.

In Chapter 6, I use the actual production process, as a member of the design team, to distil lessons learned using the method of autoethnography. In this chapter, I capture key issues encountered in the pre- and post-production process from accounts captured in my researcher's journal and from email communications among team members. I also obtain specific feedback from the other members of the team from a debriefing survey administered after the experience was completed.

In Chapter 7, I describe the process to conduct demonstrations of the experience with a small group of students, administrators and a teacher. The aim is to gather empirical data on the application's impact on immersion, interactivity, presence and agency among participants. I administer pre- and post-experience questionnaires to the participants and then interpret their feedback, which I capture in both a quantitative and qualitative fashion.

In the Chapter 8, I discuss the study's findings based on the Storymaking Framework, and I identify the limitations of the study and areas for further work. I also identify factors that contributed to the trustworthiness and quality of the research effort. The

study, in the final event, contributes to the future of 360° VR by demonstrating the usefulness of storymaking as a new art form for creating stories for virtual reality learning environments.

Chapter 1 - The Study Setting

1.1   The Context

This thesis explores the implications for the traditional art form of storytelling as it transitions to a new format due to the exigencies of new technologies for articulating stories. Storytelling has been a significant part of the human experience, as it is essentially how we communicate our experiences to others. The National Storytelling Network in the United States defines it as the interactive art of using words and actions to reveal the elements and images of a story while encouraging the listener's imagination (National Storytelling Network, n.d.). This therefore involves a two-way interaction between the storyteller and listener. This interaction in-turn shapes the story and proficiency in storytelling emerges because of the quality of this interaction between teller and audience.

As the format for conveying stories changes, it is therefore important to understand what elements of our stories are most suited to new and evolving approaches. In this way, we discover new ways to retell old stories in order to convey their significance to new generations. In addition, we are able to tell new stories in ways that are appealing to new audiences.

This chapter therefore delves into the traditions of the ancestors of the people of the Caribbean to discover the elements that made the stories of Trinidad Carnival so unique. Why did they tell these stories and how did they do it? What expressive forms did they use? How effective were they in conveying information and meaning?

It is in seeking answers to these questions that the path becomes much clearer for developing techniques that can do justice to the telling and retelling of these stories as the medium of storytelling evolves. I begin my review therefore with the story of an iconic figure of the Caribbean storytelling experience called the *Griot.*

1.2   The Griot

Being of African-Caribbean lineage, I have unwittingly enjoyed Trinidadian cultural traditions connected to a history rooted in West Africa and its oral historian – the

Griot (griːəʊ; gree-**oh**; **gree**-o; **gree**-ot).   In its simplest definition, a griot is a storyteller. The word "griot" is a French colonial term for the court singers of West Africa who sing the praises and derisions of their chiefs, and narrate in song or poetry the genealogies of their people (Liverpool, 2001).

As a Trinidadian researcher, I am only now beginning to appreciate the griot culture in my society. I use the term in rather a loose sense to denote the non-literary and oral nature of cultural expression in the Trinidadian context. It came with the enslaved Africans to the West Indies through memories and practices across a fractured history, disseminated through stories and music.

According to Tunde Jegede, a London based composer who now embraces the title, the term griot is historically a cultural figure that is both a musician and a historian. The musical aspect is one that came from the Middle Ages in 13th century Mali, West Africa, during the time of the Mande Empire. The voice, however, was the instrument that chronicled the history and brought with it all the philosophical and rhetorical knowledge. It is, therefore, a hereditary tradition that has come down to the present day through five principal families (Gould, 2012).

Fisher (1987) posits that humanity may best be considered as homo narrans, the animals who tell stories. We cannot help but tell our side of an experience with the intention of passing on something we have learned from it. It could be a cautionary tale to warn the listener to avoid similar pitfalls. It could be to enlighten, to teach a lesson or to share new information. It could be a 'tall-tale' used to improve our stature in the eyes of others. Whatever the motivation, storytelling is an expressive part of human existence. Indeed the story format is as varied as the motivation. As such, stories can be shared through a variety of art forms such as song, dance, poetry, acting, writings, drawings, and paintings. These formats in-turn have influenced how stories are captured for posterity, through books, audio and video recordings, still and moving pictures, live performances and virtual productions.

In the West African experience, however, the main format has been the human individual, to the extent where, as Jegede stated that, "every time a griot dies it's like

a library burning down" (Gould, 2012). To avoid cultural extinction, therefore, these stories need to be retold and passed on to future generations.

1.3   Trinidad's Griot Stories

As the culture of the griot travelled across the Atlantic Ocean from West Africa to the West Indies, it adjusted to the conditions of a distinctly different environment.

As Petillo concluded:

> Due to complex and often traumatic historical processes, the Caribbean region has been shaped as a space of hybridity and creolization, cross-cultural encounter and interracial coexistence. The Caribbean is a highly syncretic place where the heterogeneous and scattered genesis of its population has brought together people of different descent: native Caribs and Amerindians, Africans and Indians, Europeans, Chinese and other Middle-Eastern minorities. Nevertheless, in spite of this ethnic and cultural plurality, the African presence informs the core of the region and gives shape to its innermost identity. (Petillo, 2010, p.2)

In fact, elements of West African linguistic, cultural, artistic and religious practices are still very evident across the Caribbean today. In Trinidad, for instance, the oral tradition of the griot substantially influenced the emergence of various forms of creole-based orature. However, a significant difference was noted in the format of these presentations. These forms were no longer influenced along hereditary lines of designated storytellers but took on a more performative expression of a wider collective of people. A key influencer was the shifting societal dynamic from the noble ruler and loyal subject to the master and the enslaved. According to Liverpool:

> By a complex interplay of ethics and class lines, the Europeans and Africans used their traditions to create masquerades, songs and dances for a variety of reasons and purposes, some aimed at dominance, others aimed at survival, still others merely enjoyed themselves. (Liverpool, 2001, pp.ix)

As the Africans and the creole-born comprised the most populous group on the island, their traditions eventually dominated Trinidad Carnival and were primarily used to resist attempts to oppress and control them by their colonial masters.

1.3.1   The Tradition of Masking

The mask, masking and the masquerade are interlocking aspects of most African celebrations. The significance of this is that masking in Africa suggests spirit-associated transformations whereby the wearers cancel or obliterate their personalities, changing into other human characters and spirits so that they are no longer themselves (Liverpool, 2001).

In the Trinidad Carnival experience masking in the early nineteenth century became a vehicle for escaping the constraints and drudgery of daily existence on the plantation. This escapism, however, later emerged in contemporary times as a demonstration of 'joie de vivre', an outlet for masqueraders to 'free-up' and 'play themselves' (see Figure 1.1).

Figure 1.1

Sailors of Bad Behaviour Type
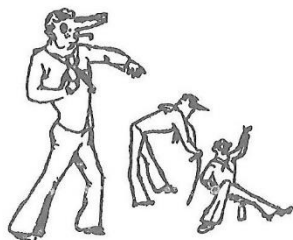
Note. Illustrations of various traditional Carnival characters by the artist Carlyle Chan. From Trinidad Carnival. A republication of the *Caribbean Quarterly, Trinidad Carnival Issue.* Vol.4, Nos. 3&4 of 1956. Paria Publishing Co. Ltd. Reprinted with permission.

Foote describes this expression as representative of a being in pursuit of his 'beingness':

> It marked the beginning of a series of actions that would shift thought, word
> and actions of individuals at that time from the level of nothingness, forced

upon them by the forces of colonialism to a level, to a creative trajectory of freedom that goes beyond merely existing. (Foote, 2005, pp.6-7)

In this context, the history of the Trinidad Carnival is appreciated against the backdrop of African enslavement and resistance from the 1500s, with the coming of the Europeans, to the 1960s when the island gained formal independence. It is indicative of the manner in which the cultural identity of Trinidadians unfolded (Liverpool, 2001).

The Africans who were brought to Trinidad came mainly from the Mandinka, Flube, Kwakwa, Yoruba, Hausa, Igbo and Kongo people. The Yoruba, in particular, brought with them the outstanding masquerade traditions of the *Egungun*, the *Efe/Gelede* and the *Epa/Elefon*. The tradition of the Egungun masquerader, for example, with a penchant for wearing layers of cloths and multiple lappets to protect him from the audience, is recognised today in the Trinidad Pierrot Grenade. Although there has been the influence of the French masque *Pierrot*, the Pierrot Grenade remained deeply West African in terms of its function, which was to parody the elite, stress the power of the word and make fun of the English language (Liverpool, 2001).

Another tradition, adopted from Southwest Nigeria and in neighbouring Benin, was the Gelede masquerade, which paid tribute to mothers who were believed to possess spiritual life force. According to Liverpool (2001), the masquerade included drums, satirical speeches, and female costumes emphasising buttocks and breasts, and dancing in pairs. In Trinidad, this tradition is reflected in the *Dame Lorraine*[1] festival, where satirical verses are sung, dancers appeared in costumes characterised by big breasts and massive buttocks, with a view to mimicking undesirables.

From the Yoruba tradition, the large helmet mask of the Epa festivals portray the celebrations of the return of Ogun, the God of iron and war; or Osanyin, the God of medicine or the trickster God – Eshu, with masqueraders wearing tailed headdresses, as half-red, half-black cocks (see Figure 1.2). All depict superiority and power.

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[1] Dame Lorraine is a French Patois word meaning "Fashionable Lady".

Figure 1.2

Fancy Indian and Fancy Indian Chief
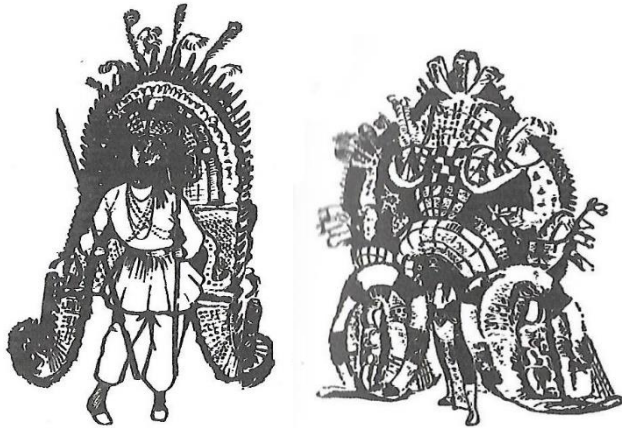
Note. Illustrations of various traditional Carnival characters by the artist Carlyle Chan. From Trinidad Carnival. A republication of the *Caribbean Quarterly, Trinidad Carnival Issue.* Vol.4, Nos. 3&4 of 1956. Paria Publishing Co. Ltd. Reprinted with permission

In Trinidad, by way of the Shango[2] religion, homage is still paid to the Gods of Eshu, Ogun, Osanyin and Elefon, among others. In the early 19th century, the Shango masquerade became very popular among carnival revellers. A significant portrayal, for example, heralded from the *Gagalo* stilt dancers in Iwoye, a Ketu town in West Yoruba country (Liverpool 2001). In Trinidad, they are called *Moko Jumbies* (see Figure 1.3).

In Africa, masqueraders thanked their ancestors, during festivals, for the blessings and provisions received at harvest time and for the New Year. Apart from being entertaining, these events were able to foster community reconciliation, unity and a release from the hard work. In other cases, the performances often seemed brutal, as in the case of the *Ogolo* in their bright patchwork suits who whipped each other mercilessly in a test of endurance.

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[2] Shango is the name given to the religious practices of the Yoruba people in Trinidad. Shango is the God of thunder in the Yoruba pantheon.

In Trinidad, similar practices were recognised in maskers portraying devils and wild Indians (see Figure 1.4) who whipped one another. Additionally, similar to the practices of their ancestors who made fun of the chiefs and their wealth, or ruthlessly satirised them in ragged clothes, oversized genitalia and ridiculous struts, the enslaved in Trinidad similarly satirised their masters in song and dance.

Figure 1.3

Moko Jumbie

Note. Illustrations of various traditional Carnival characters by the artist Carlyle Chan. From Trinidad Carnival. A republication of the *Caribbean Quarterly, Trinidad Carnival Issue.* Vol.4, Nos. 3&4 of 1956. Paria Publishing Co. Ltd. Reprinted with permission

1.3.2   Mas Making and Trinidad Carnival

The Trinidad Carnival is a very intense, creative period in the life of the country, which usually includes:

1. Traditional 'ole mas' characters such as red and blue devils, jab molassie (molasses devil), Pierrot Grenade, bats, and douens[3]
2. Modern-day characters and contemporary themes, which came out of a tradition of 'fancy mas'

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[3] Douens are mythological entities from Trinidad and Tobago folklore. Their most recognised characteristic is their feet, said to be backwards, with the heels facing the front and the knees are backwards.

3. Calypsonians who sing kaiso music that covers a range of topics including politics, social commentary, economic issues and local gossip

4. Steelband music enjoyed through the various stages of the Panorama competition for steelbands across the country

5. Various parades of carnival bands for children and adults, and

6. Large public parties called fetes.

Figure 1.4

Wild Indian and Black Indian Warrior

Note. Illustrations of various traditional Carnival characters by the artist Carlyle Chan. From Trinidad Carnival. A republication of the *Caribbean Quarterly, Trinidad Carnival Issue.* Vol.4, Nos. 3&4 of 1956. Paria Publishing Co. Ltd. Reprinted with permission

In the post-emancipation period, Carnival was influenced by the Cannes Brulèes (burnt canes) processions, later called Canboulay, which involved a ritual burning of cane fields, together with stick fights and dances in the streets, such as bèlè, calinda, and bamboola (Hill, 1993; Liverpool, 2001). In the 1850s, the masquerade involved playing or pretending to be devils variously called jab-jab, jab molassie or molasses, devil dragons, midnight robbers (see Figure 1.5) and Pierrot Grenade which were sophisticated stick fighters (Hill, 1993).

Figure 1.5

Midnight Robbers, Jab Jab, and Jab Molassie

Note. Illustrations of various traditional Carnival characters by the artist Carlyle Chan. From Trinidad Carnival. A republication of the *Caribbean Quarterly, Trinidad Carnival Issue.* Vol.4, Nos. 3&4 of 1956. Paria Publishing Co. Ltd. Reprinted with permission

As society evolved, the nature of the portrayals changed, reflecting the socio-economic dynamics of the different periods (see Figure 1.6). Indeed, according to Foote:

> Carnival is the outpouring of a people's perceptions, images, cognitions, reasonings and emotions interacting with each other under the stimuli of social issues. (Foote, 2005, pp.7)

> Carnival... is a genre that communicates its message quite emphatically through a combination of design, colour, performances and portrayals. (Foote, 2005, pp.44)

Carnival costumes are created in *mas' camps* across the country, at least a year in advance of the annual festival. Designers or bandleaders who coordinate the creative genius of the bands lead these mas' camps. According to Peter Minshall, one of the country's foremost bandleaders:

> Mas occurs as part of the Carnival in Trinidad. To come into being, 'mas' involves conception, design, craft, construction making... Something that

may be twenty feet tall and forty feet wide or as minimal as grease smeared on the skin, two horns, a tail and a pitchfork. (Foote. 2005, pp.51)

Figure 1.6

Fancy Sailor and Fancy Clown

Note. Illustrations of various traditional Carnival characters by the artist Carlyle Chan. From Trinidad Carnival. A republication of the *Caribbean Quarterly, Trinidad Carnival Issue.* Vol.4, Nos. 3&4 of 1956. Paria Publishing Co. Ltd. Reprinted with permission.

To produce the range of costumes for their portrayals, *mas' camps* engage production teams comprising bandleaders, section leaders, researchers, designers, seamstresses, tailors, technology advisers, financial advisers and choreographers.

1.3.3 Calypso

Calypso is an important aspect of the Trinidad Carnival, which represents a significant cultural continuum between Africa and the New World. It is notable that these expressions adopted the West African musical tradition of social commentary, in which praise, blame or derision was conveyed in these songs and folk tales.

Atilla the Hun, a great calypso icon, in his book Atilla's Kaiso[4] stated that:

> Kaiso is a particular form of folksong undeniably African in origin which was brought by the African slaves to the West Indies. Conditioned historically by

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[4] Calypso is also known as Kaiso

its new environment and by French acculturation, the kaiso developed most distinctively in Trinidad into a form of mass art in song and dance uniquely or typically West Indian. (Quevedo, 1983, p.2)

The motivation for singing calypsos closely follows the African tradition of satirical songs, as a means of artistic resistance to exploitation and oppression. Its texts are therefore so satirical and wittily allusive in context, so conversational and informal in tone, so ready in recording historical and political change, which constituted calypsonians raw material, always eager to express a bitter criticism of society and to actively engage in the complex process of moulding Caribbean national identity (Petillo, 2010). It is also based on a counterpoint between individual and community, where the oral tradition demands not only the griot but also the audience to complete the community: the noise and sounds that the maker makes are responded to by the audience and are returned to him (Petillo, 2010). This reflects the call-and-response chants in Trinidad called the *lavways.*

The newspaper effect of calypso is seen when it is used as a medium to filter the events of daily experience, but not as an unbiased rendering, but instead taking a deliberate position on these events. The community therefore receives information on local news and titbits of gossip from the perspective of the calypsonian, creating its own mythological world. The calypsonian becomes Legba, the trickster Yoruban god who serves as intermediary between humans and gods. According to Hill:

> Behind the mask of history, there is social process, the movement of water under the motionless surface of the sea, a drama that instructs us about West Indian social structure. In their songs and in their actions, calypsonians reveal how the Caribbean social system was formed, what it was like to live under British colonial rule, how they developed new and satisfying cultures from patches of older cultures, how they forged an identity, and how they dealt with the stark opposing forces of modern life. (Hill, 1993, p.217)

1.3.4   The Yard

The context in which these genres emerged is set during the preparations for Carnival where calypsos were sung as practice or rehearsals while masquerades got together to make their costumes and to go over their musical routines. As time progressed, the musical performances were separated from the masquerade activity and later confined to a corner of the masquerade camp and covered with a tarpaulin. This was the 'calypso tent', and it was there that the longer, story-like calypsos developed.

This also reflected the significance of 'the yard' in the development of Carnival (see some characters that emerged from the Yard in Figure 1.7). The focal point of the slave's workday life consisted of a triangle made up of the yard, the plantation, and the garden plot where most slaves cultivated their own subsistence. African-derived entertainment took place in the yard. After emancipation, yards became the hub of everyday life and the centre of local activity for denizens of barrack houses in urban Port-of-Spain[5]. Yards were for chores, socialising, for other diversions and for rituals (Hill, 1993).

Thereafter, Africans and Creoles formed voluntary associations, some of which evolved into stick fighters' bands and other Carnival groups. Eventually social unions emerged which were the forerunners of the carnival bands of today. Chantwells or kaisonians were often attached to particular carnival bands (Quevedo, 1983).

The yard is significant to this study because the virtual reproduction of its cultural events, such as the Dame Lorraine Ball, was the subject of the empirical work, undertaken with the University of the West Indies (UWI) Department of Creative and Festival Arts (DCFA) production called *The Old Yard.*

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[5] Port-of-Spain is the capital of Trinidad and Tobago.
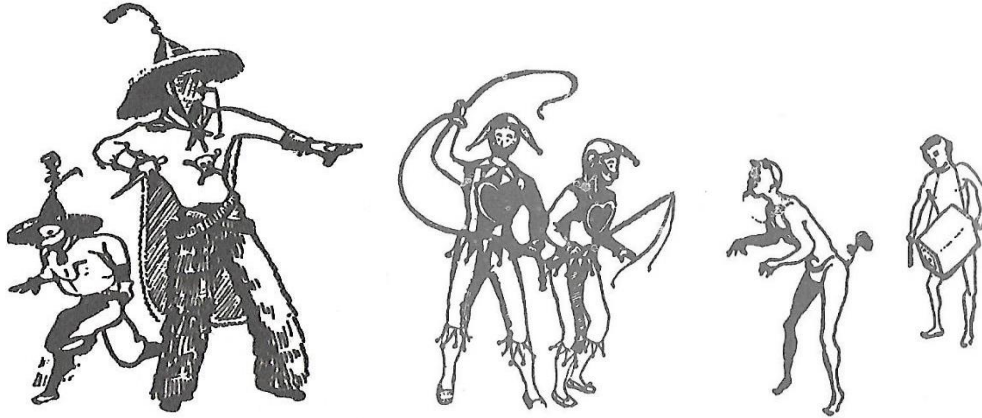
Figure 1.7

Bats and Baby Dolls

Note. Illustrations of various traditional Carnival characters by the artist Carlyle Chan. From Trinidad Carnival. A republication of the *Caribbean Quarterly, Trinidad Carnival Issue.* Vol.4, Nos. 3&4 of 1956. Paria Publishing Co. Ltd. Reprinted with permission

1.3.5 Steelband music

With music being an integral part of community life, it was inevitable that when efforts were attempted to control the rowdy spirits of the proletariat by outlawing the African drum, that suitable alternatives were quickly found. The first innovation was the tamboo bamboo (tambour bamboo – bamboo drum) which was struck and stamped on the ground to make sound. These bands took over the carnival celebrations by the early twentieth century. They came out onto the streets for Carnival, beginning with J'Ouvert (*Jour Ouvert* – "break of day") early Monday morning, to open the festivities (see Figure 1.8).

Eventually the use of bamboo declined and full metal bands developed by the 1940s. Through experimentation and trial and error, it was discovered that the bottoms of the oil drums could be pounded into different forms (convex and then concave) and different musical tones could be played on these surfaces.

Figure 1.8

J'Ouvert

Note. Illustrations of various traditional Carnival characters by the artist Carlyle Chan. From Trinidad Carnival. A republication of the *Caribbean Quarterly, Trinidad Carnival Issue.* Vol.4, Nos. 3&4 of 1956. Paria Publishing Co. Ltd. Reprinted with permission

This led to the birth of the steelband, the details of which were only captured through the oral accounts of key players and innovators. No known recordings of steelbands were made before the early 1950s, by which time the ensembles were already quite developed.

According to Hill (1993), changes in the instrumentation that accompanied calypso were key to the changing function of the music. The steelband now required new sorts of calypsos, and so the lavways and calindas gave way to *road marches.*

1.4   Conclusion

The Trinidad Carnival, in reviewing its evolution, has been:

> Simultaneously a commentary, a parade, a catharsis of the changing human condition across time documented and sung, as portrayed as calypso, masquerade and energised through steelband music. (Foote, 2005, pp.174)

The Carnival is therefore a unique form of communication that captures and retells the history, politics and socio-economic issues of the Trinidadian people performativity through visual and oral means (see Figure 1.9 for a Carnival character

influenced by the East Indian heritage). Even if people do not actively participate in the festivities, the Carnival is able to spark parallel developments of human thought and behaviour that make it possible for Trinidadians to create their own post-colonial discursive spaces.

Figure 1.9

Soumayree - East Indian Burroquite

Note. Illustrations of various traditional Carnival characters by the artist Carlyle Chan. From Trinidad Carnival. A republication of the *Caribbean Quarterly, Trinidad Carnival Issue.* Vol.4, Nos. 3&4 of 1956. Paria Publishing Co. Ltd. Reprinted with permission

In my contemporary environment, I now feel challenged to pass on an understanding of these traditions to future generations. However, I wonder whether the essence of this culture can be effectively captured for retelling through new technologies. In coming to a conclusion, the thesis therefore focusses on exploring whether new communication technologies, such as Virtual Reality (VR), can do it justice and what are the most effective means of telling these stories with new technology.

This research is significant to providing new insights into how the stories of expressive cultures, such as Trinidad Carnival, can continue to be consumed and appreciated in new ways that better connect new audiences to the context.

Chapter 2 - Review of the Literature

2.0   The Problem Statement - Shifting Paradigms

The introduction to the Caribbean Storytelling experience as exemplified by the Trinidad Carnival in Chapter 1 sets the stage for a deeper investigation of the storytelling art form in an evolving context. The centuries old storytelling art form has often followed a linear format, which has been manageable for the storyteller. The problem, however, is that the modern digital era has brought with it a number of innovations and enhancements to the art form, for example, through image synthesis, digital special effects, human-computer interfaces and ubiquitous Internet access, that are making the traditional format less manageable.

New applications such as video games and virtual environments now support multi-user interactive story experiences which require more complicated narrative formats. In these virtual spaces, there are now new tools that can capture and interactively modify the environment and provide sensory feedback to the participant. This has opened possibilities for the creation and non-linear manipulation of almost any story form in real time. Additionally, the learning experiences in these virtual environments are becoming more open-ended, exploratory and experiential, which has made it difficult to apply classical instructional design approaches to creating these environments. These developments are therefore complicating the art of storytelling.

In the face of these new technology developments, I proffer the need for a new art form to emerge, which can take full advantage of the new affordances. This chapter, as such, starts its investigation of the paradigm shift by seeking out the elements that constitute the language of storytelling in virtual environments. The chapter explores the Caribbean experience to identify the new paradigm in this context. With an understanding of this concept, the focus of the chapter then shifts to the media that support the paradigm shift. The ultimate aim is to interrogate how the psychophysical affordance facilitated by these new technologies, such as immersion, interactivity, presence and agency, are transforming the storytelling experience.

In this study, I use the term storymaking to represent the process of constructing meaning through authoring narratives that can elicit actions from participants, which in turn expands the story through their experiences. I am, as such, interested in finding points of intersection in virtual reality environments between the art of storytelling and participant interactions that contribute to memory.

2.1 Storymaking – The Caribbean Perspective

> The plot of Caribbean story follows the logic of a narrative historicism in which our people have expressed their subjectivity in historical agency that promotes justice and human flourishing. (Samuel, 2013, p.169)

I use this as the starting point for exploring the concept of storymaking in the Caribbean context, which can be described as the narrative historicism of the Griot (story) now incarnate in the social praxis that is Trinidad Carnival (making). It is said that the Carnival conveys the story Trinidadians tell themselves about themselves. A story of survival, creativity and possibility, which is not primarily to be read in historical archives, nor even in the works of regional poets or novelists. It is to be appreciated through the lives of the people who have found ways to piece together a hybrid existence with competing cultural influences. It is a counter-narrative to the forces of colonialism that the newly formed Caribbean people were challenged to re-imagine and re-story as a displaced identity.

This narrative ethos is three-dimensional. According to Samuel (2013), it was formed by the confluence of narratives at the communal level, which socialised Caribbean people to the ethical and social norms of colonial life. At the personal level, from life stories of tragedy and triumph, displacement and resettling, death and life, darkness and hope, stories of faith and cultural exemplars. In addition, at the practical level, in the daily actions, practices and discourses that embodied the life stories of people (such as the opportunities to dance, sing, worship and cultivate the land).

In these dramas of being, the human body has taken centre stage, an influence that Jennings (2010) traces back to the impact on the enslaved identity after being removed from their native land. He writes:

> The central effect of the loss of the earth as an identity signifier was that native identities, tribal, communal, familial, and spatial, were constricted to simply their bodies, leaving behind the very ground that enables and facilitates the articulation of identity. (Jennings, 2010, p.43)

As such, according to Samuel (2013), the Caribbean body harbours the memory of centuries of oppression and survival, not only the personal body but also the social Caribbean body as well. This therefore introduces the element of the embodiment of stories to the art form of storymaking. In fact, the praxis of Carnival, which I categorise as the 'making' part of the storymaking, is primarily the personal and social body's release from the ideological and institutional fetters that have constrained it to a role of subservience and inferiority. It celebrates 'beingness', a withdrawal from the humdrum of daily living to re-member and re-story oneself into a primordial vision of authentic being. Beddoe (1990) called it identity formation and restoration through the power of celebrating one's embodiment.

Peter Minshall, 'masman' extraordinaire, contributes an animated expression of this perspective during an interview with Schechner and Riggio (1998):

> I have the knowledge through the mas', having watched it ever since I was a little boy, that if you give a person a cloth, a robe, that extends from wrist to wrist, and you play the music, look at me [Minshall extends his arms as if to show off his "robes"], this is going to happen. If you give a person another piece of cloth with two sticks on it, it is going to happen. [Minshall waves his arms as though they are wings.] We have our own body language here, our own rhythm. (p.187)

Caribbean people have therefore found a way to thrive through a spirit of celebration, resilience, survival and praise. To move with grace against all odds is an eloquent reference to the creative praxis of the people to return to a vision of nobility and dignity through ritual festivity (Samuel, 2013).

According to Schechner and Riggio (1998), Minshall stated that words and paintings cannot convey this, after he recounted the story of the first of his trilogy mas'

presentations, *The River* which is featured in Chapter 3. What Minshall was alluding to is that when it comes to Trinidad Carnival, you just have to experience it to understand it. You have to be immersed in it to truly appreciate it. Traditional storytelling art forms do it little justice.

As such, in seeking a contemporaneous approach to experiencing these stories, one must find ways to put yourself into the story so that you can observe certain events, possibly undergo certain feelings or even perform certain actions that may alter or contribute to your knowledge and opinions. The range of emerging communication technologies that can possibly support this goal is what I call 'experience media', which draws on techniques and theories from diverse fields including optometry, photography, psychology, ludology, narratology, filmmaking, neuroscience and computer science, to create a first-person experience for a user.

2.2   Storymaking with Experience Media

According to Murray (2017), the core medium of experience media is the computer, which offers a user special possibilities for storytelling that are continuous with older traditions but promises new expressive power:

> Everything made out of bits belongs to a single new medium, with its own affordances that can be used for creating new forms of narrative, just as film was a new medium with its own expressive affordances rather than just an extension of live theatre. (Murray, 2017, p.113)

It is anticipated, however, that cultural practices and values will be disrupted as the media ecology is reconfigured by the advent of these new interactive works (Murray, 2017). It is reassuring to note that Murray foresees that:

> Just as the computer promises to reshape knowledge in ways that sometimes, complement and sometimes supersede the work of the book and the lecture hall, so too does it promise to reshape the spectrum of narrative expression, not by replacing the novel or the movie but by continuing their timeless bardic work within another framework. (Murray, 2017, p.10)

Scientists, therefore, have been experimenting with devices to simulate first-person immersive experiences as far back as the early 1800s, through binocular depth perception (Brooks, 2017). It was found that when two pictures simulating left-eye and right-eye views of the same object were presented, so that each eye sees only the image designed for it, but apparently in the same location, the brain will fuse the two and accept them as a view of one solid three-dimensional object (Parker, 2007). Early contributors to what was called the stereoscope include Sir Charles Wheatstone (Wade, 2002) and Sir David Brewster (Brewster, 1856). In fact, the stereoscope is the forerunner to the popular toy that Baby Boomers got in their Christmas stocking in the mid-20th century called the View-Master, with its rotating cardboard disks containing attractive world images.

The physical structure of the stereoscope is today clearly recognisable in the Head Mounted Displays (HMDs) of Virtual Reality media. According to Martirosov and Kopeček (2017), a notable pioneer was Morton L. Heilig (1926-1997), often called the father of Virtual Reality. Heilig developed the Sensorama, which was patented in 1962. Heilig described it as Experience Theatre, which engaged a user's sense of sight, sound, smell and touch while watching selected short films (Rome, 2019). He later worked on an apparatus for individual use called the Telesphere Mask, which gave the user a complete sensation of reality, i.e., moving three-dimensional images, which may be in colour, with 100% peripheral vision, binaural sound, scents and air breezes (Rome, 2019).

In 1968, computer scientist, Ivan Sutherland created the first head-mounted display that rendered images for the viewer's changing pose, as sensed by The Sword of Damocles, a the mechanical tracking system. This was widely considered as the first augmented reality HMD system (Sutherland, 1968).

The Google Cardboard, which is essentially a stereoscope made from cardboard, was released in 2014. The viewing apparatus is a low-cost system to encourage interest and development in VR applications. It easily folds together to create the stereoscope (lenses included). A smartphone can be inserted at the back of the viewer to view 360° content accessible by running Cardboard compatible mobile apps

on the smartphone. The affordability of the Google Cardboard therefore took the immersive experience of VR out of the research laboratories and into the hands of the average user (Yoo & Parker, 2015).

Mattel later announced in February 2015 a collaboration with Google that produced the View-Master Virtual Reality Viewer, which also used smartphones. Between 2014 and 2017, companies like Oculus, Google and Facebook (now called Meta) were able to support these immersive technologies with large cloud-based platforms, such as YouTube and Vimeo, to facilitate the display of 360° videos uploaded by independent creators.

As these experience media become more and more prevalent, the question then is - what are the characteristics of these devices that are most significant to the storytelling process?

2.3   Characteristics of Experience Media

Benítez de Garcia and Herrera Demas (2019) are of the view that these immersive technologies have in fact fostered the appearance of a new kind of storytelling. This is where users are placed in the centre of a spherical setting to offer first-person viewpoints that can be controlled by users turning their heads to follow the activities in the setting. The movement of the head or device changes the user's field of view (FOV).

Vosmeer and Schouten (2014) characterised this as a lean-in medium that turns the viewer into an active observer compared to a passive participant of, for example, traditional video. The stereoscope viewer is what allows for a feeling of immersion in the three-dimensional drama or story. This representation is supported by the use of aesthetic and interactive narrative resources, which constitute the action between the user and the story (Domínguez, 2010).

To understand what advantages this narrative format can provide, there is a need therefore to look more closely at the characteristics it embodies to judge in what ways they are extensions of older narrative traditions and in what ways they

introduce new affordances. The four main characteristics to be explored are immersion, presence, interactivity and agency.

2.3.1 Immersion

When Janet Murray writes about immersion, she stresses that immersion is about the sensation of being surrounded by a completely other reality that takes over all of our attention, our whole perceptual apparatus, such that participation in this new reality involves learning to do the things that the new environment makes possible (Ceuterick & Ingraham, 2021).

In the Lewis Carrol classic, Alice's Adventures in Wonderland, Alice falls down the hole of the White Rabbit and enters a strange and absurd alternate universe called Wonderland. This to me is an excellent illustration of the immersion effect, where you perceive that your body is no longer in the current reality but in a new space that feels just as real and where you can carry over normal bodily conventions from the "real" world. Of course, this is made possible by the technology, hardware, and objective qualities of the VR system (Slater, 2003).

There is also a psychological aspect, a pleasurable surrender of the mind to an imaginative world often described, in Coleridge's phrase, as the "willing suspension of disbelief"[6] (Murray, 2017), a state in which the mind forgets that it is being subjected to entertainment and instead accepts what is perceived as reality (Laramée, 2002). In fact, Arjoranta et al. (2021) prefer to refer this effect to the phenomenological concept of bracketing, which is temporarily setting aside the assumed objective reality. However, Murray feels this is too passive a formulation because:

> When we enter a fictional world, we do not merely suspend a critical faculty; we also exercise a creative faculty. We do not suspend disbelief so much as we actively create belief... we use our intelligence to reinforce rather than question the reality of the experience. (Murray, 2017, p.136)

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[6] A term coined in 1817 by the poet and aesthetic philosopher **Samuel Taylor Coleridge**, who suggested that if a writer could infuse a *"human interest and a semblance of truth"* into a fantastic tale, the reader would suspend judgment concerning the implausibility of the narrative.

Mateer (2017) indicated that by establishing the rules of presentation early enables audiences to understand how to interpret what they are experiencing. Not only in terms of look, sound and style but also in the handling of physical impossibilities, for example, that it is possible for people to fly, to walk through walls, or to hear the thoughts of others.

Technical immersion is accomplished through cues to direct the viewer's attention and cues to acknowledge the viewer as a part of the virtual environment. Examples of how this is achieved, for instance, are when a character acknowledges the viewer through looks, gestures, and words directed towards the camera (Sheikh et al., 2016, p.1). The representation of the viewer, as a visible and virtual body, can also enhance the feeling of being present in the story world (Slater & Usoh, 1999).

Narrative immersion, on the other hand, is influenced by the setting, as well as by the interplay of story, characters, and viewer integration (Elmezeny et al., 2018). The focus is on the influence of a story's content and structure on the viewer. According to Ryan (2015), there are four dimensions of narrative immersion:

1. *Spatial immersion,* which looks at setting, place and time of the story, as well as the composition of the world. This is essential for presenting viewers with a virtual environment (VE) in which they can feel present. Mostly, it is a visual aspect and shows the place and time of a story. In addition, other elements of the narrative, like characters' dialogues or actions, can be used to determine or confirm the time, place, or rules of the story world.

2. *Temporal immersion,* which deals with the structure of the plot, including generating suspense, the focus of the story (character, plot or place-driven), the genre itself, and the expectations linked with it. Therefore, typical structures from traditional storytelling are part of temporal immersion, like foreshadowing upcoming events, or the hero's journey.

3. *Spatio-temporal immersion,* which is influenced by narrative perspective and the integration of the audience within the story. Deictic cues are often used to emphasise the presence of the viewer's character within the story world. By including the viewer in both the VE and other characters' narratives,

spatio-temporal immersion manifests itself.

4. *Emotional immersion*, which deals with the feelings a story elicits in the recipient. The viewer's integration within the narrative, and relationship to other characters, links spatio-temporal immersion closely to emotional immersion, with the latter determined through characters, conflicts, and the video's mood (Ryan, 2015, pp.106-114). Emotional immersion can also be influenced by temporal immersion in that it is driven by conflicts between characters or consequences of the character's actions (Elmezeny et al., 2018, pp.5-6).

2.3.2 Presence

While the experiences of immersion and presence in VR are closely linked and sometimes referred to as the same thing, there is a difference between the two. The distinction proposed by Slater and Wilbur (1997) is that between presence and immersion, immersion is an objective description of aspects of the system such as field of view and display resolution, while presence is a subjective phenomenon such as the sensation of being in a VE.

I, however, favour Heeter and Allbritton's (2015) neurobiological perspective, which goes beyond the current discourse of VR scholars. The view is that a sense of presence happens at the mental and corporeal levels, where the human brain and body work together to experience and evaluate emotion and thought, to create a felt sense of presence. As such, while virtual worlds replace what one or more of our senses (usually ears and eyes) can perceive with designed stimuli, it is our human system, body and mind, which has the experience. Heeter and Allbritton (2015) explained that the external stimuli of VR are, as such, components of a much larger integrative system of experiences that is deeply grounded in bodily sensations. As such, visual and auditory sensory inputs are integrated with current bodily sensations and bring about new bodily sensations that reflect thoughts and emotions. According to Craig (2014), this dynamic process produces our subjective feeling of the moment. Therefore, as humans, our bodies become the lens through which we experience life (Heeter & Allbritton, 2015).

Presence researchers, however, typically conceptualise presence in virtual worlds as a successful illusion. According to McMahan (2003), presence is "the artificial sense that a user has in a virtual environment that the environment is unmediated" (pp.72-73). User characteristics (Heeter, 1992) and technology design characteristics contribute to this illusion (Slater, 1999; Slater & Wilbur, 1997). McMahan (2003) further explains that it is characterised as a complex phenomenon involving a set of dimensions including:

1. The quality of social interaction,
2. Realism in the environment,
3. The effect of transportation and immersiveness generated by the interface, and
4. The user's ability to accomplish significant actions within the environment, and respond to the computer as an intelligent, social agent.

Depending on the presence or absence of, and interplay between, these dimensions, the environments and experiences can vary greatly. However, all of the dimensions are said to share the perceptual illusion of non-mediation.

The outcome of this illusion, according to Slater et al. (1999), is that a person remembers the virtual environment as a place rather than a set of pictures. As such, presence as discussed in the literature related to immersive VR can be characterised by the concept of transportation. That is, people are usually considered "present" in an immersive VR when they report a sensation of being in the virtual world. Almost every theory on presence therefore refers to the subjective sensation of "being there" experienced and reported during immersion in a VE, and this sensation is in fact part of most definitions of presence (Schuemie et al., 2001).

2.3.3 Interactivity

Louchart (2007) sounded the warning that interaction in stories requires a major rethink about the way in which narrative media is approached, mainly due to the presence of the user in the story world. This had not been an issue in previous narrative formats and, in fact, according to Ryan (2005), interactivity in novels and

films tends to break immersion because it draws attention to the medium itself. In contrast, VR utilises interactivity to deepen the sense of immersion because the user is encouraged to be part of the story, to participate in the drama and not passively consume it (Google News Lab, 2017).

In order to create meaningful actions, however, an understanding of the mechanisms related to interactivity and their use in achieving narrative coherence takes precedence over an overall plot or story structure (Louchart, 2007).

Ryan (2005) therefore focused on the perspective of the user and identified a dichotomy between internal versus external interactivity due to the presence of the user within the story world. The internal perspective involves the user as a player or character in the story, while the external involves the user experiencing a god-like point of view on the environment. Ryan was able to identify the following four main types of interactions where the role and interactive potential of the users vary dramatically:

1. Ontological - user decisions affect the plot,
2. Exploratory - user decisions do not affect the plot,
3. Internal - user is part of the story,
4. External - user is not a part of the story (see Figure 2.1).

In considering the user's interaction with the story world, attention focuses on whether the role is limited to observational functionalities or whether there is an effect on the unfolding drama. In the former, Ryan categorises the effect as exploratory, while in the later it is considered ontological. Interactivity is seen as the extent to which users can participate in modifying the form and content of a mediated environment in real time (Schuemie, 2001, p.184).

Figure 2.1

A Representation of Ryan's Interactivity Classification
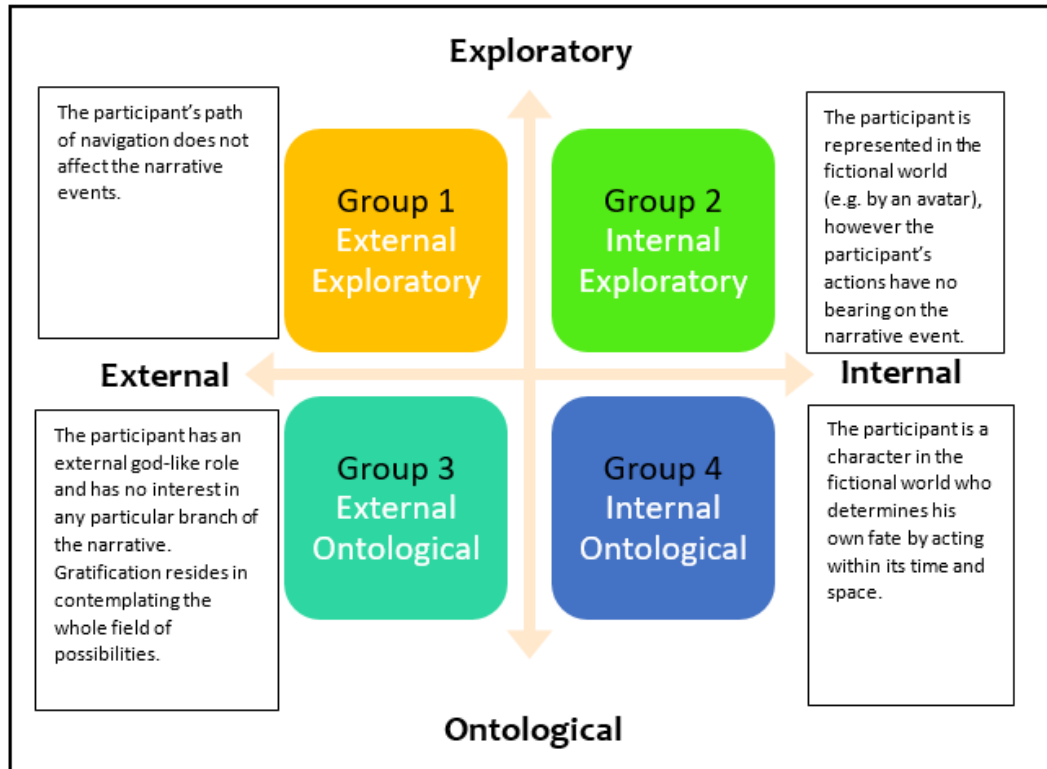
Note. Ryan distinguishes four strategic forms of interactivity based on two binary pairs: internal/external and exploratory/ontological. This is a graphical representation of Ryan's classification, which was first presented in a paper at the 2001 Computer Games & Digital Textualities conference in Copenhagen. (Ryan 2001). The figure is the author's own work.

Where the application allows the participant to freely explore the experience, however, this neither affects the story nor the order of presentation; Ryan catergorises this as **Group1: *External-Exploratory Interactivity*.** When the participant is allowed to take a virtual body into the fictional world, however, this role is limited to actions that have no bearing on narrative events; this conforms to **Group 2: *Internal-Exploratory Interactivity*.** The participant in this case is able to exercise agency through movement in the virtual space, the ability to select or pick up objects or experience the narrative from different points of view (Ryan 2001).

Group 3: External-Ontological Interactivity confers an omnipotent god-like role to

participants. From a position external to the time and space of the fictional world, the participant can make decisions that can alter the story environment. This activity is seen as similar to the operation of a simulation system (Ryan 2001).

In **Group 4: *Internal-Ontological Interactivity*,** the participant is cast as a character where the interaction between the participant and the fictional world produces a new life and a new life-story with every run of the system.

Ryan's Interactivity Classification proved useful to this study when an actual virtual experience was developed for an empirical examination of the storymaking process. Based on the classification's definitions, the interactivity of this application was similar to *Group 2: Internal Exploratory*.

With respect to the mechanics of interaction, Bowman and Hodges (1999) define interactions within VEs as concerned with three main task categories: viewpoint motion control (navigation), selection, and manipulation. In viewpoint motion control, key aspects that can guide a viewer include: choosing the frame by looking around in a very natural way; through interactive scene changes, for example, selecting hot spots that easily "teleport" users to new locations; and including interactive cues within scenes to draw a user's attention, e.g., a ringing telephone (Rothe et al., 2019).

Selection and manipulation techniques, on the other hand, are classified into six interaction metaphors. La Viola et al. (2017), describe these metaphors as: grasping (e.g., using a virtual hand); pointing (e.g., ray-casting); surface (e.g., using a 2D multi-touch surface); indirect (e.g., the ray-cast selects then performs additional multi-touch gestures to modify without directly selecting the object of interest); bimanual (using two hands to interact); and hybrid (interaction technique changes depending on context of selection) (Scavarelli et al., 2021).

From this discourse, it is evident therefore that interactivity has different degrees of engagement. Based on the user's role in the story world, interactions can be limited, medium and high. Limited interaction means that the user influences none to insignificant parts in the story. In medium interaction, the user influences a whole

level of the story, while with high interaction, the user can influence all the story levels (Sharaha, 2016).

2.3.4 Agency

The final characteristic reviewed is agency. Agency is described as the satisfying power to take meaningful action and see the results of your decision or choices in the story world (Murray, 2017). This happens when the shaping of the interactor's behaviour and the computer's behaviour in the story fit well together. This requires two kinds of scripting – coding the actions of the digital system and cueing the actions of the interactor.

One form of agency, which is characteristic of digital environments, is spatial navigation, which is the ability to move through the virtual landscape. There is also dramatic agency that occurs when the action is motivated by something in the story and where the response provides a reward in some appropriate way.

However, activity alone is not agency. Agency also refers to the realm of possible options that the interactor has that can determine the course of the story.

2.4 Conclusion

In concluding this review of the literature, the research was able to gain useful insights from the Caribbean experience, which revealed that the concept of embodiment is significant in the transition from the teller-listener to the builder-participant paradigm. The story is no longer told but instead experienced by the participant. In a sense, the Caribbean experience exemplified this shift, where the narrative historicism of the Griot was replaced by the immersive praxis of Trinidad Carnival.

To capitalise on the shift in paradigms, scientists began experimenting with devices that could simulate putting the person into the experience through the manipulation of visual, auditory and haptic feedback. The most significant device, to date, is the Head Mounted Display, which manipulates left and right eye viewpoints to facilitate a three-dimensional experience.

The experience of being in the story in-turn engendered new affordances for participants. These affordances included the characteristics of immersion, presence, interactivity and agency that allow for the creation of a storyscape that is both procedural and participatory. These stories are experienced through the execution of a series of rules that allow for the realisation of complex, contingent behaviours.

The question now is how do we go about creating these stories? How does one write procedurally or cater for the actions of the participants? Are there rules that support how events occur in the story or allow the exploration of the storyline from different perspectives?

Saschka Unseld, head of Oculus Story Studio, sees that a lot more work is needed on the grammar of 3D interactive storytelling (Unseld, 2015). Unseld would like people to experience virtual worlds directly, with characters who interact with us in real time. These stories are to be told through our senses.

In formulating possible approaches to address these questions and aspirations, the next chapter therefore starts with an examination of how stories are being told in emerging virtual environments. Narrative structures and how they can facilitate new conventions for the future of storytelling are examined. Narrative is placed at the centre of this investigation as it is seen as an essential criterion in the creation of authentic experiences. The Caribbean Story is therefore revisited to examine how narrative can effectively activate corporeal participation and thereto embodiment in a story.

Chapter 3 - The Core Construct

3.1   The Future of Storytelling - "We want to live inside our stories again"

The previous chapter provided an insight into the range of opportunities offered for the telling of stories with evolving VR technologies. From the devices that support human to computer interface, to the new characteristics of experience media which support interactivity in stories, there is likely to be a shift in how stories are told in virtual environments.   This chapter delves in more depth into the core construct of the research, which is that the future of storytelling requires a new art form. The purpose of the research is to uncover what approaches could contribute to this emerging art form.

Wesch's (2015) closing statement in a 5-minute video presentation called *Unboxing Stories,* – "we want to live inside our stories again" - signals a future direction for storytelling. Wesch expressed the view that our evolution from a literate culture to a digital one can return us to collaborative storytelling, resulting in a more engaged, participatory, and connected society.

As we grapple with such poignant issues, the Future of Storytelling (FoST) community sees that the more important question is, as technologies continue to evolve - how will we create, share and experience the most fundamental unit of human culture – the story?

In a video interview (FoST, 2016), Charlie Melcher, Founder and Director of FoST, expressed the view that we are now living in the Golden Age of Storytelling. For Melcher, the paradigm shift that we must come to terms with is what he calls the Age of Immersion.   He stated that we are moving into a period where people have a desire to become the heroes of their own adventures, they want to be a part of the story. According to Murray (2017), our age-old desire to live out our fantasies aroused by fictional worlds have been intensified by a participatory, immersive medium that promises to satisfy it more completely than has ever before been possible.

So, whereas traditional screen grammar encourages the viewer to engage and identify with one or more characters existing within the narrative from a safe

distance, with VR, viewers may find that they are a character who exists within the 360° story world as either silent witness, participant or protagonist. Many Cinematic VR (CVR) works have adopted the first-person storytelling technique so that the viewer can become part of the events that unfold. This approach results in a significantly different emotional journey and relationship with characters and objects than that offered by traditional filmmaking (Dooley, 2020). In fact, as mentioned previously, VR offers the following three unique elements to the narrative - immersion, presence, and embodiment (Dooley, 2020).

Murray (2017) reminds us, however, that narrative traditions do not arise unexpectedly:

> A particular technology of communication – the printing press, the movie camera, the radio – may startle us when it first arrives on the scene, but the traditions of storytelling are continuous and feed into one another both in content and in form. (Murray, 2017, pp.34-35)

With digital technologies, the narrative serves as a threshold experience between our external realities and our own minds. Because the liminal trance is so inherently fragile, narrative art forms have developed conventions to sustain them (Murray, 2017, p.126).

In the formation of new conventions for VR experiences, narrative mediation may be important. Ricoeur's (1977) narrative hermeneutics provides a useful starting point as the goal of interpretation enables us to make sense of our embodied existence, real or virtual, with others including our predecessors and successors in the world.

Although Ricoeur (1977) did not produce a general theory of interpretation, he provided insights into the interplay of thought, discourse and expressive action in the transformation of human understanding. His work in the area of Narrative Identity, in particular, revealed that individuals form an identity by integrating their life experiences into an internalised, evolving story of the self that provides the individual with a sense of unity and purpose in life. This life narrative integrates one's reconstructed past, perceived present, and imagined future. Furthermore, this narrative is a story – it has characters, episodes, imagery, a setting, plots, and themes

and often follows the traditional model of a story, having a beginning (initiating event), middle (an attempt and a consequence), and an end (denouement). This feeds into the creation of storied experiences, biographies, practices and rituals to bring ones social context and personal story into clarity, to engage the imagination, and thus to beckon to an alternate (or more substantial) vision of that context and story (Samuel, 2003). According to Ricoeur (1997), this self-relationship is essentially one of active interpretation, rather than fully autonomous self-authoring.

This hermeneutic phenomenological human subject emerges, for Ricoeur (1997), essentially through narrative. "Narrative" means more than simply a story here; narrative refers to the way that humans experience time, in terms of the way we understand our future potentialities, as well as the way we mentally organise our sense of the past.

Ricoeur (1997) takes as his paradigm Aristotle's (2016) definition of narrative as the imitation of an action. The central feature of narrative is emplotment (muthos), the imaginative ordering of the diverse elements of human acting and suffering into a structure that has a beginning, a middle and an end.

Murray (2017) concludes, therefore, that:

> To be alive in the twentieth century is to be aware of our alternative possible selves, of alternative possible worlds, and of the limitless intersecting stories of the actual world. To capture such a constantly bifurcating plotline, however, one would need more than a thick labyrinthine novel or a sequence of films. To truly capture such cascading permutations, one would need a computer. (Murray, 2017, p.4)

3.2   A Narrative Format for VR Storytelling

Grambart (2015)[7] articulated the question "what is the secret to telling a good story in VR?" His answer was, "to tell a good story". In other words, the VR medium relies on the same storytelling principles as other narrative screen media (Dooley, 2017). As such, the first concept is that of the story itself. Story is defined as any account of a

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series of related events or experiences, whether nonfictional (e.g., memoir, biography, news report, documentary, travelogue) or fictional (e.g., fairy tale, fable, legend, thriller). The ways in which the story is shared is the narrative, which may include a sequence of written or spoken words, still, or moving images, or a combination of these. The order of arrangement of the events in the story is called the plot. Greek philosopher Aristotle (2016) contributed to the concept of plot by stating that a play should imitate a single whole action, which has a beginning, middle and end.

Todorova and Weinstein's (1969) Structural Analysis of Narrative, purports that each narrative is characterised by a three-part structure that allows the narrative to progress. At the beginning, there is the establishment of equilibrium, a state of non-conflict. This is then followed by a disruption to this state, which may be caused by external events. Finally, there is a restoration or a return to equilibrium or the conclusion. This sequence forms a dramatic arc known as Freytag's pyramid (see Figure 3.1) with its associated seven-step framework that inspires good storytelling. Chey (2021) describes these seven steps as:

1. **Exposition:** The storyteller sets the scene and the character's background.
2. **Inciting Incident:** The character reacts to something that has happened, and it starts a chain reaction of events.
3. **Rising Action:** The story builds. There is often a **complication,** which means the problem the character tried to solve gets more complex.
4. **Climax:** The story reaches the point of greatest tension between the protagonist and antagonist (or if there is only one main character, the darkness or lightness of that character appears to take control).
5. **Falling Action:** The story shifts to action that happens because of the climax, which can also contain a reversal (when the character shows how he has changed by events of the climax).
6. **Resolution:** The character solves the problem or conflict.
7. **Denouement:** French for "the ending," the denouement is often happy if it is a comedy, and dark and sad if it is a tragedy. (Chey, 2021)

When we are told a story, therefore, we want it to have some chronological order

and an unfolding of events that hints at an overarching meaning to the story. Intrinsically, the story arc helps us to feel sympathy for a character. It asks the audience to live in the character's story world and feel the complexity of his problems.

Figure 3.1

Freytag's Pyramid
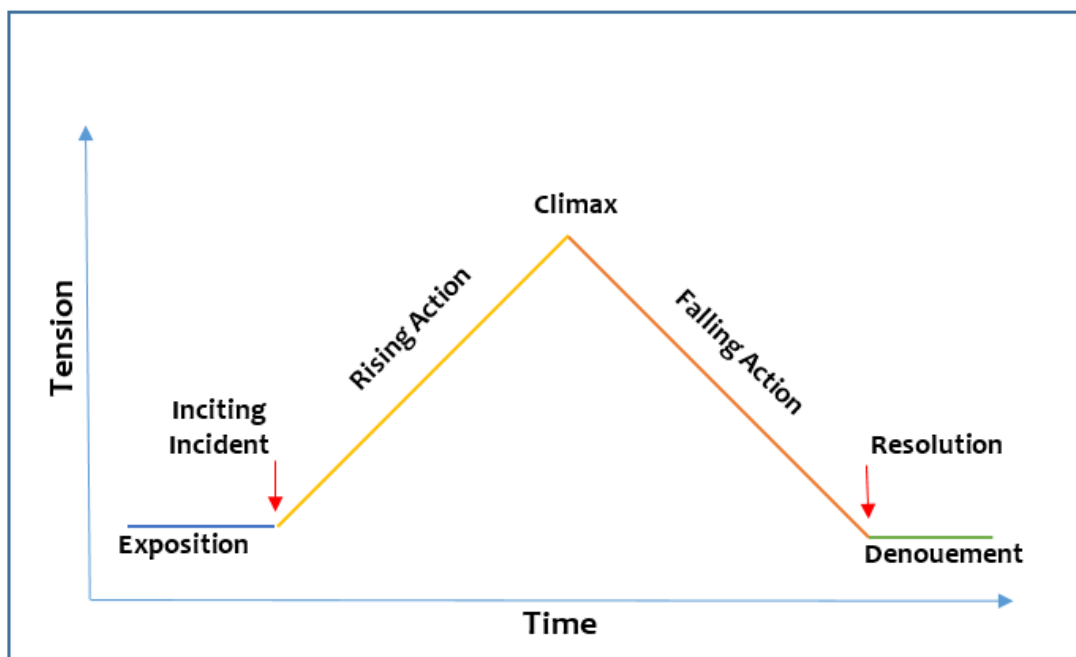
Note. Freytag's pyramid, also known as the dramatic arc, showing a seven-part story structure with rising and falling tension over time. The figure is the author's own work.

If the dramatic arc happens to the characters in the story, what happens to the storyline when you become a part of the action? VR researchers and developers have been grappling with this fundamental question. Having been accustomed to the narrative conventions of existing media, it is only natural to use the grammar of the silver screen or the novel to find answers to this question. This tendency has happened before, as noted by Aylett and Louchart (2003), who saw that just as narrative in film was originally seen through the lens of narrative in the novel, so there is a tendency to consider narrative in VR in relation to film or television, or to even earlier narrative theories.

What is evident from this experience, however, is that as the medium changes the nature of the story changes. For some people the film adaptation of a best-seller never lives up to the actual written work or the song without a music video would not be as popular. The narrative therefore has to be told, shown or experienced in a way that is suitable to the medium in order to take advantage of opportunities that may contribute to a more satisfying expression of ideas.

This is why Aylett and Louchart (2003) concluded:

> VR should be considered as a specific narrative medium alongside other narrative forms such as theatre, literature or cinema. Each of these presents particularities that differentiate them from each other and determines their relative narrative forms, means of communication and displays of content in relation to story. (Aylett & Louchart, 2003, p.2)

Researchers such as Meyer (1995) have noted that VR creates a world that may be occupied in a way not possible in other media. A unique characteristic of the medium is the possibility for interaction with the story, which Meyer rightly predicted creates tension with the dramatic structure. This has brought about the Narrative Paradox in the evolution of VR storytelling.

3.2.1   Narrative Paradox

The question now is, how can a story be depicted and executed to include the interactivity of a user in the story world? It is a given that a story is authored, meaning that someone decides who the characters are, where the events take place, and how the story unfolds. Aylett and Louchart (2005) state that authoring, in storytelling terms, is stereotypically the representation of the author's mind, the vision of one person. The author's ability to create interesting stories, characters and narrative events, is coupled with control over the timing, order, rhythm and nature of the different story events and their display. The story, as witnessed by the spectator, is the procession of an appropriately orchestrated narrative vision for dramatic purposes. This is reflective of Aristotle's (2016) concept of the 'single whole action'. The storyline or plot therefore exercises control over the content and progress of events.

According to Aylett and Louchart (2005), the idea of an intervening user is incompatible with such an approach since one cannot expect the user to make the right decision for the story, at the right moment or even at the right place, unless the user plays a role similar to that of a conventional actor following a script. Hence the narrative paradox.

Conflict therefore occurs between the interactive freedom that is a basic characteristic of the VR medium and the structure required by traditional conceptions of plot. This brings into question the validity of the Aristotelian plot as a useful principle in the face of interactivity, because it would dramatically alter the inherent nature of narrative in VR (Aylett & Louchart, 2005).

In order to facilitate interactivity, therefore, the story may have to become plural, such as having branching or emergent storylines. Murray (2017) states that "when the writer expands the story to include multiple possibilities, the reader assumes a more active role" (p.44).

Murray (2017) used the term "multiform story" for a dramatic narrative that presents a single situation or plot line in multiple versions. These versions would be mutually exclusive in our ordinary experience.

The multiform story format, however, is not new, as there have been numerous examples in film such as Frank Capra's beloved Christmas story, *It's a Wonderful Life* (1946) or among postmodern writers such as Jorge Luis Borges's *The Garden of Forking Paths* (1941). In the case of branching systems, the storylines represent instances or variations of a given story, while in emergent systems, they result from the association of many micro-stories at character level.

These works, as such, have been pushing against the linear format as we question our common perceptions of time and space. Murray (2017) noted that we are outgrowing the traditional ways of formulating our experiences because they are not detailed or comprehensive enough to express "our sense of the pullulating possibilities of life" (p.41).

Although multiple storylines are common in literature, cinema or even theatre, VR

allows for the changes or alterations to be made in these sub-stories, which are orchestrated either consciously or not by the user. This makes the execution of an Aristotelian plot a difficult challenge, in terms of timing and outcome from a branching point of view and in terms of formulation, articulation and representation from an emergent perspective (Aylett & Louchart, 2005).

In formulating a methodology for VR storytelling, it is suggested that interactivity must be constrained to preserve the dramatic structure, so that the audience might interact with elements of the story world while remaining essentially passive with respect to the story (Dooley, 2017). Jones (2017) stresses the narrative approach of cause and effect, which is typical of Greek drama, as being central to a successful VR experience (Dooley, 2017). Aylett (1999), however, believes that an emergent approach to storytelling should focus more on the actions and paths of individual characters than an overall general story. Whatever approach is adopted, our definition of what makes a story has to be extended and broadened in the face of interactivity to the consideration of narrative as a dynamic process rather than a static structure.

3.3   The Caribbean Story

Narrative as a dynamic process rather than a static structure is representative of the Caribbean experience. In fact, according to Samuel (2003), the Caribbean lived witness to narrative historic praxis may provide a worthy resource for other contexts in this regard. The Caribbean legacy has been about the making of stories – lived, world- constituting stories of resistance and creativity. These stories have constituted a unique subjectivity in history, embodied in legendary figures – such as the revolutionary Toussaint L'ouverture, the activist Marcus Garvey and the singer-prophet Bob Marley – but equally in the millions of 'ordinary folk' caught in the daily struggle for survival. They are the unheralded artists of Caribbean existence. Together, we all share in a vocation of becoming human before God (Samuel, 2003).

Samuel (2003) identifies two formats of narrative historicism that are significant to this discussion. The practice of hospitality and the practice of festivity. He states that:

> Narrative hospitality is lived in the to-and-fro of mutual recognition of human

beings, in which power and vulnerability oscillate between persons. As stories are shared and received, traditional roles of host and guest are blurred. Power is shared to the extent that each person becomes host of the other's story. Only in this way can the significance of the other's story for one's life be recognized. (Samuel, 2003, p.153)

To practice hospitality is to be open to creating just communities that extend to all of humanity and creation. This is seen as important, as postmodern society becomes increasingly populated by what anthropologist Marc Augé (1995) calls 'non-places' – the airport terminal, the highway, the shopping mall, the Internet – in which the richness and diversity of the human being is lost, and identities are reduced to utilitarian categories of 'travellers', 'consumers,' 'website hits' and 'social media profiles.' Indeed, entire countries can be essentially treated as non-spaces by the global market and by the practice of free trade, wherein human communities are reduced to economic agents with no identity or history, defined simply by their ability to produce and consume (Samuel, 2003).

Narrative hospitality therefore forces us to ask the question "Who am I neighbour to?" It problematises the limits of community beyond traditional and narrow boundaries of family, village and local church. It is a critical hospitality on guard for the narrative that destroys, corrupts and belittles (Samuel, 2003).

Narrative festivity, on the other hand, signifies occasions of withdrawing from the "dailiness" of life to celebrate and reconnect with life's deepest meanings. The value of the festival is intrinsic to its performance; it possesses meaning in itself – meanings communicated and experienced within its embodiment.

The significance of Caribbean festivity is truly profound. As was described in more detail in Chapter 1, festivity is a source of national memory, of retelling the experiences of the past and reformulating visions of the future. As such, Minshall states:

> Yes, I adore the Robber, the Bat. But the Bat was right for the '50s, he's quaint now because his competition really is Darth Vader. Today it's movies, television. So we have to learn what the Bat or Robber teach us—that dance, that mobility—and not just recreate them, but find their contemporary equivalents. (Schechner & Riggio, 1998, p.182)

Through festivity, human beings can return to an empowering vision that resists the non-places and dehumanising narratives of this postmodern age. As such, the secular version of Caribbean festivity, which is Carnival, helps us to reclaim and reconstitute a transcending vision of our human dignity. These festivities often demonstrate that true wealth lies not in riches or other material possessions, but in having life and health, in being able to be creative, and to express our deepest sense of identity through bodily movement.

3.4   A Trinidad Story – The Technology in the River Mas'

To explore the concepts of narrative festivity and embodiment in the Trinidad Carnival, I feature excerpts of Schechner and Riggio's (1998) interview with Peter Minshall.   The focus of this excerpt is on Minshall's 1983 carnival band called *The River*.

3.4.1   The Overture

The Cast: Mancrab, Washerwoman, the River People.

We first meet Mancrab and Washerwoman at the Carnival preliminaries. We can see straight away that Mancrab is very clever, an accomplished master of technology, full of complicated genius. He is clearly most powerful and dangerous. Yet he is never satisfied or content with himself. Enough is never enough for Mancrab. He always wants more. Washerwoman is just the opposite. She is really quite simple, as her costume shows. Her power is her love for life, which is the simplest thing of all. Her heart is pure and clean and happy, like her lines of washing dancing in the breeze. Washerwoman is the beloved leader of the River People.

Minshall says:

> Then a story begins to build. And you don't get the final line in the story until a week before Carnival, because that's how it happens. You put parts into place, you don't know—then suddenly, Oh, that's the story, Mancrab and Washerwoman. (Schechner & Riggio, 1998, p.182)

On Carnival Monday, Mancrab embattles Washerwoman. He is eager to take from her the river, which he needs for his own purposes of enrichment, but he must first defeat her and win over her people's trust. Washerwoman's very strength is in that trust, and it is with that trust and love, in the form of a simple square of white cloth, that she overcomes Mancrab and banishes him from the Savannah.

3.4.2   Minshall Describes the Mancrab Costumes

> I actually constructed the model, then realised that man normally stands like that [demonstrates feet together], but you play mas' like that [demonstrates feet apart] considering the distance between the ankles. Therefore, extending a man's shoulders into a kind of rectangular armature with arms going out at each corner perfectly angled and fibreglass fishing rods coming into the angles so that one is going there, one there, one there as he rocks his shoulders all of those rods move. At the tip of each rod is the corner of a 25 square foot piece of silk, so that the dancing steps of the feet move the rods, which give life to the canopy of silk, a turbulent, billowing cloud. Yes, 'to make the cloth dance' (see Figure 3.2). This is contemporary. (Schechner & Riggio, 1998, p.182)

With respect to the River People, Minshall states:

> I used the clothes of our island ancestors—African, Indian, some European; turbans with pearls, all in white cotton—2,000 people, men and women (see Figure 3.3). And each section was called by the name of a river of Trinidad. "The River Shark"—dandy men in waistcoats and bow ties, and little hats and trousers with canes. "Oropouche," great turbaned women with frills and yards and yards of white cotton. (Schechner & Riggio, 1998, p.183)

Figure 3.2

Mancrab

Note. Mancrab portrayed by Peter Samuel, captured on the Queen's Park Savannah stage. Photo by Noel Norton. Reprinted with the permission of The Noel Norton Collection Limited.

3.4.3   The Face-Off

Mancrab eventually develops a clever strategy. He settles quietly by the riverbank and, using his finest chemicals and oils, assisted by his best technicians, he floods the river with a rainbow of extraordinary colour. He stirs the water with glowing promises of profit and luxury for all.

The River People are truly amazed. They run to see and, with buckets and calabashes and cups, anything to hold water, they attempt to catch and keep Mancrab's illusory colours, each fighting the other for more. In their haste and greed, they leave Washerwoman unprotected. That very night Mancrab steals into Washerwoman's mas' camp, which is no longer surrounded by the force of love. He kills her (see Figure 3.4).

Figure 3.3

River People

Note. Peter Minshall, River, Trinidad Carnival 1983. The procession of the River People on Carnival Monday. Photo by Derek Gay. Reprinted with the permission of the Carnival Institute of Trinidad and Tobago.

Minshall describes the events of Carnival Tuesday:

> Carnival Tuesday morning. Every single person in the band has been supplied with a white cotton pouch and in it is a white squeezy bottle [plastic dishwashing liquid bottle] loaded with colored dye. Ha! Red, orange, yellow, green, blue, purple. Now this is where the people take the art over from the mas' man. I, being the disciplined artist, and knowing that Carnival has to be pretty and entertaining, had been stupid enough to think the first section would splash itself orange and blue on the stage, the next section neatly green and yellow, and the other colors would follow and so on. (Schechner & Riggio, 1998, p.185)

> Because the river now—the story is coming to completion—is polluted. We had parked up by the side of de stage six 500-gallon barrels of these same colours, hooked up to power hoses. … I'm telling you. Yellow went 30 feet up into the air like an arc of pee, and look at the people: "Oh, God, wet me down!" And they came wid de blue, and as it came up the people are shouting, "Wet

me dowwwnn!" And talk about the frenzy of the 20th century, "Wet me dowwnn!" This baptism, this ritual, this total madness onstage! This was ritual, I've never experienced anything like it. (Schechner & Riggio, 1998, p.185)

Figure 3.4

The Face-off

Note. Peter Minshall, River, Trinidad Carnival 1983. Mancrab faces-off with Washerwoman at the Queen's Park Savannah. Photo Noel Norton. Permission pending from the Callaloo Company.

The river is his. The waters are polluted. He drags the lifeless body of Washerwoman before us, her lines of washing now stained and borne by others. The rainbow river follows, and the River People. They are wild and frenzied in their dance. They believe themselves the richer for Mancrab's rainbow. They bathe themselves in its colours. In so doing they destroy themselves.

3.5   Conclusion

According to Minshall, words, paintings, or a movie cannot convey this story. From Minshall's recounting of the presentation of this folktale, it is clear that there are different perspectives that are important to the story that give it meaning in the

context of the Carnival. The bifurcated plotline of *The River* includes the designer's vision and the creativity involved in making costumes that can effectively illustrate the story in the movement of the people.

There are also, the experiences of the masqueraders in the band who become immersed in the storyline on Carnival Monday and Tuesday, some of it orchestrated and others quite spontaneous. There is also the effect on the spectators of the presentation, who are pulled into a discourse on Carnival Monday that wearing white is not Carnival, because Carnival is colour, who are then shocked by the colourful theatrics of Tuesday's presentation. Even Minshall was pleasantly awed by the transformation that the people created. Finally, the opinions of fellow bandleaders and the judges who gave the presentation a low score because they were not accustomed to mas' being featured in this way.

The people were not only captivated by the imagery of the portrayals but also by the representation of their contemporary existence within the framework of an old folktale. The symbolism of corruption, greed, power, environmental degradation, among others, which are part of their daily lives were so eloquently conveyed in the fable of a simple washerwoman and a conniving crab. The collaboration of the masqueraders in the telling of this story is a clear example of embodiment of the people in the narrative festivity of Trinidad.

It is important, now, to turn attention to the theories and concepts that make up a conceptual framework for storymaking in the next chapter. These elements, which contribute to the grammar of VR, will be useful to the design process that can capture these narratives in multiform story formats, which according to Wesch (2015) can allow the viewer to live inside the story again.

Chapter 4 – The Formation of the Conceptual Framework

4.0   Introduction: Towards a Grammar for Storymaking

The following entry from my research journal, which I explore in more detail in Chapter 6, provides a brief insight into the internal struggles I experienced as the Director during the creation of an immersive experience for this study:

> I gathered that there are preconceived impressions on what teaching is, which is linear and very much based on the teller-listener paradigm and very practical and measurable in its outcomes. The concept of the narrative for the environment, while accepted, was not fully understood. The elements of storytelling being a valid method for teaching and learning was not grasped. (Director)

This entry recorded the difference of opinions between members of the design team and me on the approach to be followed to produce a 360° VR experience. I supported the view that the very familiar media production techniques that followed a set plotline would not be effective. I also felt there was a need to understand what could be done to make 360° VR experiences more interactive for the user. This format had often been reported to be on the passive end of the activity spectrum. I therefore felt strongly that the effective use of narrative instruments could support greater immersion and interactivity, thereby leveraging the technological affordances of VR.

The significance of this research study lies in its ability to uncover an evolving grammar for virtual experience, which, while drawing from existing media production conventions is also contributing to new techniques.

In the literary sense, grammar is defined as the body of rules for written and spoken language that allows us to easily understand each other when we communicate. It explains the form and structure of words (called morphology) and how they are arranged in sentences (called syntax).

As we transition from non-participatory to participatory narrative formats, from novels and cinema to virtual reality, we are effectively moving from traditional to non-

traditional ways of applying grammatical constructs. As storytelling moves into the realm of what I call storymaking, it is important that the unique adaptations to narrative are captured and distilled into suitable guidelines for the language of virtual reality.

4.1   The Theoretical Context

4.1.1   Embodiment Theory

The guiding focus of the thesis is Embodiment Theory, which addresses what takes place when a participant is located in the story world of a virtual environment. Significant to this perspective is the fact that "telling" is less central to an experience. By entering into a scene, inhabiting a digital entity, and experiencing the virtual environment, participants learn through embodiment and engagement. They experience the story as though they are living it:

> I think when we're saying 'storytelling' we're putting on a cognitive tool belt that belongs to a different medium. There is no teller in this sense, because it is a direct sensory experience. The storytelling is the retelling or re-enactment of something that happened to someone else or something else, before. But VR is happening to you, here and now. I'm not saying 'storytelling' is a forbidden word, but using it anchors us into something that VR isn't.[8] (Google NewsLab Report, 2017, p.09)

As such, situating a learner in a virtual environment requires an understanding of the role of the body in the experience. According to Kekesi (2017), this involves the embodied view of cognition which sees learners as situated beings whose interactions with the environment form and constitute cognition:

> The world can only come into the brain via the body itself and the changes caused in the body by the body-world interaction are inevitably mapped in the brain by neural patterns (Kekesi, 2017, p.4).

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[8] Statement by Ola Björling, Global Director of VR, MediaMonks

In this way, embodiment is connected to cognitive science. However, the term does appear in a variety of contexts; as such, its conceptualisation is influenced by the viewpoint from which an issue is considered (Kilteni et al., 2012).

For this thesis, the focus is on embodiment in Virtual Reality. Kilteni et al. (2012) define a Sense of Embodiment (SoE) in virtual reality as the ensemble of sensations that arise in conjunction with being inside, having and controlling a body especially in relation to virtual reality applications. They explain:

> SoE toward a body B is the sense that emerges when B's properties are processed as if they were the properties of one's own biological body, (Kilteni et al., 2012, p. 375)

The participant therefore feels that the virtual body is theirs because its motor properties are perceived as identical to their real body (Kilteni et al., 2012). According to Tussyadiah et al. (2017), this translates as a feeling of fusion between the human body and the virtual body which is thus felt to form the same entity. With this fusion, any interactions in virtual reality enhance the participant's cognitive engagement (Foloppe et al., 2018), which leads to embodiment (Spanlang et al., 2014).

Embodiment in Virtual Reality supports participants' active engagement in their learning experience, rather than being passive recipients of information. This aligns with the constructivism learning theory (Piaget, 1936; Vygotsky, 1978; Dewey, 1938), which describes the process of knowledge construction as an active process. Sanchez et al. (2000) noted that constructivism was one of the most commonly used learning theories in virtual environments for education, with researchers such as Youngblut (1998), Osberg (1997) and Winn (1997) focusing on its main pedagogical benefits in the design and use of virtual reality tools.

This process can involve both cognitive and physical constructions of meaning, through the development of mental models or schemas, as well as physical or virtual representations of knowledge (Osberg, 1997). One of the key objectives of constructivism is the need to develop a sense of depth about a concept. The constructivist environment is therefore based on inquiry, which leads to a deeper understanding of the concept (Sanchez et al., 2000).

There has been a focus on the importance of learners actively constructing their knowledge via more experiential models (Scaravelli et al., 2021), supported by algorithms and artificial intelligence. In this context, importance is placed on learners interacting with simulated real-world or authentic environments.

Lave and Wenger (1991) stated that what people learn, see, and do is situated in their role within a given environment or community, which is called situated learning. Dewey referred to this as genuine education (Dewey, 1938). Manery (2008) further stated that we then become fully fledged narrative selves by constructing a narrative point of view from which our embodied experiences can be expressed. These narratives arise directly from the lived experiences of the embodied subject. According to Atkins (2004), they usually take the form of a first-person stance (as the originator of the embodied engagement) or a third-person perspective (as an object in the virtual world).

If narrative is the lens through which we filter our experiences, then it would be useful to also consider the discursive role of narratives and the construction of a narrative point of view in embodiment. Menary (2008) supports Atkins's (2004) view of embodied narrative by acknowledging that:

> The self is primarily an embodied consciousness that engages with the world, only later does it attempt to weave together the subjective embodied experiences, intersubjective communication with others and the objective public and shared world in which this all takes place, via narratives. (Menary, 2008, p.77)

It is notable, therefore, that according to Ryan (2003), whether our narrative worlds function as imaginary counterparts or as models of the real world, they are mentally constructed by the participant as environments that stretch in space, exist in time, and serve as habitats for a population of animate agents. Ryan stated that these three dimensions correspond to what has long been recognised as the three basic components of narrative grammar: setting, plot, and character.

4.1.2 Narrative Theory

As personal experiences and our efforts to construct meaning are the basis of stories, we should therefore dabble in the complex world of the narrative, of which this framework is only able to scratch the surface. Narrative theory is relevant to the role of the participant in the story world and the meaning constructed from this experience. Narrative is considered as a basic human strategy for coming to terms with fundamental elements of our experience, such as time, process, and change; and it proceeds from this assumption to study the distinctive nature of narrative and its various structures, elements, uses, and effects. In fact, narrative theorists study what is distinctive about a narrative (e.g., how it differs from other kinds of discourse, such as lyrics, poems, and arguments). I therefore reviewed what may be considered the most influential perspectives of narrative theory to determine possible contributions to the art form of storymaking.

Aristotle's (2016) *Poetics*, which is really just a little collection of lecture notes, is considered to be the oldest narrative approach in Western Europe, and one that has been used by a number of researchers in computer-based narratives. Other narrative approaches include the school of the Russian Formalists, featuring the work of Propp (1968)[9] and the French Structuralist perspective through the work of Barthes (1977a).

Aristotle (2016) was the first to apply logical and ordered reasoning to the investigation of narratives in his *Poetics*, in order to identify their different structures and components. He identified six main components - *Action, Character, Thought, Language, Pattern and Enactment (spectacle)* and two main concepts – *Muthos* (plot) and *Mimesis* (dramatic enactment). The manner in which these events are communicated often includes the concepts of **Diegesis** (the poet directly addresses the audience), and **Mimesis** (the poet addresses the audience through the use of characters). Diegesis involves the telling of a story by a narrator while Mimesis shows rather than tells, by means of action that is enacted.

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[9] Propp's Morphology of the Folktale was first published in Russian in 1928

While the Aristotelian emphasis on an authorial narrative model and plot-oriented structure may not be appropriate for supporting user interaction in a virtual story world, the concept of Mimesis may have value as a means of conveying the story through the actions of the characters.

The Russian Formalist, Propp (1968), on the other hand, considered the narrative as a logical sequence of actions, each action possessing a set of functions relative to the narrative. The story includes a range of elements such as events, people and places, in a multitude of combinations. The way that these elements are combined forms the basis of narrative, which represents the weaving of the story material together to give it shape and structure.

Terms in narrative construction that originated from the work of the Russian Formalists include **Fabula** and **Syuzhet** (sometimes spelt 'Sjuyet'), where the fabula is the chronological order of events that comprise the story and the syuzhet refers to the way these events unfold in the narrative.

Narrative, therefore, was about organising the story material and making choices about how to put it together. The challenge, however, as pointed out by Louchart and Aylett (2004), is that such macro-structural narrative approaches quickly find their limits when the storyline does not conform to a quest-type format. As such, the need for narrative to emerge through interaction fitted poorly with Propp's prescriptive narrative structure. What is notable here is that the traditional role of the author as the controller of the narrative comes into question and in a sense becomes less relevant in the embodied context.

The French philosopher Bathes (1977b) in his essay The Death of the Author, argued that the meaning of a text is not determined by the author's intention, but instead by the reader's interpretation. The text is seen as impersonal, a manifestation of the social institution called écriture (writing) (Biswas, 2021). The author is seen as no more than an intermediary, a space in which the action of writing precipitates the elements and codes of the pre-existing linguistic and literary system into a particular text (Biswas, 2021). This in turn implies that the reader has the prime source of power in a text. The reader is at liberty to see the plurality of the text. According to Biswas

(2021):

> Therefore, Barthes celebrates in his concluding lines the birth of the reader
> which implies the prioritization of the reading process in criticism to achieve
> multiple interpretations, thereby suggesting the ultimate erasure of the
> original intention, i.e., the death of the author. (Biswas, 2021, p.197)

This opens the way for a different view of the author for virtual environments, which is more as a story builder. In the building process, Structuralist theory is useful, as it shows that a narrative has two parts (see Figure 4.1):

> A story (*histoire*), the content or chain of events (actions, happenings), plus
> what may be called the existents (characters, items of setting); and a
> discourse (*discours*), that is, the expression, the means by which the content
> is communicated. In simple terms, the story is the what in a narrative that is
> depicted, discourse the how. (Chatman, 1978, p.19)

Figure 4.1

A Simple Representation of the Structuralist Theory
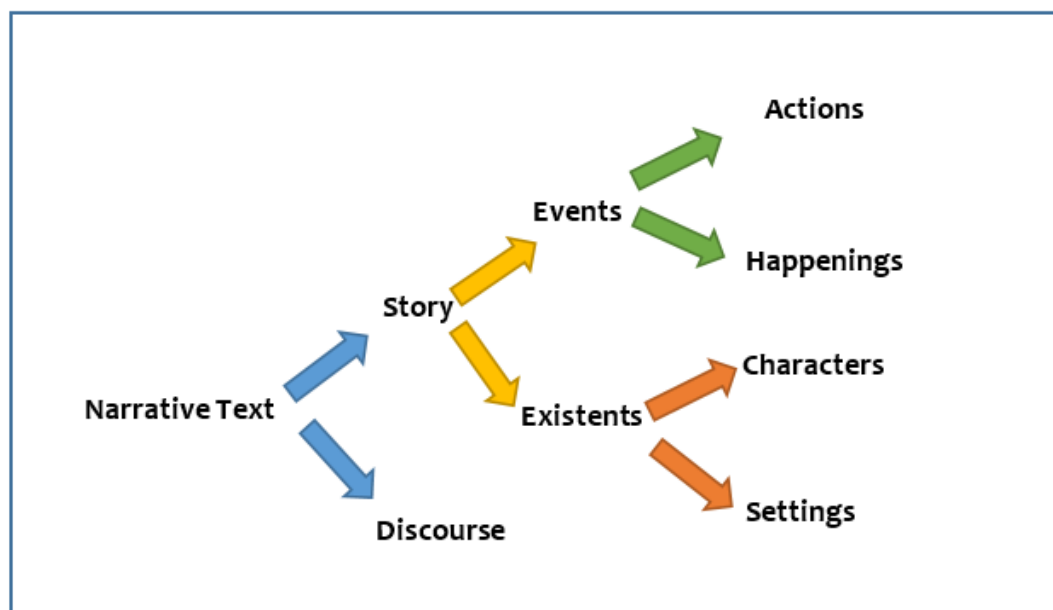
Note. Structuralist Theory presented in Chatman (1978). The figure is the author's own work.

The deconstruction of the narrative into different parts therefore provides the story builder with the tools to move the participant through the story world (e.g. events can be manipulated, actions can be prescribed, and characters may have to react to changing settings).

4.2   The Storymaking Framework

4.2.1 Storytelling to Storymaking

Having established an understanding of the theoretical focus for the emerging art form of storymaking, it is useful now to concentrate on the practice. Engaging in storymaking will require guidelines and the application of appropriate techniques. I first identify the key elements that are influencing a transition from storytelling to storymaking. I then identify key media conventions that may facilitate the qualities of VR in the production of immersive experience.

The first significant change noted for a virtual story world is that the reader/listener (the receiver of a story) becomes a participant (a character in a story) and this introduces the element of interactivity in the story. In interactive experiences, the participant makes a choice at each story intersection and rearranges the linkages of story fragments into their own configuration. There is a connection here to the theory of meaning production and reception within cultural studies where Hall's article, Encoding/Decoding (1973) has made a significant contribution.

Hall (1973) placed strong emphasis on meaning, which first goes through a process of encoding by the story builder that produces meaning (meaning structure 1), and then a process of decoding, when the receiver produces their own interpretation (meaning structure 2), drawing on frameworks of knowledge.

In virtual environments, however, the decoding process (meaning structure 2) happens in real-time because the participant is not only receiving but more importantly operating within the encoded environment. In this respect, meaning is influenced by the extent to which the participant can modify the form and content of the encoded environment in real time. According to Ryan's Interactivity Classification (see Figure 2.1), in VR the participant can have a range of control over their actions and this in turn determines their overall interpretation of the

experience.

Interactivity, however, poses a major challenge to narrative authoring, especially if one wants the participant to be able to exercise a certain level of freedom of movement within the virtual environment. This is where the narrative paradox is encountered. A single storyline is no longer relevant when it is impossible to predict the actions of a participant in a story. To allow choice in a participant's decision making, therefore, the story plot has to be replaced with *story pathways* or *branching storylines*. The story experience emerges from the path/s taken by the participant. The author's role changes to that of constructing story elements that may contribute to a rewarding experience for participants. The author's creativity may now have to centre on designing encounters that can influence a participant's choice of pathways. According to Aylett and Louchart (2005), therefore, the success of an experience results not from the quality of the story in conventional terms, but in the level of enjoyment, active and willing participation from the user.

Aylett and Louchart (2005) further state that the role of the author is now being channelled into writing interesting characters with a strong potential for dramatic interaction together with flexible narrative events whose only aim is to set up scenes and situations. The author (creator of the story) therefore functions more like a *drama manager* (orchestrator of experiences). This is identified as the second change in the virtual environment.

The third change is that with virtual environments there is no longer a frame (*no frame*) for the participant to look through.

> The old narrative frame does not exist in our actual physiology. We have been stuck with this frame or cage (of perception) for so long, since Renaissance times, representing three dimensions on a two dimensional plane. But you can now do magic in three dimensional VR space (without that frame)... why keep using the same story making conventions? A new medium does not come about every day.[10] (Google NewsLab Report, 2018, p.13)

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[10] Statement by Tom Small, VR Manager at YouTube Spaces

With participants breaking the fourth wall to step fully into a scene, the story builder has to understand how the elements in a scene may contribute to the participant's appreciation of the story or otherwise distract from it. Nothing can be hidden in this spherical format. Additionally, the cinematic camera techniques that have been assimilated for creating mood, drama and for directing attention (e.g., zooming in for a closer and more intimate experience) are now difficult to execute in 360° VR.

Due to these three influential factors (see Figure 4.2), storymaking is able to draw on an expanded understanding of narrative.

Figure 4.2

Key Elements of the Emerging Storymaking Art Form
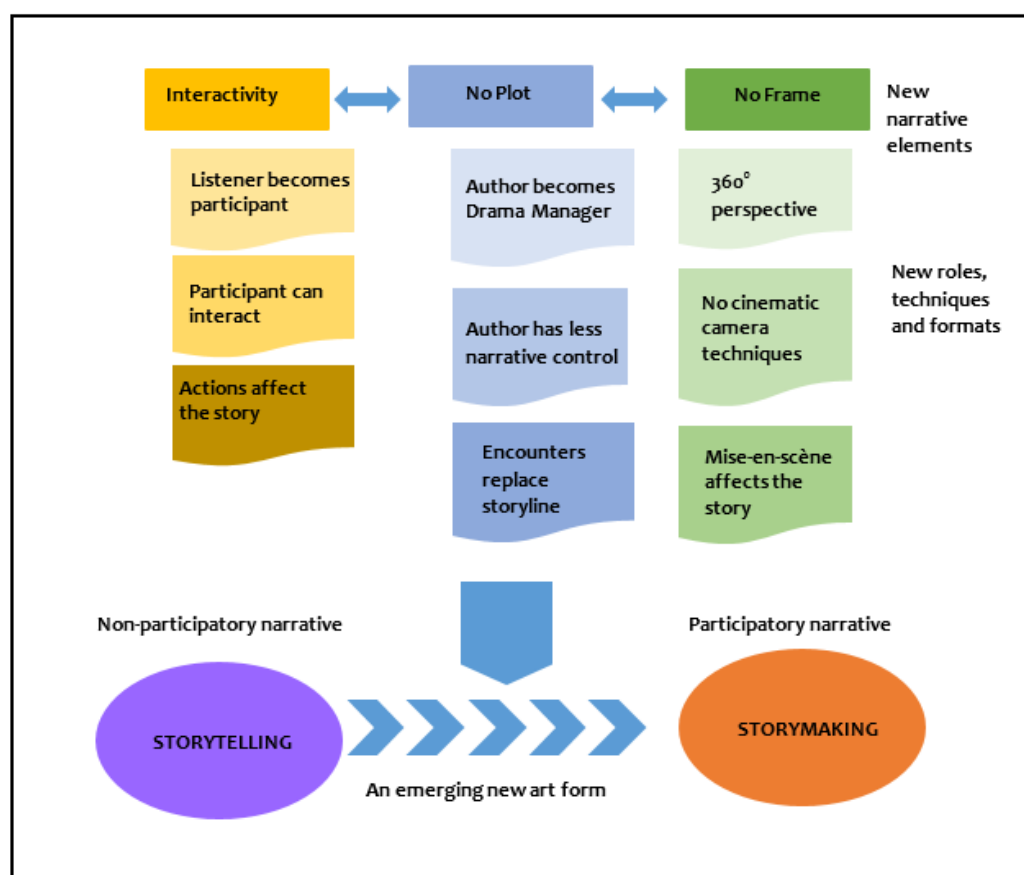
4.2.2   Decoding the Narrative Potential of VR

To guide the practice of storymaking, it is also important to understand the influences of the narrative potential of VR. This, for example, involves the accumulation of

meaningful experience as a result of agency, which allows participants to construct their own appropriate narratives (Fencott, 2001). Narrative potential arises from agency but is not determined by it (Fencott, 2001). As such, it is useful to explore the influence of all of the key qualities of VR (immersion, interactivity, presence and agency).

4.2.2.1 Immersion – Theory of the Mind

According to the fiction feeling hypothesis (Jacobs & Willems, 2018), for example, narratives with emotional contents tend to invite readers more to be empathic with the protagonists and thus engage the affective empathy network of the brain, the anterior insula and mid-cingulate cortex, than do stories with neutral contents. In fact, they state that literature (re-)creates emotionally charged images of our experience in the world and by means of such images we orient ourselves to the world, organise our values and motives, and thus regulate our behaviour (Jacobs & Willems, 2018, p.148).

This effect is broadly connected to the Theory of the Mind (ToM), which suggests that spectators can express emotional reactions regarding their own thoughts (Baron-Cohen, 1991). In simple terms, the thoughts developed by a spectator (while watching a movie, for example), that follow the fate or situations of characters, favour the generation of emotions in the spectator. The thought of something dramatic happening to a character with whom the spectator identifies with, is enough for the generation of emotions. According to Louchart (2007), though the term is not used, this approach could be related to empathy and how one can be emotionally affected by the fate of others.

ToM, therefore, seems to have value as an important underlying mechanism for the narrative potential of VR. A story builder can anticipate a participant's reaction in the timing of dramatic events or the participant's emotional connection to the characters in a story (empathy) (Louchart, 2007). The story builder, for example, can pre-assess the state of mind of users (i.e., "emotionally map" an audience) when creating a dramatic experience. The aim is to take the audience on an emotional journey that may include surprise, fear, happiness or sadness depending on the particular genre of the script (Louchart, 2007). In fact, emotions are at the core of human reasoning

and recognition (Damasio, 1994), and should logically figure in any narrative model. Traditional storytelling media, such as the novel, cinema, and television, have drawn much of their emotional power from characters and their interactions.

The ToM approach, therefore, could be incorporated into a character-based design for VR where decisions could be made based not only on the inherent emotional state of an individual, but also on how they would affect others emotionally. Such processes would allow the character to make decisions on a dramatic basis (the number of emotions internally generated for a given action determines its dramatic weight) (Louchart, 2007). This therefore presents an interesting insight into the way decisions could be made and how they could potentially contribute to the development of character interactivity in virtual environments.

4.2.2.2   Immersion – Lost in a Book/Transportation/Flow

In the language of reading, another effect experienced by readers is the feeling of being "lost in a book" (Nell, 1990). This occurs when the reader becomes absorbed in the unfolding drama of the text, and is often unconscious of the external environment. This is one of the most salient features of narrative, which is the power to transport readers into an alternate story world. A similar effect occurs when music teleports listeners to another realm.

This effect of feeling as if you are in a story is called transportation and it is closely related to the psychological constructs of absorption or the feeling of immersion (as in the case of VR). Gerrig (1993) was the first to coin the notion of narrative transportation within the context of novels. He conceptualised narrative transportation as a state of detachment from the world of origin that the story receiver experiences because of his or her engrossment in the story, a condition that Green and Brock (2000) describe as the story receiver's experience of being carried away by the story. Green (2004) also determined that an increased sense of transportation results in increased perceptions of realism, which was found to be an important factor to audience enjoyment (Rome, 2019). Zillmann (1991) also noted that transportation is linked to narrative suspense and is a significant predictor of enjoyment. In fact, both transportation and identification with a character are

believed to be associated with the phenomenon of audiences becoming engaged with experiences, and therefore, achieving more significant levels of enjoyment (Green et al., 2004; Tal-Or & Cohen, 2010).

Closely related to transportation is the concept of flow introduced by Csikszentmihalyi (1990), who noted in his research that persons often attained enjoyment from intense activities in which their attention was fully absorbed. He called this state flow, because during his research, people illustrated their intense experiences using the metaphor of being carried by a current as a river flows. Flow therefore refers to a state of mind that brings together cognitive, physiological and affective aspects. Flow experiences correspond to an optimal psychophysical state, which has attributed to such expressions as 'being in the zone', 'being on the ball', and 'being in the groove'.

For virtual environments in particular, flow and transportation are positively correlated with the perceived realism of a computer-mediated experience (Green, 2004). However, it is important to note that VR practitioners have also attested to the fragile state of immersion. Immersion can be disrupted by realistic infidelities either in computer-generated characters or in the behaviour of the simulation.

In summary, concepts such as Nell's (1990) analysis of the psychological state of being "lost in a book" and Gerrig's (1993) concept of transportation point to the effect of narrative on immersion, which requires an active engagement with story and a demanding act of imagining. The view is therefore supported that these concepts can be used as a means of considering engagement across media and may be well suited to exploring the applicability of techniques to achieve transportation and immersion in VR. The richness of this experience seems to be dependent on the resonance on the participant's mind of the aesthetic features of the environment including the narrative presentation, characters, images and style (Ryan, 2003).

4.2.2.3 Interactivity – Role Play Games

Interaction with stories requires a major rethink about the way in which narrative VR should be approached. What the major schools of narrative theory have revealed so far is that classical approaches have been heavily influenced by the idea that narrative

must be authored. According to Aylett and Louchart (2003), narrative is seen as an artefact which can be studied and not as the dynamic process resulting from the interaction between characters and their impact on the participant. It was noted that Aristotle's (2016) plot-centred approach did not include interactivity between the author and the user as a possible component of the narrative. This made it difficult for the approach to be used for virtual environments, as the freedom that VR potentially offers to the user was restricted.

The main challenge now is to reconcile interactivity in the narrative, to provide the participant with a satisfactory level of freedom while allowing a story to emerge. As mentioned earlier, Aylett and Louchart (2003), as well as Nath (2001), have argued for a character- based narrative form, which I agree with.

Role-Playing Games (RPGs) for example, use characters and emotions as essential elements in their narratives. They share a need for interactivity and dynamic narrative development to be located within a much more abstract, high-level view of plots. Rather than altering the nature and essence of narrative matters, they tend to use methods to equally distribute the decision-making process and to reduce authorial inputs in favour of the participants. As such, in the execution of the narrative, there is more focus on story planning and anticipative considerations (Louchart & Aylett, 2004).

Within the RPG, control is dynamically negotiated across different levels of inputs. For instance, a Game Master (GM) exercises control over the narrative unfolding, plot, pace and structure of the story at a high level. The a priori plot line is usually hypothetical and as such the GM requires specific tools in the form of the encounters, to gain some control over the overall story. On the other hand, the players, through their actions, decisions, strategies, the skills of their characters and their own personal capabilities to act in role, produce the content at all levels, from abstract action downwards. As such, the players, though they do not carry any narrative responsibility, exercise control at a character and individual level, while the GM is in charge of issues of greater narrative importance (Aylett & Louchart, 2003).

In the story planning process in RPGs, therefore, there needs to be a thorough study of the worlds where the action takes place before the start of the game. The narrative is then shaped by pre-scripted, improvised or random events, which are managed by the GM. The GM is therefore responsible for managing the narrative by making decisions, for example, with respect to the introduction of new characters, the exact outcome of actions carried out by characters, the content of the world or the events taking place. As such, narrative development becomes a process instead of an artefact and continuously takes into account the current situation and the status of character interactions.

4.2.2.4 Interactivity – Improvisational Drama

For improvisational drama (Improv), actors are briefed with a situation and roles, then asked to interact 'in character' without any script. The core of the narrative is based on sub-plots resulting from interactions between different characters. This allows the participant to experience empathy with different characters based on their ability to interpret and understand their decisions and behaviours.

With Improv, actors are given information about their character's history, background, personality and agenda, which provides them with essential information for interaction. They then dynamically steer the narrative by choosing actions under the constraints of the personality and history of the character they are portraying. In these genres, personal profiling must be considered, along with the emotional status of characters because the scenarios only provide a general abstract outline of the final narrative. It is therefore the responsibility of the characters to provide the real core of the narrative, which emerges and grows from the background, histories and agendas that the characters bring to their interactions with each other (Louchart & Aylett, 2004).

4.2.2.5 Interactivity – Interactive Drama

Important elements for an interactive drama include the persons of the drama, what Propp (1968) termed as the **Dramatis Personae** or the main characters in a story. Propp (1968) identified a limited set of eight broad character types, including the hero, the villain and the helper, as examples. As such, character actions and

decisions should be made in accordance with a precise and accurate goal, motivation description and personality. The participant becomes an interventionist user in the story and his character should be developed to fit the world environment of the overall theme of the experience. The goal not only helps participants to find their positions in the experience but also guides them in understanding the significance of their actions within the narrative context. When goals are well designed, they help participants to comprehend the narrative continuously and consistently. Conflicts provide both opportunities for narrative events and narrative context. As such, when participants overcome obstacles in the story, they are not only the audience but also the narrators (Qin et al., 2009).

The story environment's reaction to an interventionist user leads to the concept of the *Dynamic Story Environment*. This refers to the continuous planning functionality that is required to manage the story contexts accurately by keeping track of what has happened within the story. This allows for decisions adapted to the story and the interventions of the participant.

Emotions in characterisation, also called *Affectively Driven Characterisations (ADC)* (Louchart, 2007), is another important element that should be considered for interactive narratives. As mentioned earlier, a participant's empathy with story characters contributes to believability; therefore, emotions play an important part in narrative practices. This contributes to what Aylett (2000) referred to as *Storification,* where the narrative participant is able to continuously build a mental model and develop and test expectations about the story's outcome and a character's present and future motivations, roles and emotions as the story unfolds in real-time.

In summary, execution of these art forms therefore illustrates that the definition of what makes a story needs to be extended and broadened in the face of interactivity. A key observation is that once interactivity is involved, the discourse becomes plural. This is because each character experiences a **Syuzhet** influenced by his own actions and decisions arising from the dynamic process of experiencing. The way interactivity could therefore be approached for virtual environments would be through a multiform plot or a storytelling system (Murray, 2017). In this way the user's actions

would create unforeseen combinations of elements, but the pieces would always interlock into a narratively meaningful picture.

4.2.2.6 Presence – Emergent Narrative

As the name implies, the approach of the Emergent Narrative (EN) combines the use of dramatic instruments that allow stories to emerge because of a character's presence in the story world. The concept has been central to the work of Aylett (1999) and Louchart (2007) in their development of virtual environments through changing the narrative process. Over time, they developed a toolkit of sorts drawing substantially from interactive narrative genres (e.g., interactive theatre, RPGs and video games).

Aylett (1999) noted that one way to adapt narrative approaches is to divide the narrative process into a number of levels, for example:

1. Overall plot.
2. Character-level abstract action sequences.
3. Physical behaviour – cognitively determined/reactively determined.

The narrative experience can thereafter be shaped via a bottom-up approach where interaction at each level is influenced by the interaction below it. As such, starting with the level of the character, the focus can be on ascribing the ability to assess a situation and autonomously decide upon actions that would either invite the user to participate, or provoke the strongest reactions among other characters or the user in order to generate dramatic tension (Louchart, 2007). Characters therefore can perform roles (e.g. based on goals, motivations and actions); or assume pre-determined story control responsibilities dictated by the GM (e.g., intervening with information that could influence decision-making); or they can act in the best interest of the story experience rather than on a personal level (Louchart, 2007).

Since the drama intensity is not controlled by a dominant plot, the plot in EN becomes hypothetical, therefore, highly flexible. As such, it is important for a story builder to create the narrative in terms of interactions and character roles rather than overall

discourse. It is left to the participant to understand other character actions or events to determine a discourse for the experience.

The narrative formulation process for a character-based approach can therefore include:

1. Constructing the story surface, which is essentially defining the story environment including a possible backstory and world maps, major influencers being the RPG and video game.

2. Shaping the characters, for example, deciding on personality traits and defining how the characters belong to the environment. Interactive theatre and video games are major influencers here.

3. A debrief at the end, in which the multiple story experiences of the participants are shared and integrated through the appreciation of larger-scale causal chains than those an individual has directly experienced. This is a feature of live role-play (see Table 1).

Table 1

Emergent Narrative Concepts and Origins

CONCEPT	ORIGIN
Dramatis Persona	Theoretical
Fabula/Story	Theoretical
Sjuzet/Discourse	Theoretical
Internal ontological interactivity	Theoretical
Interventionist user	Narrative systems
Dynamic Story Environment (DSE)	Narrative systems
Affectively Driven Characterisation (ADC)	Emotions
Storification	Emotions
Distributed Story Management	RPGs
Multiplicity of Discourses	RPGs
Hypothetical plot	RPGs
Narrative Debrief	RPGs
Indirect Story Management (ISM)	RPGs
Story Surface	RPGs

Note. The relevant concepts of EN are from Louchart (2007) p. 136. This table is the author's own work.

4.2.2.7 Agency – Narrative Adaptation

Putting Louchart's (2007) EN elements into practice is a key functionality of narrative

systems that can augment the story experiences according to users' actions and can tailor story elements to individual users' preferences and needs. According to Rowe et al. (2010), to implement these capabilities, interactive narratives can utilise a range of artificial intelligence techniques for narrative planning and autonomous agent behaviour. These approaches, although still not yet clearly defined, can apply three basic strategies including plot adaptation, discourse adaptation and user tailoring.

A narrative system, for example, can prevent the occurrence of a narrative event by triggering some action that modifies the virtual setting, or reorders a sequence of events scheduled to take place in the narrative. This is called **Plot Adaptation**. Rowe et al. (2010) noted that, in learning applications, a plot might require direct adjustments if a student appears incapable of solving a problem. The objective is to maintain narrative coherence while allowing students new opportunities to improve their knowledge or aptitude. In another approach, the drama manager may alternatively adapt a plot sequence by adding or removing goals for the participants to accomplish. In this case, the system does not need to manipulate the story event independent of the user's intervention. It can instead assign a user a quest or goal whose achievement (or failure) will constitute an important plot point. It is noteworthy also that manipulations of an autonomous character's traits can also indirectly shape an interactive narrative's emerging path.

The other approach, **Discourse Adaptation,** allows for the manipulation of story elements without affecting the narrative's underlying plot structure. This is achieved through manipulating the quantity and quality of narrative information that the user has access to, to either draw or divert his attention for narrative effect. For example, the story system could focus on event-presentation sequence adaptation to deliberately hide or reveal information about a narrative through non-chronological orderings. In this way, the unfolding events can increase suspense and drama by concealing key information or alternatively evoke curiosity and interest by prematurely revealing information. As such, by augmenting the presentation of story experiences, interactive narratives can dynamically define particular moods, hide and reveal facets of the narrative environment, and take advantage of dramatic idioms to highlight important story elements (Rowe et al., 2010).

User Tailoring, another technique of narrative adaptation, utilises local plot changes and both diegetic and non-diegetic presentations (i.e., information revealed either inside or outside the story setting, respectively) to deliver customised guidance, support and feedback to a user (Rowe et al., 2010). This approach is one of the key functionalities associated with intelligent tutoring systems where the necessary support is provided for the user to follow the intended plot progression, rather than diverging from the expected narrative path. This could be accomplished through cognitive support, such as through conversational interactions with virtual characters, targeted camera or lighting adjustments, or non-diegetic means (such as text overlaid on the narrative interface). In addition, through dynamic affective support, virtual characters can make emotional expressions that enhance the dramatic tension. Moments of frustration or confusion can be mitigated through targeted, empathetic feedback.

With these story-generating systems, therefore, users are afforded a range of actions, which shape the user's degree of agency and participation. It was noted that through these narrative adaptation techniques, the user's capabilities in the narrative can be dynamically expanded or constrained for narrative effect. For the student, the augmentation of the narrative's trajectory can contribute to an improved learning experience, through problem solving activities.

4.2.2.8 Agency – Story-based Learning

The use of narratives to support learning and cognition is nothing new. In fact, such approaches date back to early human culture, with the iconic image of telling stories around the fireside. The technique has remained as an important aspect of the modern classroom and is becoming more and more relevant to virtual environments such as for Serious Games and Instructional Simulations. This is best exemplified by the research projects of the Institute for Creative Technologies at the University of Southern California (Gordon, 2004; Hill, Gordon, & Kim, 2004; Korris, 2004; Swartout et al., 2006), which have followed the educational design principles of guided experiential learning (Clark, 2004).

In story-based learning environments, the experiences are designed to have distinctly

narrative qualities, such as a set of characters, a temporal sequence of causally related events, a rich but relevant amount of descriptive detail, and a point (Gordon, 2009). These story-based learning environments can be a complex form of communication, mediating between real world experiences told as stories and the experiences of learners in virtual environments.

Typically, the user participates as a character within this environment, following a learning-by-doing pedagogical strategy, and the actions taken affect the outcomes of an emerging storyline. According to Rowe et al. (2010), manipulating student goals is particularly useful for story-based learning because it provides students with additional opportunities to learn important skills and concepts, and it streamlines narratives to eliminate activities that may be redundant. The techniques involved in game studies or ludology can have a contributing influence on the design of these experiences.

As noted earlier, the empathetic behaviours of characters can also be dynamically adjusted to manage students' emotional states during learning, such as excitement, confusion, boredom, and frustration. As such, story-based learning environments often provide affective feedback to guide students toward emotional states that are conducive to learning and can promote motivation. By dynamically maintaining optimal levels of challenge throughout story-based learning experiences, such experiences become more engaging. Overcoming a challenging task, for example, often provides a test of abilities and a personal sense of achievement. Theories of intrinsic motivation suggest that humans often equate objectives that are challenging, with objectives that are meaningful.

In summary, story-based learning is a learning model grounded in the theory that humans find narratives effective at framing and understanding perceptions of the world. Narratives are able to contextualise abstract concepts and provide a scaffold for the transfer of knowledge within specific contexts and environments. As mentioned earlier, this aligns with the constructivist ideals of situated learning where active learning takes place within the context in which the knowledge must be applied. At the narrative's core is a problem that must be solved by constructing and applying the knowledge within the targeted learning domain. Figure 4.3 distils the

key takeaways of the preceding discussion into a framework for guiding the practice of storymaking.

Figure 4.3

The Storymaking Framework
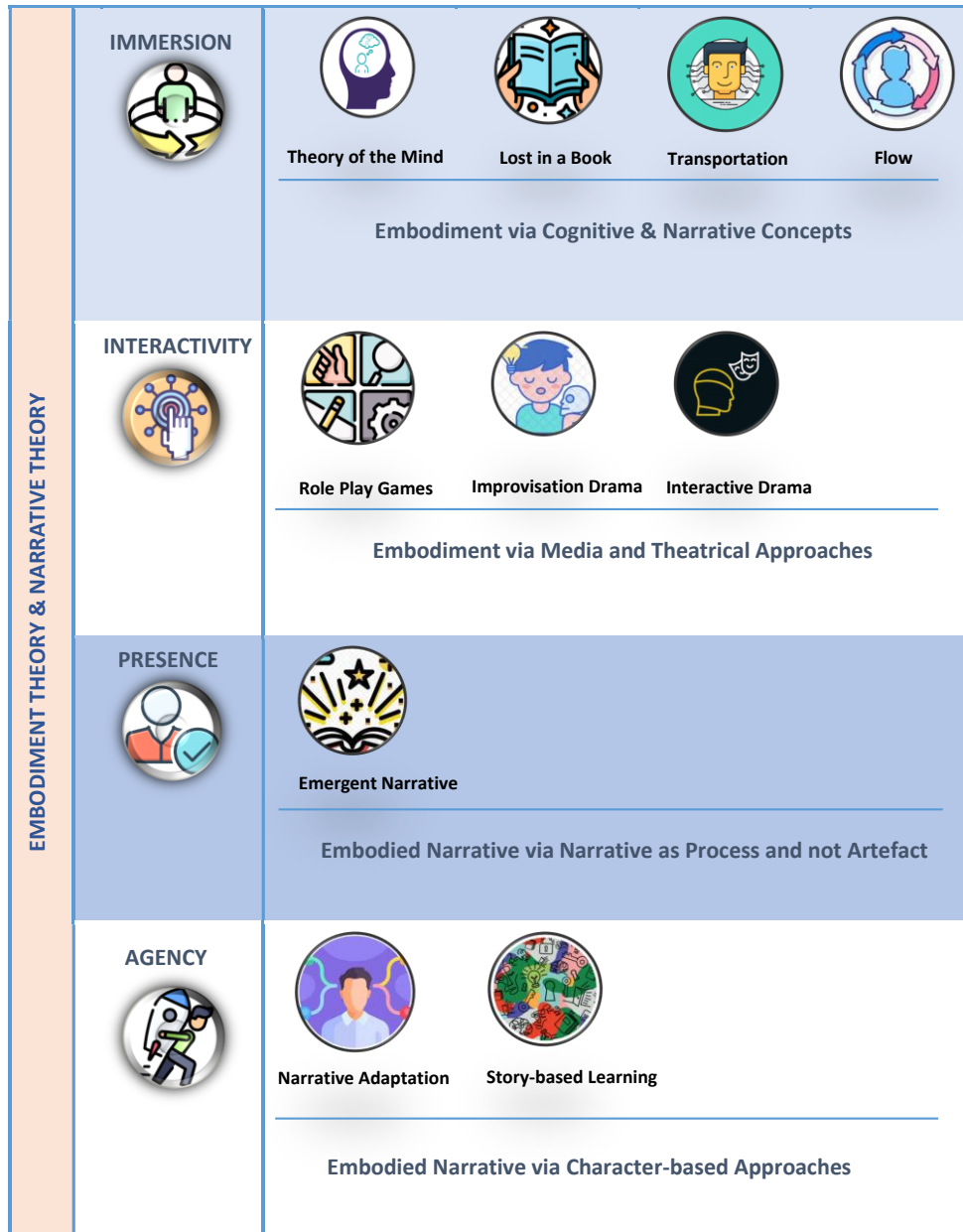
4.3   Conclusion

The Storymaking Framework is an ecosystem of approaches from which emerging practices for storymaking in immersive environments can draw. The theory of embodiment is the overarching focus. Embodiment is further linked to the learning theory of constructivism which focusses on reducing the gap between what learners know and what real-life experiences can teach them. Learners actively interact with the learning process, instead of being passive recipients of information. With VR, this can be supported with re-creations and simulations.

The inclusion of narrative theory in the framework allows for an understanding of the embodied narrative self and what approaches could be applied to unlocking the narrative potential of VR. Aristotle's (2016) use of Mimesis, Propp's (1968) organisation of story elements, and Barthes's (1977a) deconstruction of the story in narrative text were highlighted as potential contributors. However, reconciling user interactivity in the narrative remained a challenge.

It was helpful, therefore, to identify the factors influencing the transition for storytelling to storymaking to address this issue. Three important factors for participatory narratives are:

1. The importance of considering narrative as process (an agile concept) as opposed to narrative as artefact (a static concept).
2. Not having one overarching plot but a combination of sub-plots that emerge from the interactions among characters around a theme.
3. Creating an unfolding drama through the emotional and motivational actions of the characters.

The storymaking practice, therefore, pays attention to facilitating the interactivity of participants supported through multiform story formats; and catering for a 360° perspective to stage the unfolding interactive drama. In finding approaches that took these factors into consideration, it was helpful to determine what would contribute to the story grammar in virtual environments, and what would support interactivity or the making grammar in these spaces. This was accomplished by linking concepts and approaches that could activate the four key qualities of VR – immersion,

interactivity, presence and agency.

Facilitating an understanding of how feelings of immersion could be achieved it was helpful to consider the likely cognitive influences on participants in other formats, which included concepts such as the theory of the mind, lost in a book, transportation and flow. In VR, achieving immersion means that the participant is now a part of the story world or embodied in VR and would naturally want to interact with the environment.

In considering the factor of interactivity, a character-based approach to narrative was found to be more suitable than a plot-based approach, particularly for resolving the Narrative Paradox. The approaches which best represented the execution of character-based dramas are Role Play Games, Improvisation Dramas and Interactive Dramas. The techniques they employ contribute to a better understanding of the devices that could be used to involve the participant in the story.

Being embodied and interacting in the story world leads to qualities of presence and agency in VR. The approach of Emergent Narrative showed how presence could come into being through the process of allowing the story to emerge from character choices, allowing participants to act as if they were really a part of the virtual environments, as if they were there. The agency of a character, the ability to act and see the consequences of those actions in turn moves the story along. Agency can be supported by devices used in Narrative Adaptation such as plot and discourse adaptation. Finally, the Story-based Learning format provided the context for meaning making surrounding the immersion, interaction, presence and agency of participants in virtual environments.

In conclusion, the Storymaking Framework unlocks an evolving grammar for virtual experiences that draws from existing narrative and media conventions. The hope is that the framework encourages the emergence of new techniques to develop the art form through its use by VR practitioners. The application of the elements of this framework in real world practices, therefore, is the focus of the empirical work of the study that is the basis of this thesis. Of importance to this study is how the framework can guide the design and development of learning experiences based on available

technologies and narrative resources for creating immersive learning environments. In the following chapter, the empirical work of this study begins with the design and production of a 360° VR experience.

Chapter 5 - 360° VR Application Design Process

5.0   Introduction: The Design Challenge

The Storymaking Framework that the study conceptualised in the previous chapter was applied to the design of a virtual reality 360° VR experience for the general subject matter of Trinidad Carnival. The question, as articulated in Chapter 1, which was formulated into a design challenge, is whether the essence of Carnival cultural expression could be effectively captured and retold with the new immersive technologies, such as VR.

The design challenge, therefore, is to select an aspect of Trinidad Carnival, film the activities in the 360° spherical format and use this content to create a virtual experience, which conveyed the reality of the activities as authentically as possible through psychophysical affordances, such as immersion, interactivity, agency and presence. This study proposes to accomplish this challenge using storymaking in the design process, which combines narrative development with user-praxis to convey the experience.

5.1   The Selected Design Experience – The Old Yard

The Old Yard (TOY) is an annual showcase and presentation of the traditional Carnival masquerade in the format of a heritage fair. The fair features the performances and exhibition of traditional mas' characters against the backdrop of a re-created barrack yard complete with the 'gayelle'[11] as centre stage.

The spectacle, creativity, and artistry of the traditional masquerade is conveyed to patrons by taking them on an interactive journey. Patrons can dance, play, sing along, and even try to replicate the moves of the traditional masquerade with the masters of Carnival Arts performance.

From an educational perspective, TOY serves as a training platform for the Department of Creative and Festival Arts (DCFA) students in the areas of Festival

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[11] An arena where stickfighting takes place in Trinidad. Stickfighting is a martial arts/dance performance practiced to the accompaniment of drumming and a call and response refrain known as a 'Calinda' in an arena/gayelle usually formed by a circle of onlookers.

Management, Costume Fabrication, Performance, Technical Theatre and Visual Arts. It has also facilitated research in action for secondary school students pursuing the Caribbean Secondary Education Certificate (CSEC) and the Caribbean Advanced Proficiency Examination (CAPE) for courses in which the traditional masquerade and heritage are components of the curriculum.

From a social anthropological perspective, TOY interrogates how my ancestors lived in Trinidad's urban society of yesteryear and how they made their lives meaningful. The subject matter provides insights into how the society among the lower-income class emerged and organised itself and what were some of the relationships between the values and behaviours of the people - why they did what they did.

Cummings (2004) stated that by the turn of the twentieth century the barrack-yards of Port-of-Spain were the established means of housing people of the lower income bracket. Barrack-yards were a feature of the hilly eastern end of the city, which was generally called "behind the bridge", or the "Dry River District". The property-owners of that era let lands at monthly rentals mainly for one- and two-room tenement buildings. According to Cummings:

> These structures consisted of adjoining rooms each about ten feet square with batten door and one batten window. Rows of such rooms were often laid out to face a common area, all of which became the barrack-yard. (Cummings, 2004, p.xvi)

Pertaining specifically to the Yard and the Yard Dwellers, it is therefore interesting to understand the significance of masquerade and what it meant to them to "be the mas", to "play mas". Carnival has always been about social expression and the voice of society, which is displayed on the streets of the country in a highly-spirited celebration of energy. Many people like to play traditional characters (mas') on the streets, which helps to preserve the various social customs of an evolving culture, and provides a vital and essential link to the rich heritage of the country. There was overwhelming significance of the barrack-yards in the generation of this Carnival spirit long before the official two days of Carnival. For example, in the larger barrack-yards, calypso tents were constructed as temporary structures built with bamboo and enclosed with branches of the coconut tree.

Eventually, the name of the calypso tent or the Carnival band created in these spaces became the name of the yard, such as "Millionaire Yard", "Red Dragon Yard" and "M'Fumbo Yard". According to Liverpool (2001), before the Carnival, the unsanitary barrack-yard became the Carnival tent in which: bands of masqueraders planned, sewed and tried on their costumes; dancers and stickfighters choreographed their steps; calypsonians practiced their calypsoes and attacked one another in song. The yard was therefore the theatre of the African population. The masquerades were in fact expressions of resistance to barrack-yard life.

The Dame Lorraine masquerade, for example, was a key feature of these yards on the Sunday before Carnival. According to Liverpool (2001), the event was a complex performance involving several dances starting with a "haughty butler" announcing the names of couples who entered the stage dancing. This was followed by a schoolmaster in a frock coat and a long whip, who in a parody turned the stage into a classroom with the pupils mocking the mannerisms and pretensions of the upper class. In the parody, the physical features of these prominent persons were exaggerated, for example, to show bulging buttocks, and other oversized private body parts. These performances contributed to the name Jamette Carnival given by the French settlers because of the sexual themes and acts of aggression displayed by the revellers. The word Jamette, in fact, came from the French word diamètre to refer to the class of people who were considered as below the diameter of respectability.

TOY, as such, provided the study with an appropriate subject matter to apply the process of storymaking for the digital recreation of these events. This opportunity, unfortunately, also coincided with the restrictions to personal interaction that were introduced with the virulent spread of the COVID-19 virus, across the world in 2020. This pandemic led to the suspension of in-person instruction at the University and the cancellation of public events such as Carnival in 2021.

The work was therefore confined to the activities of the class pursuing the programme – the Art and Practice of Costume Fabrication. This class, which would normally showcase their costumes in the Old Yard event was invited by me to capture

their processes and presentations for a virtual experience. This virtual experience provided the possibility for creating a new stage to present the experiences of TOY in new formats, to new audiences.

5.2   Models for the Design Process

The fundamental objective, which informed the design process was the need to go beyond the initial fascination and entertainment value of 360° VR videos, which quickly dissipates and leads to less than satisfying encounters with the content. The goal therefore was to create a memorable experience, which contributed to learning.

The starting point for the design process was the exploration of the body of 360° VR experiences freely available via the Internet to identify suitable models to emulate in the design. The productions which bore the most significance to designing the experience were: Rio Beyond the Map; Mi Vida Loca; Anne Frank House; Diverse and Subversive: The Anti-Gentrification of Boyle Heights; and Lavway: Our Story. The insights gleaned from these productions are described below.

5.2.1   Rio: Beyond the Map

This was a very good example of how immersive and interactive experiences were being created to give people a more authentic exposure to a country's culture. With the help of the local Afro-Brazilian collective, Afroreggae, Google started mapping Rio's infamous informal settlements called the favelas. The project was initiated prior to the Rio Olympics to shine a spotlight on the spirit and humanity of the favelas' locals. It showed Rio's favelas using 360° videos in addition to more than three thousand images and historical exhibitions of Rio de Janeiro (Google Arts & Culture, n.d.).

The key take-away from this application for this study was the effectiveness of combining drone footage, Google maps, 360° videos, 2D videos, images and text in a single experience. These resources provided the user with a range of options that promoted engaging interactions with the content.

5.2.2   Mi Vida Loca

This production, although not a 360° experience was a good example of an interactive video drama. Mi Vida Loca is a Spanish Language course produced by the British Broadcasting Corporation (BBC, 2014), which takes the viewer on an intriguing mystery adventure to Madrid and beyond. It was composed of 22 episodes each lasting about 10 minutes, which covered the basic learning points for Spanish speaking beginners. A learning section complemented each episode where users could go through the vocabulary and grammar in more detail at their own pace and then complete activities for practice.

The interactive drama was a good example of the story-based approach. An important takeaway was the identification of the Point-of-View (POV) for the user. In this experience, the Second Person view was used to good effect. This is where the narrator and the actors in the film speak directly to the user, for example by using words such as "you". The POV contributed to the feeling of the user being a key player in the unfolding drama.

5.2.3   Anne Frank House – VR

This was an award-winning VR documentary of historical and educational significance developed by Force Field Entertainment (2019). The work provided participants with an emotional insight into the two years Anne Frank and her family and friends spent in hiding from the Nazis during the Second World War. The setting was the Secret Annex of an old office building in Amsterdam, which was transformed into living quarters for the families. Participants could wander through the digitally recreated rooms of the Annex and examine the contents of these spaces.

The ability to move within the digital spaces was a key takeaway for the study. The concept of being present in spaces, which were not part of one's natural reality, was an advantage, which made the experience memorable. Also, the ability to interact with objects within this environment further heightened this effect.

5.2.4 Diverse and Subversive: The Anti-Gentrification of Boyle Heights

This production documented the activities of a group of community activists taking a stand against gentrification in Boyle Heights, Los Angeles, California, United States of America, in the summer of 2016. The activist group, along with filmmakers Mitchell and Polon (2020) released a 14-minute-long short film that, for the first time ever, gave outsiders a look into their strategies. The entire feature was filmed with a 360-degree VR camera to give viewers the feeling of protesting with the group. The film focused on the activist group - Defend Boyle Heights and its actions against art galleries and coffee shops such as 355 mission, Chimento Contemporary and Weird Wave Coffee. This activist group was ultimately successful in making these businesses close.

I experienced this production as a riveting and emotional piece that told the story through interviews, live protest scenes and news footage combined within a full 360° experience. My immersion as a participant in the story was fully accomplished.

5.2.5 Lavway: Our Story

The word Lavway is of Trinidadian origin and is associated with the call and response chant used when working or marching or during the cheering on of stickfighters. In 2021, the Creative Director of the Carnival band – The Lost Tribe, produced this experimental film based on the traditions of Trinidad's unique Carnival. The context is the producer's love letter to the festival called *"**Dear Carnival**"* which expresses the confusion and disorientation felt by masqueraders about the limitations due to the spread of the COVID-19 virus and the cancellation of Carnival.

The key takeaway from Lavway was the effective use of the personification of elements of the Carnival Experience to construct an engaging story:

> Once upon a time there were three siblings… Savannah, Time and Carnival. They been around way before you and I and way before they were called by those names. Savannah was the youngest… Time was the eldest …And then there was Carnival, their sister and the apple of their eye… Every year without

fail Carnival visited her brothers. Savannah, particularly looked forward with great excitement. This year, he heard someone say that she wasn't coming... he got upset, but then laughed in their face and waited patiently for his sister... And it is here that our Story of LAVWAY is told. (Maharaj, 2021)

5.3   The Story Grammar Approach

The 360° VR experience for this study was created as a participatory narrative, which required the receiver of the story to become a participant in the story. To accomplish this, as outlined in Chapter 4, the narrative had to be considered as process and not as artefact. The narrative had to emerge from the interactions among characters in the story, around a theme. The character-based narrative form (Aylett, 1999; Nath, 2001) was therefore adopted for the development of the story. A first step was to find a theme for the experience.

5.3.1   The Theme

The initial theme developed was based on the cancellation of Carnival 2021. The story focused on the effect this had on the DCFA students who were designing costumes for The Old Yard that year. This story kept, as close as possible to the students' reality, however, this did not yield an experience that included the participant in the story. There was a tendency to write the discourse in the format of a demonstration or explanation, which limited the potential for interactivity for the participant.

It should be noted that because of the way the opportunities presented themselves, the filming schedule was completed first before the story was created. As such, the story had to be constructed around what was already captured, instead of from scenes captured based on a prepared script and storyboard. This was not the intended approach. This approach will therefore be interrogated in more detail later.

The theme that was eventually selected was creativity and the use of the masquerade as an outlet to escape existing realities or an excuse to engage in behaviours that were not normally deemed acceptable in everyday life - the suspension of reality. The title of the story is **"We Live to Dress-up"** and this encapsulated the literature of the

yard. It speaks to the appalling conditions in which its inhabitants eked out an existence, but according to Cummings (2004):

> What it announces is not defeat but the irrepressible urge towards self-expression, the dammed-up and muscle-bound energy of the people who can never be made to forget that they are people. The buried seed reaching out to the light. (p.vii)

The focus on dressing-up opened the story to exploring the creative process involved in making carnival costumes. Fournillier (2009) in her study of Mas' Making and Pedagogy, for example, examined the perceptions of mas' makers about the practices at work in producing Carnival costumes. She revealed that the subjects of her ethnographic study learned mas' making through observing, practising, and modelling in the mas' camp. These experiences, however, were neither easy to capture nor replicate, as one of Fourniller's subjects revealed in an interview (December 11, 2004):

> He [Minshall] has taught me the concept that he being the designer not only teaches me but learns from me and what he told me is that "Peaza I get into your head and you have to learn to get into my head." And in the process of going with Minshall I get to understand Minshall just as Minshall get to understand me. On the phone he would say, "De Peaza I want so and so". And just give me a measurement and an idea of what he wants. He would say, "You make a sample. Come, I doing a drawing". And we will work. And sometimes when I reach in the camp he would say, "Just add here take off here". (Fourniller, 2009, p. 98)

To capture this costume fabrication process, therefore, I used the three basic components of narrative grammar, which were the setting, plot, and character, to build the story.

5.3.2 The Components of the Narrative Grammar

As already indicated, the story was based on TOY at the University. The idea for the plot and characters, however, came from a well-known fairy-tale which dealt with the

concept of the magical transformation of the main character from rags to riches – *Cinderella.* This story depicts this transformation through the process of "dressing-up" for a ball, where the protagonist eventually escapes her terrible reality and enjoys a life beyond her wildest dreams.

The main characters for the study's narrative were therefore the protagonist and the fairy-godmother, whose relationship was redefined as granddaughter and grandmother for this experience.

5.3.3   The Story

Along the lines of the original fairy-tale, the protagonist, Cindy, lives a depressing existence with her step-mother and sisters abroad. Her father who was originally from Trinidad had passed away leaving her to fend for herself. Cindy's only link to her Trinidadian heritage is her father's mother Val (a play on the word Carnival), who essentially becomes her fairy godmother. Val eventually arranges for Cindy to make her first ever visit to Trinidad. It is Val's hope that by introducing Cindy to the spirit of Carnival, she will take her out of her depression and transform her outlook on life. Val plans a series of engagements so that Cindy is able to acquire a better appreciation for the art behind the masquerade. This includes sitting in on class sessions and presentations of DCFA students at the University and paying a visit to a mas' camp called Callaloo, where she gets a first-hand exposure to the creation of a costume. These experiences build up to The Old Yard event, during which the Masquerade Ball occurs. Cindy's introduction to the spirit of Carnival brings about a change in her, and a commitment to be a full-fledged masquerader in the future.

The weaving of these story elements is done through what Aristotle (2016) called **diegesis** where the poet directly addresses the audience in the form of an all-knowing narrator who speaks from "outside" in the form of commenting on the action or the characters. This communication is conveyed via 2D videos. With these videos, a Third Person POV of the experience is established where the narrator in the video plays the role of conveying the thoughts and feelings of the main characters to participants. Participants become interventionist users in the story, as they accompany Cindy through the story events. New information is revealed to them as the experience

unfolds. Although the storyline is communicated through diegesis, which provides a third person perspective, the POV also switches to a first person perspective when participants explore the 3D environments of the story worlds. This will be discussed further in the section on the Making Grammar.

5.3.4   Narrative Construction

To determine how these story worlds connected, I created a story map. I applied Phelan et al.'s (2012) concept of progression, which is grounded in the link between the logic of the text's movement from beginning, to middle through ending. This involves exploring the story worlds, moving from one engagement to the next (the encounter dynamics) and includes a participant's temporal experience (participant's dynamics) of that movement. According to Phelan et al. (2012), the logic of exploring the story worlds encompasses not only the interconnection among events but also the interaction of those story-level dynamics with the discourse-level dynamics arising from the interactions of implied author, narrator and audience. On the other hand, participants' temporal experience consists of an evolving (or shifting) understanding, judgements, emotions and expectations as they follow the encounter dynamics. These dynamics are facilitated by the arrangement of the story elements that can produce larger patterns. Figures 5.1 to 5.6 highlight the key narrative structures employed by writers.

Figure 5.1

Linear Narrative Structure
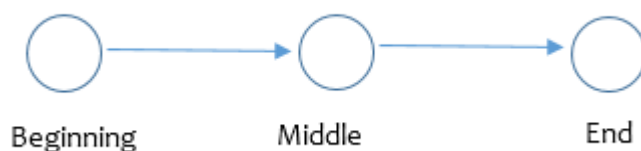
Note. Linear narratives draw a straight line from the beginning to the end of a story. These narratives start the story at the beginning and tell consecutive events until the finale. This figure is the author's own work.

Figure 5.2

Parallel Narrative Structure
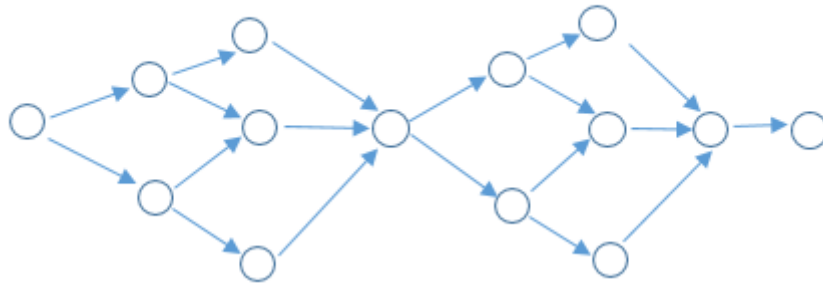
Note. Participants are presented with choices in the story and although these decisions alter the route they take, they always return to the main narrative thread for pivotal moments. This figure is the author's own work.

Figure 5.3

Threaded Narrative Structure
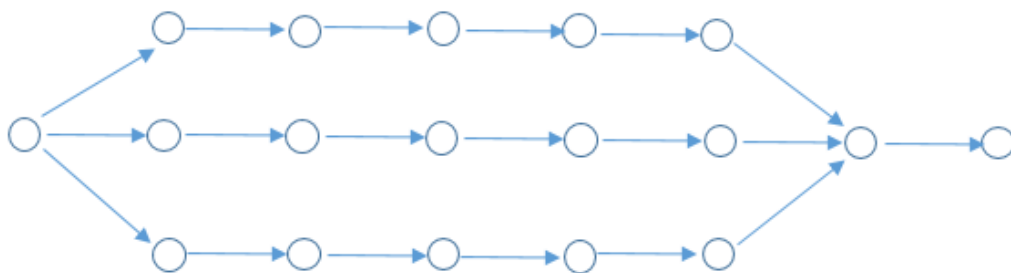
Note. This structure allows for the telling of the story through multiple points-of-view. Threads can link together or stay very separate. The course of the plot does not follow a single path, rather the story comprises a number of different threads that develop largely independently. This figure is the author's own work.

Figure 5.4

Concentric Narrative Structure
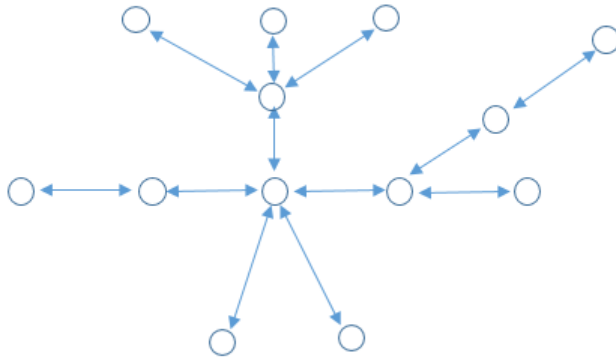
Note. This structure revolves around a main hub, which contains multiple points to different threads of the story. Participants can choose which path they take in whatever order they fancy but they always return to the core area. This figure is the author's own work.

Figure 5.5

Branching Narrative Structure
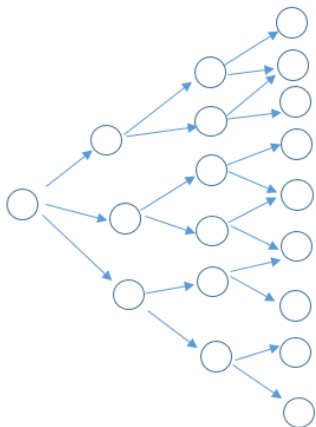
Note. The simplest non-linear stories use a branching structure where you start at the beginning and are given several options, and those options lead to new choices, which each lead to new choices… this can go on for a long time. This figure is the author's own work.

Figure 5.6

Fishbone Narrative Structure
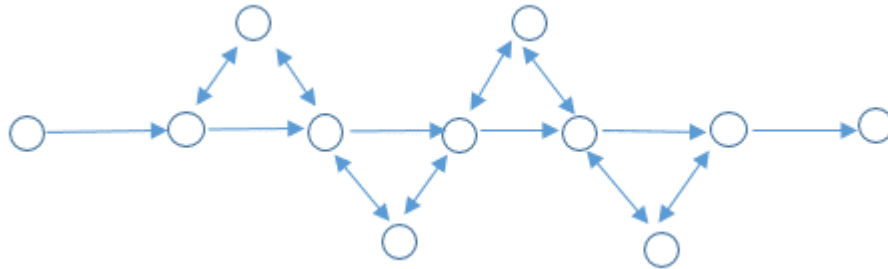
Note. The Fishbone has a traditional linear structure running through its core but it also allows participants to veer off and explore the sub-stories of its tale but always return to the main thread of the story. This figure is the author's own work.

I selected the Fishbone Narrative structure for the 360° VR experience. This format allowed for the control of the unfolding plot while presenting opportunities for the participant to veer off the path to get more information from sub-plots. This facilitated choices for participants in their decision making and supported some level of dynamism in the story environment

In this design, the story progression is facilitated by starting videos that pick up the thread of the story as the participant enters the story worlds. After the starting story world (Cindy's Storyworld), the participant has the option to visit the two other main story worlds (the Classroom and the Masquerade Ball). However, there are also supporting story worlds (Val's Back Story and the Callaloo Mas' Camp) branching from the main pathway that provide more context for the experience (see Figure 5.7).

Figure 5.7

We Live to Dress-Up - Fishbone Narrative Structure
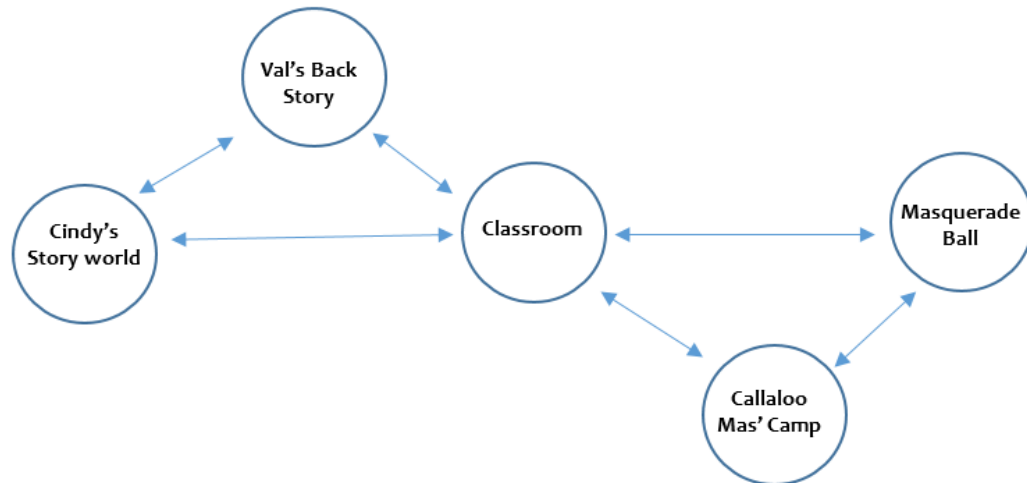
Note. The diagram illustrates the desirable pathways to progress through the experience. This figure is the author's own work.

According to the Storymaking Framework, as outlined in Chapter 4, the story grammar included defining the theme, POV, the discourse, and the format for the progression through the experience. The making grammar is next. This includes the software platform and technical sequencing that provides the user with the required agency.

5.4   The Making Grammar Approach

5.4.1   Character-Based Approach

Using Aylett's (1999) approach to adapting the narrative, the story (see Appendix 2) was constructed at three key levels, as follows:

1. The overall plot.
2. Character-level abstract action sequences.
3. Physical behaviour (cognitively or reactively determined) of the participant.

This approach allowed the design to navigate the clash between the pre-scripted drama and the freedom to allow the experience to be created through encounters. There was always a need to strike a balance between how far the pre-determined

nature of much of the narrative could be relaxed and how far the user in the virtual environment could freely participate in the experience rather than acting as a spectator.

The narrative format therefore followed a character-based approach. The story unfolded in story worlds, which conveyed information on the main characters. *Cindy's Storyworld,* for example, reveals information on her life prior to her visit to Trinidad. The story picks up as soon as she arrives in Trinidad. Cindy, as well as the participants, are placed in an art gallery environment that introduces them to traditional Carnival characters through images and text information (see Figure 5.8).

This is a 3D environment, which facilitates the physical activity of participants, through the process of moving through the story world. If there are multiple participants in this space, discussions among themselves on their impressions of the images on display can occur.

Figure 5.8

Cindy's Storyworld
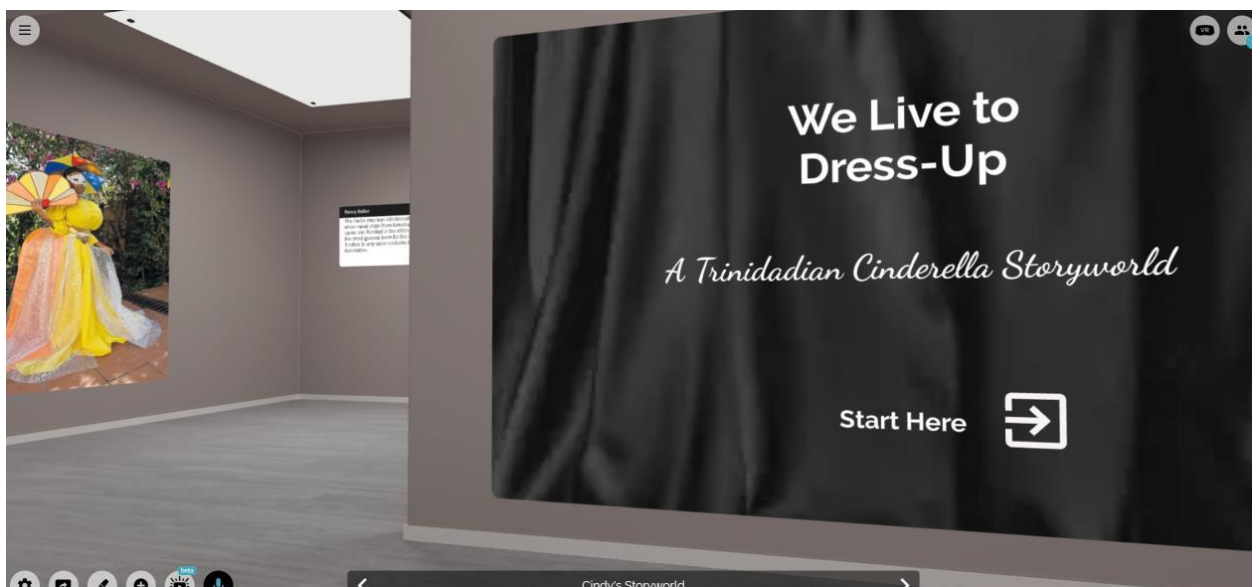
Note. Cindy's Storyworld image taken from the 360° VR experience developed by this study.

To initiate the physical behaviours of participants, cues are provided within a scene to signal to them to explore the environment and autonomously decide on their actions. These actions, although simple decisions, such as where to look, where to move to, or what to click on, facilitate the characteristics of interactivity.

5.4.2   Online 3D Documentary Models

To build the experience, I reviewed examples of productions on the internet and their technologies. Most significant were the HIGHRISE Trilogy. This project was not a standalone documentary but a series of documentaries regarding the issue and topic of urban high-rise living. The first episode was *HIGHRISE – Out of My Window*. The other episodes were *HIGHRISE - One Millionth Tower*, and *HIGHRISE – The Universe Within*.

5.4.2.1 *HIGHRISE: Out of My Window*

This production of the National Film Board of Canada directed by Cizek (2013) was said to be one of the world's first 360° VR documentaries delivered entirely on the web. The story is about the state of our urban planet told by people who look out on the world from their high-rise windows. This online documentary was a place-based storytelling project involving 49 stories from 13 cities put together in one virtual highrise, using a 360° game-like interface. It combined a multitude of digital media including digital photography, soundscapes, short-cut videos and graphics. This program was created in Flash and therefore could not be accessed on mobile devices such as iPhones or iPads. Eventually, it was archived when Flash was no longer supported on the web. McDougall's (2014) case study on the project, however, provided the following useful insights:

Flow: There was no particular flow of content. There were windows to choose from at the beginning and then a global map, and the aim was to go to every dot on the map or back to the windows and explore every area, learning of the people and their stories. The flow of content was different with every user and differed depending on which path was followed. This documentary, therefore, did not flow in a story-like or chronological way; there was the freedom to choose what you would like to watch and therefore experience within the documentary.

Navigation: The navigation was quite easy, straightforward and involved choices. Once a story/person/place was selected, the navigation around the apartment scenes was done simply via click and drag or using computer arrows. This supported participants' agency, as users felt they were forging their own path through the story.

Interactivity: There were interactive elements that allowed users to explore further into the lives and stories of the people they visited. Certain objects within the scene popped out and glowed when the mouse passed over them, letting users know there was something further to discover in relation to that object. It was through this method that snippets were revealed about the people and their lives, to build a picture of the experiences of vertical living and urban high-rises.

Typology: The use of text was limited. The project refrained from using video subtitles. When typography was used it was linear and clearly formatted in order to convey the information correctly.

5.4.2.2 *HIGHRISE: One Millionth Tower*

This documentary was built with open-source Hyper Text Markup Language (HTML) 5 and a web-based graphics library (webGL). It placed the user in the three-dimensional world of a run-down high-rise neighbourhood, where users can interact with the environment and see it reimagined as a lively flourishing community. The 3D environment runs on a webGL engine (Mr. Doobs three.js 3D javascript). The event sequencer was Mozilla's Popcorn, which triggered camera moves, animation, video and audio playback, and pulled in semantic data from Flickr and Wikipedia. The production also drew on Google Street View and satellite titles through their Application Programming Interfaces (APIs) and Yahoo's Weather Service API, which gave the project both a global and local feel. Open video and audio formats (WebM and OGG) were used to encode assets and a custom alpha channel library for HTML 5 videos was also used to composite the video assets seamlessly on top of 3D planes within the environment. XPath Extended Mark-up Language (XML) and XML HttpRequest (XHR) helped prepare assets and pre-load and cache (Cizek, 2011).

This documentary explored how persons locked away in their concrete towers communicated with friends and loved ones. As stated on the website it:

> Takes us inside the hearts, minds and computers of vertical citizens around the world: from Guangzhou to Mumbai to New York and beyond… Trapped in our apartments, how do we engage with our loved ones over the worldwide web? How has it rewired our brains and our relationships?… Universe Within confronts the viewer with provocative questions about ethics, emotions and empathy in our digital, vertical environments. (Cizek, 2015)

This production used still cameras, video cameras, audio recorders, 3D-video capturing systems, video editing tools and open source web technology - webGL to build the project. In addition, an open source software called DepthKit created by James George, Alexander Porter and Jonathan Minard was used. The production captured photographic data in three dimensions, combining the language of photography and data visualisation. DepthKit was used to pair up digital Single-Lens Reflex (SLR) video with 3D-scanned depth information to produce 3D-point cloud avatars (Cizek, 2015).

The HIGHRISE documentaries were big budget productions made by teams of experts with, among others, media and software development expertise. A significant amount of software programming was used to create these works. These documentaries were very creative and interactive.

These resources, however, were not available to this study. As such, a search was made for an affordable, possibly free platform, to create the virtual experience. From the review of the HIGHRISE productions, however, I was able to identify criteria and features for the selection of an appropriate software application for the project.

5.5   Selecting the Platform

A fundamental requirement for the platform was that there should be no need for software programming, as this was beyond my expertise. In addition, the platform

had to be able to facilitate user navigation in an exploratory, tour-like format. In telling the story there should be the ability to incorporate different media in addition to the 360° videos, e.g., images, text, and 2D videos.

The search began with virtual tour software including VEER Experience, MARZIPAND, ORBIX 360, THEASYS and KUULA. I felt that these applications would assist with the much-needed mobility through scenes that could contribute to the feeling of presence in these spaces. Unfortunately, these applications could not facilitate the unfolding of a story.

Other types of software reviewed including the following 3D development platforms and storytelling applications: Stornaway.io, Odyssey, Klynt, Interlude (EKO Studios), Unity and Wonda. A comparative review of their capabilities is included in Appendix 1.

5.5.1 Wonda

The Wonda platform was selected for this study. Wonda is a VR learning and collaboration platform that allows users to easily edit, share and access immersive learning and collaborative experiences based on 2D, 3D and 360° media, accessible using any device, e.g., Virtual Reality Head Mounted Displays (VR HMDs), mobile telephones, tablets or personal computers (PCs). The Wonda editor works as a web-based authoring tool which allows users to seamlessly add interactive annotations and quizzes on top of any 2D, 3D, 360° media or audio content (Syed, n.d.).

5.6 Conclusion

This chapter outlined the storymaking approaches that were used to design the 360° VR experience. The first step was to define a context for the story. Following this, suitable immersive story applications on the Internet were reviewed for ideas on how similar projects were executed. Next, design activities included working out the story grammar which involved defining a theme, writing the story, creating a story map and selecting a narrative structure to link the story worlds (see Figure 5.7 - The We Live to Dress-up - Fishbone Narrative Structure). The making grammar used a

character-based approach to work through the interactivity elements. Finally, a software platform to build the application was selected based on a review of the technical execution of interactive, immersive projects, which demonstrated how the elements of flow, navigation, interactivity and typology can be applied.

The following chapter is devoted to examining this design experience using autoethnography, which is a qualitative research method that allowed me to connect my personal experiences to wider perspectives on the production of interactive 360° VR experiences.

Chapter 6 - Examination of the Storymaking Experience

6.0   Introduction to a Storymaking Autoethnography

The previous chapters can be viewed as the backstory for the actual production of this storymaking experience. The subject matter for the experience – Traditional Trinidad Carnival Characters - was identified in Chapter 1. In Chapter 2, a review of the technology and the possible affordances to be included in the experience were examined. The focus for Chapter 3 was on the future of storytelling in virtual reality, paving the way for a new art form, storymaking, to support immersive experiences. In Chapter 4, a conceptual framework was crafted from selected theories and concepts to provide a basis on which storymaking could be understood and articulated. Then in Chapter 5, examples of how others had developed immersive experiences and the software platforms they used provided clear guidelines for the execution of the design and development process.

This chapter aims to interrogate the production of the experience, which occurred between 2021 and 2022. This is accomplished using a self-reflective account as a member of the design team, which I captured in a research journal. In the following discussion, my journal entries are reflected as the opinion of the Director.

The main method I used to capture the design and development experience was autoethnography. This method facilitated me to be the instrument to capture the lived experience to make it available to the study. The anecdotal accounts from my research journal were used to connect my experiences to wider cultural meaning and practices.

Autoethnography is a research method and methodology, which uses the researcher's personal experience as data to describe and analyse a topic of personal relevance in the social context in which it occurs (Méndez, 2013). Autoethnographic methods include journaling, reviewing archival records (institutional or personal), and self-interviews. The data collected are expressed in narrative writing, which allows the researcher, according to Clandinin and Connelly (2000), to question internal conditions such as feelings and emotions, external conditions such as the

environment and the temporal dimensions of past, present and future. Although autoethnography as a research method is a relatively new tool for me to use, I felt that capturing my experiences as events unfolded was essential to interpreting the outcomes and representing them through writing. The advantages include gaining access to rich data and the ease of access to the data (Pavlenko, 2002, 2007). Another advantage is the potential to contribute to others' understanding through my reflective practice.

6.1 The Production Exercise

6.1.1 Filming

360° VR is considered to be at a nascent stage of development and, as a result, it was difficult to find universal guidelines to evaluate the successful deployment of pre-production activities for an immersive experience. Much of what transpired in this production exercise was interpreted from the perspectives of the team members.

The team's composition was small, consisting of a DCFA member as the subject matter expert (SME), a videographer and female assistant, and me in the role of Director. Both the videographer and I had qualifications in video production; however, only the videographer had shot and edited a 360° video. All members, however, would have had 360° video user experiences from YouTube videos and Oculus applications.

As the leader of the design team, I kept a journal to capture the experiences. I also collected email communications among team members as a secondary source of information. Approval to use these communications in the study was received. Additionally, a third source of information was collected from a debriefing questionnaire that was administered to the other main team members at the end of the production phase, for their objective feedback on the production process. The comments of the SME and the videographer were drawn from their responses to the debriefing questionnaire.

The team's initial expectations of the pre-production process were influenced by a familiarity with making 2-dimensional (2D) videos. The following illustrates these initial perceptions:

> Initially my thinking is that it would follow a similar storyline of traditional film and the concepts I learned in my studies. (Videographer)

> I expected it to require some specific filming expertise and post-recording production skills. (SME)

> With this being my first experience in 3D filming, I feel that the filming process will be just as engaging as filming a scene in 2D. (Director)

After actually filming a scene, these perspectives were adjusted, as follows:

> Because the set changes entirely for 360 film, I had to re-conceptualize how a storyline can fit that set which now has no 'shot' and therefore simple concepts like reverse shot would not apply. I also had to reconsider camera positioning because everything is in the frame and therefore I had to choose the perspective that best suits the character and storyline. (Videographer)

The Videographer's comments, in fact, revealed a change in the filming procedure encountered with the 360° video exercise. During the filming process, the camera was simply placed in the scene and filming was triggered remotely. Camera perspectives based on using different angles, lenses, and other filming techniques such as close-ups or panning were not available in this format. As such, there was little room for directing how a scene could be captured using camera techniques. Filming a scene with the camera on a monopod required that anyone who was not connected to the actions being recorded had to hide from the camera. This not only meant that the crew could not be seen in the shot but, also, they could not see what was being recorded:

> I felt that the mind's eye of the Director was totally missing. This disconnection was very disruptive to my creative process and signified to me that the majority of the creative work would have to happen in post-production. (Director)

This was a significant discovery for me. The story could no longer be supported by shooting different camera perspectives.

Another finding was based on the camera attached to a backpack mount to facilitate movement through a scene. For this method of filming, the person wearing the backpack (the Assistant) was simply the vehicle for capturing a First Person POV. As such, in whatever way she moved, there would be a similar effect on the participant in the experience. Accordingly, the Assistant had to be conscious of her movement and interactions while filming. What I noted during post-production was that when she quickly spun around to capture an object behind her in the mas' camp, this contributed to a dizzying effect for the viewer.

In addition, it was noted that the Assistant had to remember that although she was physically a part of the scene with the backpack camera, she should not make audible comments during filming because this sound would seem to be an out-of-body sound, as the camera would not capture her image, only her audio. An example of this was noted during the recording of the Callaloo Mas' Camp scene. I picked up in post-production that the Assistant had made some automatic vocal response, which were recorded by the ambisonic microphone. The microphone in fact picked up many extraneous noises that also proved to be distracting in some instances.

The lighting of scenes was another finding that demonstrated the difference between filming 2D and 360° video. I found that in the spherical format using independent light sources to spotlight key action spaces was not possible, as the camera would pick up the light stands. As such, the team quickly realised that all scenes had to be shot when there was sufficient available natural light. The only other options were to use regular lamps in a scene or to rig an indirect light source that could not be detected, such as through a window.

Significantly for me, however, was that after the filming was completed, I did not have the benefit of seeing what was captured, as there was no playback system to view the recorded material on location. The full visuals were only viewable when the recordings were stitched together during editing. I therefore had to take on good faith that the quality of the recordings was satisfactory and that there were no major issues with the scenes. This placed pressure on the videographer to record a scene perfectly the first time, otherwise the entire scene would have to be re-shot. This was

because using transition effects (e.g., dissolves, fades and cuts) in editing to mask filming issues could compromise the realism of a scene.

6.1.2 Post-Production

The first brainstorming session for the post-production was done virtually on February 26, 2021 after the filming was completed. The DCFA team member had initially planned that the completed recordings would only be one part of a much broader experience of TOY. Unfortunately, the COVID-19 pandemic disrupted schedules, which eventually made it impossible to host the TOY event that year.

The initial format (see Figure 6.1) for the experience was along the lines of a virtual museum tour experience where the participant could visit different spaces to engage in various activities. In light of the cancellation of TOY, the team had to decide on how the experience could be created with what was already filmed.

My journal entry of March 5, 2021 reveals my impressions of the team's efforts at reconceptualising the experience:

> The session proved to be more difficult than anticipated. I was prepared for resistance. I came with my ideas and presented them. They had an impact but not at the level of convincing people to use my suggestions to make a final product.

> I gathered that there are pre-conceived impressions on what teaching is, which is linear and very much based on the teller-listener paradigm and very practical and measurable in its outcomes. The concept of the narrative for the environment, while accepted, was not fully understood. The elements of storytelling being a valid method for teaching and learning was not grasped. (Director)

Figure 6.1

Initial Format for The Old Yard Experience
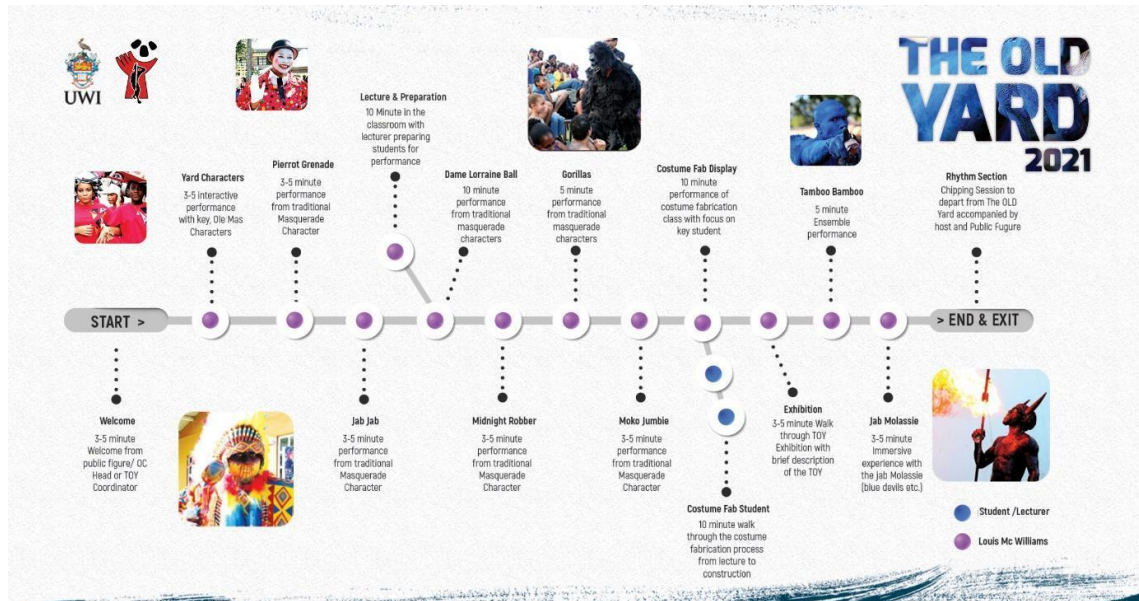
Note. This format was developed by the DCFA Subject Matter Expert.

At the end of this brainstorming exercise the team agreed that the videos would be given to the DCFA for their use and I would develop my concept of the experience separately.

I decided to focus on writing a story to link the videos together. The first idea was to write the story from a student's perspective on the impact of the cancellation of TOY on her costume fabrication process. The story would be based on her experiences and reflections on how she adjusted to the new restrictions for creating and presenting her work.

The DCFA shared their approach in the following email excerpt (March 9, 2021):

Good Afternoon …

This email serves to confirm the process that we are undertaking (have undertaken) for the recording of the Costume Fabrication Production 2021.

"The Art and Practice of Costume Fabrication"

This production can be broken up into four phases.

Phase 1: A recording will be done of the lecturer presenting the art and practice of costume fabrication. He will give a historical perspective of the course (goals and outcomes) and walk the viewer through the process enacted in the subsequent recording from start to finish. The key features of the costume fabrication process will be outlined in this presentation ensuring the viewer has an intimate experience detailing the story of costume fabrication.

Phase 2: Will feature the lecturer in a classroom setting discussing and detailing the work that is required in the costume fabrication process with the students. This classroom setting will feature the lecturer and the students engaging with theory on costume fabrication, what is produced and presented. He will present to the class what is expected of them during practical sessions. This recording will then break out into three parts.

- One will feature a student in Callaloo Mas Camp going through the stages of putting into practice theories presented in a tutorial session (theory, illustration, practical construction/prototyping, trial)
- One will feature students in the DCFA Classroom presenting their work, detailing the components and materials used.
- One will feature a student in Callaloo Mas Camp "prototyping/ trialling" the completed work.

Phase 3: Will present students individually showcasing (with narration) the completed costumes.

Phase 4: Will feature a group presentation of the entire class connecting the theme of the 2021 showcase. This group presentation will be narrated by the Course Lecturer.

Do let me know if further clarification is needed. (SME)

I responded:

Dear ...

Received with thanks. This is quite helpful for understanding the format for the DCFA's version of the Art and Practice of Costume Fabrication. I did an initial draft script for what I am hoping to do with the same materials for my version of the project. I think we have agreed at our last session that it should be ok to do two versions. The thoughts from the DCFA Team on the attached script are appreciated. (Director)

After receiving this communication, I had concerns on the approach that the DCFA had shared. I was concerned that there would be very little opportunity for participants to interact in the experience. For the most part, participants would be spectators of the different encounters. On the scale of 360° videos this would be on the passive end of the spectrum, which I found to be very similar to some productions that I had already experienced. I was concerned that the experience would be like watching a movie with the only difference being that the participant would be doing this from inside the scene. I was also conscious of the fact that this approach had no story connecting the different encounters and as such would not be of much value to my research study, which needed to unpack the story elements that contribute to an emerging storymaking art form.

6.2   Building the 360° VR Experience

From the review of the literature, I felt that the approach to producing a memorable 360° VR experience required careful consideration of how the new dimension of depth could be put to good use. I felt that it was important therefore to consciously consider how to produce for the effects of immersion, interactivity, presence and agency on participants.

However, having completed the filming, I was very concerned that the experience would be constrained by whatever was already captured, which I felt was limited. I also felt disappointed that the pre-planning for developing the experience had failed to reveal a vision of how I could accomplish the next stage of the production.

6.2.1   The Narrative Design

I started post-production by coming up with a suitable narrative for the experience. I interviewed one of the students involved in the project. From this interview, I drafted a script. This student had produced one of the more creative Carnival costumes while having no significant Carnival background. She had never played mas', and had never attended an Old Yard event. Her major was dance and she simply wanted to get more experience in visual arts. As such, she decided to pursue the courses Costume Fabrication 1 and 2. Her exposure to Greek mythology in the theory sessions and its influence on Trinidad Carnival's dragon mas' had a strong impact on her costume design. For her practical sessions, the lecturer allowed her to come to the Callaloo mas' camp where she started with making face masks and then made her headpiece for the costume.

The first script I produced followed the story of this student's experience. However, my early attempts to use the existing footage to create the story experience revealed to me that I was still following the teller-listener format. I tried applying mimesis, which was showing rather than telling, by means of action that would be enacted by the student. However, to do this effectively required much more detailed planning at the pre-production stage, including a script and storyboard to guide the capturing of the required scenes during filming. The attempt at using this script, along with the limited footage, resulted in an output that told a story using the video clips, which provided a passive experience for a participant. In developing the narrative, I realised that I had to avoid a dictating mode.

The following highlights the sentiments of the other members of the design team from the debriefing questionnaire (see Section 6.1.1), when asked what, if anything, you would do differently in a future project of a similar nature:

> Future projects require more preparation. I would have a longer rehearsal period. (SME)

> I would definitely re-think the storyline since it is all first person view and therefore I would reconsider things like placement and narrative etc. (Videographer)

The lesson learned from this attempt was that the focus should be on developing activities for participants in the different scenes. The application should walk participants through the environment while engaging them to interact with the narrative elements.

Therefore, to create the narrative design, I eventually used a story-based learning template (see Appendix 2) to work through the following elements of the narrative:

1. Theme.
2. The Plot.
3. The Characters.
4. The Tone.
5. The Scenes.

This approach enabled a flexible presentation of the narrative, which was described in detail in Chapter 5. I used diegesis to convey an interior view of the story worlds. Details about each world and the experiences of its characters were revealed explicitly through this narrative. The story was told by a third person outside of the scene, as opposed to enacted by actors within the scene.

The segmentation of the narrative was based on the different experiences the available footage allowed. I was able to develop five segments. The first scene – Cindy's Storyworld - allowed for the presentation of the traditional Carnival characters. The scene – Val's Backstory - provided information on the concept of The Old Yard, which incorporated the history of the Carnival experience. The classroom scene featured the students' description of their costumes, while the Callaloo Mas' Camp scene presented the stages of costume fabrication. All these activities culminated in The Old Yard, which was presented in the final scene.

In Chapter 5, I indicated that these scenes were connected using a fishbone narrative structure. This structure included a traditional linear format running through its core but also allowed participants to veer off to sub-stories and then return to the main thread to advance the experience. In this way, the participants were afforded options on sequencing the story experiences based on their choices. The procedural logic used for each scene included a starting video that provided the context of the scene.

Participants were then encouraged to explore the scene to gain more information from the features included, which were either photographs, text, 2D or 3D videos. A quiz element was later included to motivate participants to engage with the information in a more meaningful way. To exit a scene to visit another, participants were able to click on a hotspot, which brought up a transportation chamber image from which the next destination was selected (see Figure 6.2).

Figure 6.2

Transportation Chamber Connecting the Story Worlds with Hotspots
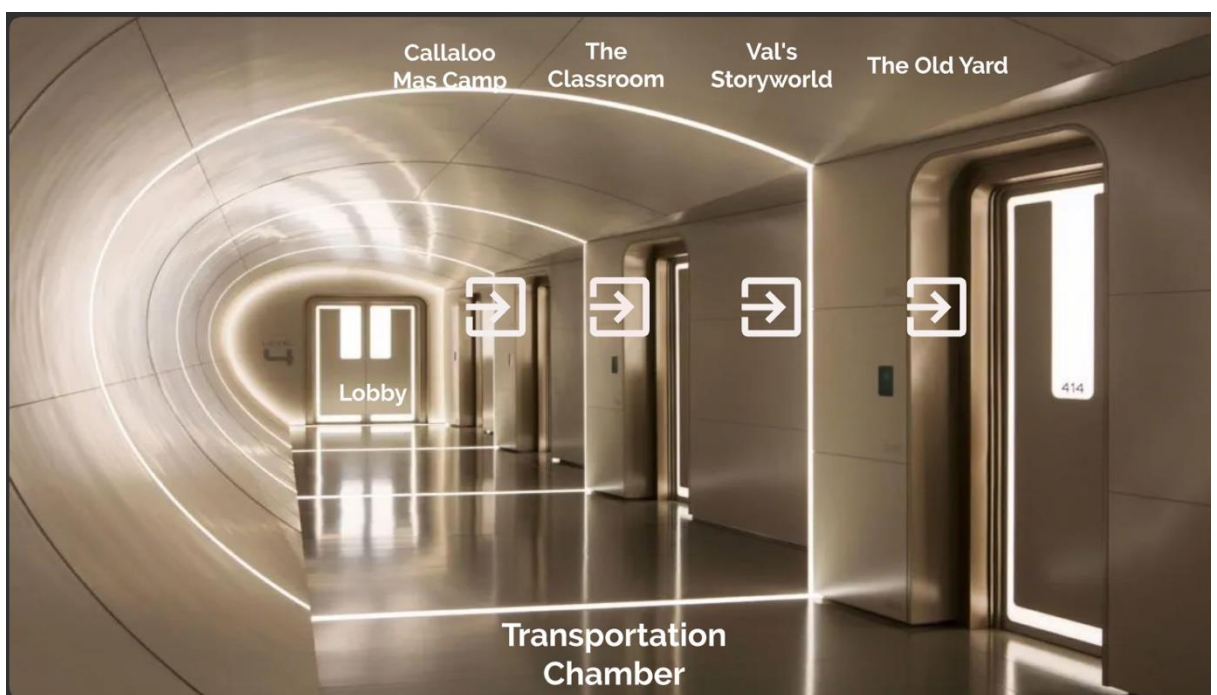
Note. Transportation Chamber image taken from the 360° VR experience developed by this study.

6.2.2   The Functionality

To visualise how all the elements that contribute to the narrative development could come together to create an experience, I started by story mapping the connections among them (see Figure 6.3). This served as a blueprint that detailed the assets, hotspots, hyperlinks, and directional symbols to be used for the experience's functionality. In the story-based learning template (see Appendix 2), for example, I listed all the resources that would be assigned to each scene, including the Uniform Resource Locators (URLs) for the 2D videos.

Figure 6.3

Example of the Initial Story Map
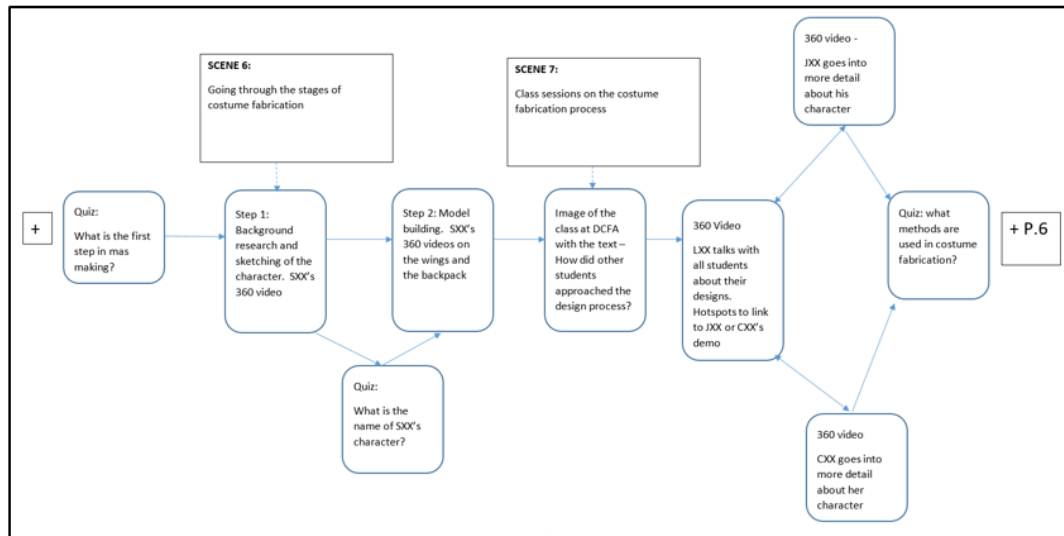
Note. *This image was taken from a 5-page layout called the Story Behind the Story of The Old Yard – Story Map. This figure is the author's own work.*

With five different story worlds and different narrative elements within each story world (e.g., text and videos), it was also important to include procedural devices that supported self-directed exploration and prevented users from getting lost. I therefore included simple narrative vectors, such as directional text signs, which alerted participants to click on images for more details or to exit the scene. I felt that these vectors would allow participants to discover the materials provided in their own order and provided them with a degree of agency (see Figures 6.4, 6.5 and 6.6).

Figure 6.4

Quiz Clue Hotspot and Progress Tracker

Note. Hotspot and Progress Tracker image taken from the 360° VR experience developed by this study.
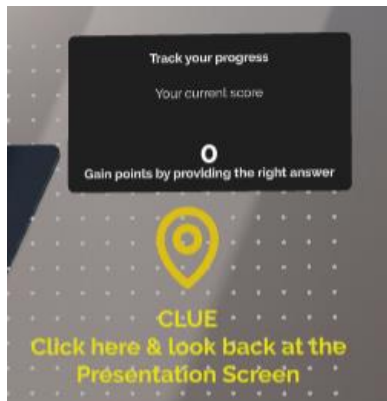
Figure 6.5

Options for Joining 360° Classroom Videos

Note. Joining 360° Classroom Videos image taken from the 360° VR experience developed by this study.

Figure 6.6

Hotspots to 360° Videos
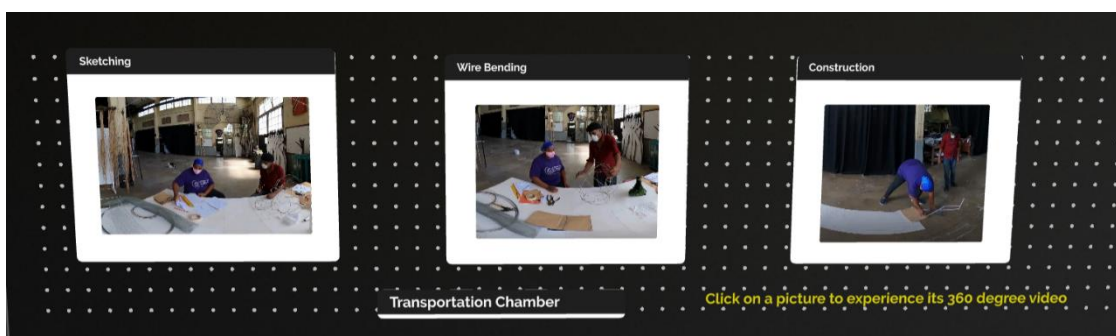
Note. Hotspot images taken from the 360° VR experience developed by this study.

Having worked through the Narrative Design and the Functionality, I used the pre-developed scenes in the software platform (Wonda) to construct each story world. These scenes were, however, not authentic to Trinidad and I considered this as a limitation of using commercial software platforms compared to a custom-made solution. With more time and resources, however, the authenticity of the application can be improved by creating 3D environments that reflect the local environment.

I worked around this limitation with assets (photographs, text and videos) that conveyed a visual and auditory connection to the story context. This is similar to a museum experience where the physical spaces are not authentic; however, the staging of these spaces allows the imagination to create a sense of realism.

Engaging with the application using a VR headset and hand controllers facilitated a user to navigate through the scenes and interact with the assets. With a laptop, participants can use a mouse or the keyboard directional keys to move around and to select assets.

6.3   Describing the 360° VR Experience

6.3.1   Navigation and Flow

The 360° VR experience I created can be shared via private link or embed code, where participants are invited to enter the experience via a website or a compatible VR headset (e.g., iOS + Mac; Oculus Quest, Rift & Go; Pico; HTC; Microsoft Mixed Reality and Windows). Participants must select a suitable avatar (see Figure 6.7) then join each other in the immersive space to engage with the experience.

The story worlds can be explored individually (using separate access codes) or all in one session. The first scene is *Cindy's Storyworld,* where participants are introduced to Cindy's story and can move around the space to view the different installations on traditional Carnival characters. In each scene there is a presentation screen where images and 2D videos can be displayed (see Figure 6.8).

Figure 6.7

Selecting an Avatar
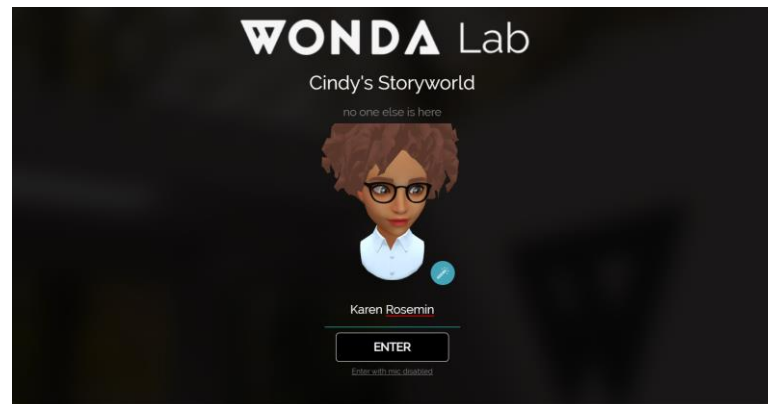
Note. Screenshot of the avatar selection in the Wonda space for 360° VR experience developed by this study.

Figure 6.8

Layout of Cindy's Storyworld
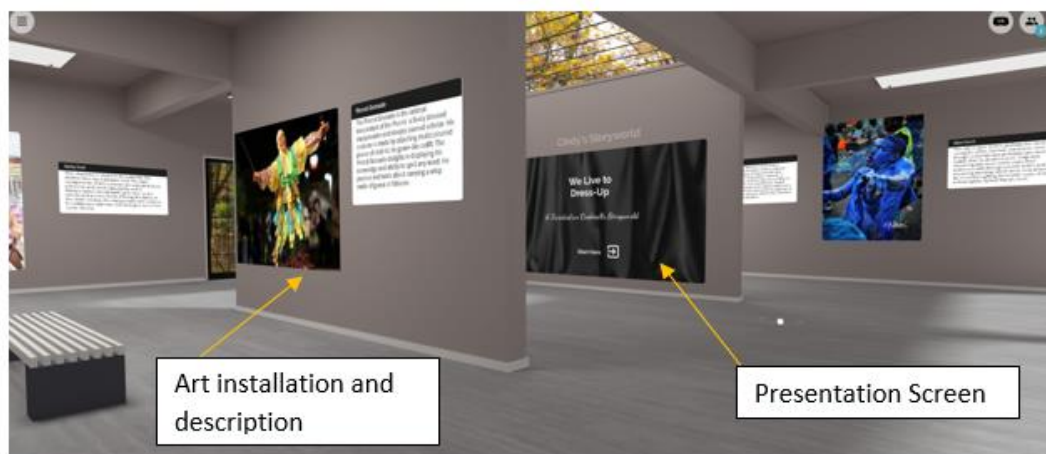
Note. Screenshot of Cindy's Storyworld identifying key features of the space. From the 360° VR experience developed by this study.

To navigate the 3D space using an HMD and controllers (e.g., the Quest 2), users must manipulate the left controller thumb stick to move around. On a PC or tablet, the mouse or direction keys on the keyboard can be used to select the positions to move to. With the HMD, the user can also have a swivel chair VR experience by simply swinging around to gain a 360°view.

To move from one story world to another, users must mouse click or use the right controller trigger on a hotspot in the Transportation Chamber image. The Transportation Chamber provides a choice of what scene to enter next, which can disrupt the chronological flow of the experience. However, the scenes are developed so that users can still follow the storyline based on whichever path is selected. As such, users' experiences will differ according to the paths they choose.

6.3.2   Val's Back Story

Val's back-story gives participants an insight into the history of the barrack yards of Port-of-Spain, from which the concept of The Old Yard event originated (see Figure 6.9). Participants will encounter images and information on the settlements of east Port-of-Spain, well known as "Behind the Bridge".

6.3.3   The Classroom Sessions

The Classroom Sessions space provides a connection to the DCFA and the work of the Costume Fabrication students (see Figure 6.10). This 3D space features the individual works of the students and classroom sessions where they describe the processes used to conceptualise and create their costumes. In this story world participants can experience 360° videos. These videos involve the classroom sessions with the lecturer. In addition, there is a discussion on the construction of the costumes and the display of the costumes and their themes by the masqueraders.

Figure 6.9

The Layout of Val's Back Story

Note. Screenshot of Val's Back Story space taken from the 360° VR experience developed by this study.

Figure 6.10

The Layout of the Classroom Space

Note. Screenshot of Classroom Space taken from the 360° VR experience developed by this study.

6.3.4   The Callaloo Mas' Camp

A trip to Chaguaramas[12] to join some members of the University at the Callaloo Mas'
Camp provides participants with the opportunity to get more familiar with the
various stages of the costume fabrication process (see Figure 6.11). This is
demonstrated by a student of the DCFA class in the 360° video format. In this space,
a 3D object was added for participants to examine. In future projects, 3D scans of
actual Carnival costumes can be added for participants to inspect their details. When
the images on the walls are clicked, the 360° videos are activated.

Figure 6.11

Layout of the Callaloo Mas' Camp Space
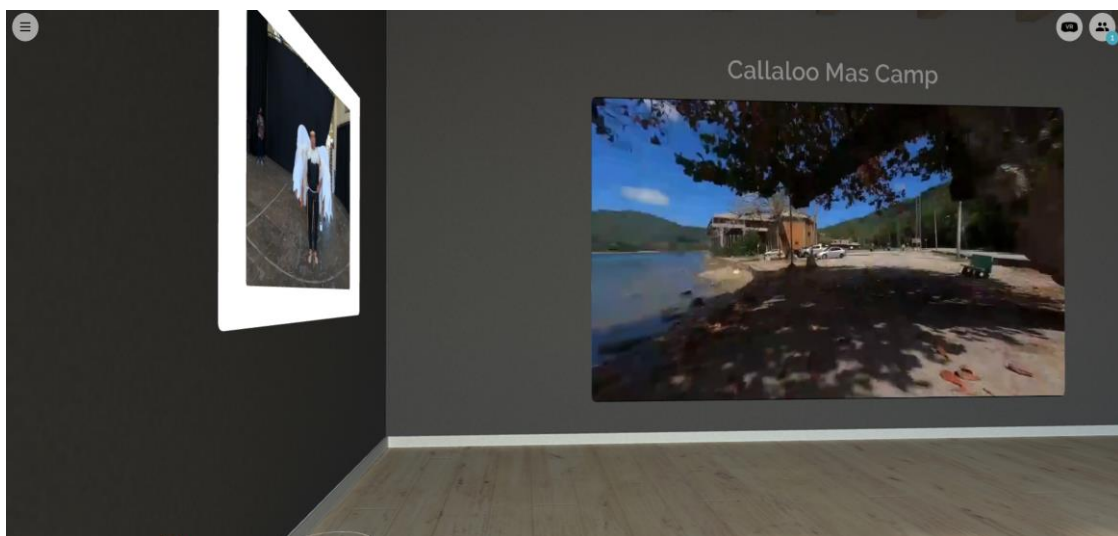
Note. Screenshot of Callaloo Mas' Camp taken from the 360° VR experience developed by this study.

6.3.5   The Masquerade Ball

The final destination is the Masquerade Ball (or Dame Lorraine Ball) of The Old Yard
where participants see the traditional Carnival characters in a real-life setting. This 3D

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[12] Chaguaramas lies in the northwest peninsula of Trinidad, west of Port of Spain. The name is often
applied to the entire peninsula, but is sometimes used to refer to its most developed area. The
developed area in Chaguaramas starts at ALCOA and ends at the Army and Coast Guard camps on the
mainland.

space is an indoor/outdoor space where participants get a feel for the natural surroundings (see Figure 6.12). This aligned nicely with the fact that The Old Yard event is always an outdoor experience.

In the iterative development of the experience, a Lobby space was added, as the entry and exit point for participants. The Lobby provided overall instructions on the goal of the experience and gave participants the opportunity to test out their virtual legs for the first time.

Going through the experience in its entirety can take between 30 minutes to an hour, depending on how long a user spends in exploring the features of the story worlds.

Figure 6.12

The Layout of the Masquerade Ball Space

Note. Screenshot of the Masquerade Ball space taken from the 360° VR experience developed by this study.

6.5   Conclusion

The objective of this authoethnographical review of the Storymaking Design Experience was to determine how narratives can work both as kinds of text and as strategies for navigating 360° VR experiences. The mechanisms and methods such as Aristotle's (2016) digesis, Barthe's (1977a) Deconstruction of the Story, Aylett's (1999) Character-based Systems and the Story-based Learning approach (Rowe et.

al., 2010) were drawn from the Storymaking Framework which was defined in Chapter 4 (see Figure 4.3). In transitioning from non-participatory to participatory narrative formats, it was useful to have this framework as a guide.

For the story grammar, the French Structuralist approach (Barthes, 1977a) of deconstructing the Narrative Text (Story – Discourse; Events – Existents; Action – Happenings; Characters – Setting) provided a useful tool for identifying the elements of the story that would be important for the narrative structure. Once the script was developed, the choice was made on how the discourse could be represented. Although I initially identified Aristotle's (2016) mimesis as a suitable approach, this exercise was constrained by the fact that the script was developed only after the 360° video materials were captured. These videos were, however, not sufficient to support the story being told through the actions of the characters. In fact, their characters were never physically represented in the experience. Instead, their presence was conveyed through diegesis, where a narrator revealed their stories. This required the use of some Affectively Driven Characterisations (Louchart, 2007) to build an emotional connection between these unseen characters and participants. Their stories were also conveyed using still images, video and text that provided the participants with insights into the characters' experiences. This in turn facilitated participants to build their own mental pictures of these character stories, which is connected to the Theory of the Mind (Baron-Cohen, 1991).

For the making grammar, the experience was developed according to Louchart's (2007) character-based approach. The role assigned to a participant in the experience was an interventionist user who accompanies the protagonist on her journey of discovery of the spirit of Carnival. This journey has various encounters; as such, it would be through the participant's decisions on what to look at and where to go next through the experience that would represent the protagonist's journey.

Through the support of the inherent functionalities of the software platform, the interaction of participants with the story environment was possible. Virtual movement, selection of objects, and being able to portal to different spaces gave a sense of agency and presence in the environment.

All the facets of this design experience were brought together using a story-based learning template that facilitated the unpacking of the theme, plot, characters, tone and scenes of the experience. This in turn was graphically represented in a story map that highlighted the connections between the different elements that served as points of interaction for participants.

In the next chapter, the feedback on the user experience will be reviewed to determine the effect on participants and the implications for the retention of the information provided.

Chapter 7 - Results of the Empirical Study

7.0   Introduction

So far, I have examined an emerging narrative practice for 360° VR called storymaking, from the points of view of a Storymaking Framework (see Figure 4.3) and a design process (see Chapter 5). The Framework identifies key theories and approaches that explore the narrative potential of virtual environments. The main focus is the embodiment of the participant in the virtual environment and the mechanisms that can be used to achieve this state and to extract meaning from these experiences. If achievable, then the Storymaking Framework can be a practical guide for creating 360° VR immersive experiences.

To test the usefulness of the Storymaking Framework, I participated with a small team to design and create a 360° VR experience. Although this process was not perfect in its execution, due to the constraints of the COVID-19 pandemic and the limitations of timelines and resources, this practical exercise provided invaluable insights for the application of approaches identified by the Storymaking Framework (see Sections 6.1, 6.2, 6.3).

The feedback from a small group of participants who tested the *We Live to Dress-up* experience is the focus of this chapter. The aim is to identify the approaches from the Framework that facilitated the characteristics of immersion, interactivity presence and agency. The specific research question to be addressed is RQ 2 (What mechanisms, methods and approaches are useful for producing a virtual experience that could contribute to shaping a storymaking practice?). The other question to be addressed is connected to the impact on memory (RQ 3 - What are the prominent factors that contribute to making the experience memorable?).

7.1   Study Design

7.1.1   Participants

Participants were drawn from the UWI Open Campus Pre-University Centre, which offers Caribbean Advanced Proficiency Examination (CAPE) subjects to students. This Advanced Level programme is designed to provide certification to students in

the Caribbean who, having completed a minimum of five years of secondary education, wish to further their studies and seek university entrance thereafter.

The participants were studying one of the compulsory courses in the CAPE programme - Caribbean Studies. This was important to the thesis because these students were being exposed to perspectives, largely from the humanities and social sciences, to provide an understanding of Caribbean society and cultures, of which Carnival is a significant event. It was noted that the suggested learning activities for these students included creating a scrapbook based on newspaper, magazine and Internet clippings or creating a short video on a festival to be shared on YouTube. The intention of this study's demonstration, therefore, was to open students to a new learning activity which could be incorporated into their programme to facilitate an expanded view of cultural activities in an immersive 360°VR manner.

The group included 6 students, 1 teacher and 2 administrators. One administrator was the principal of the school and the other provided student support. Students were aged 18-19 years (4 women and 2 men), while the 1 teacher (female) and 2 administrators (1 woman and 1 man) were over 35 years. Including the teacher and administrators in the study was designed to get their perspectives on incorporating immersive experiences in the curriculum (see Appendix 4 - Details of the Participants).

The size of the group was small because students were doing their studies remotely due to the COVID-19 pandemic. As such, only those persons who agreed to come into the school during specified timeslots (due to the availability of the VR headsets and social distancing requirements) were available to the study. However, even if this is a small indicative study, it points the way to how these ideas might be developed further and the survey instrument can be applied and even adapted for future work.

7.1.2 Data Collection Instruments

To collect data from participants, two instruments were used; a Storymaking Art Form Pre-experience Questionnaire and a Post-experience Questionnaire (see Appendix 3). In addition, I noted observations in my journal about user performances, their comments, and any difficulties expressed during the experience.

The purpose of the Pre-experience Questionnaire was to establish a benchmark for each participant from which their post-experiences would be compared. In the initial questionnaire, there were 33 questions that covered socio-demographic data; cultural interests; general lifestyle; attitudes to technology and VR; and knowledge of the Carnival experience and traditional characters.

The initial Post-experience Questionnaire had 39 questions for socio-demographic data; user experience; questions on the sense making impact; user expectations; the quality of the technical implementation; questions on repeatability and an open-ended comment question.

The study gathered two types of data. Quantitative data were collected from binary questions and questions based on Likert scales. Qualitative data were collected from questions, which elicited descriptions or comments.

User experience questions modelled after Schrepp et al.'s (2017), User Experience Questionnaire (UEQ), were included in the instrument. The UEQ is widely used to measure the subjective impressions of users towards a product/experience. It allows them to express feelings, impressions, and attitudes that arise when experiencing the application under investigation in a simple and immediate way. The standard UEQ is a 7-point semantic differential with 26 items. Each item of the UEQ consists of a pair of terms with opposite meaning, for example, boring/exciting. The answers are scaled from -3 (fully agree with negative term) to +3 (fully agree with positive term) (Schrepp et al., 2017, p.103).

The short version of the UEQ (UEQ-S) was used in the instrument, because it had to fit into the wider post-experience feedback questionnaire that had to capture other information beyond the user experience. UEQ-S contained eight items, grouped into two scales. The first four items represent the pragmatic quality scale and the last four items the hedonic quality scale (see Table 2).

Table 2

The Short Version - UEQ-S

PRAGMATIC QUALITY	SCALE	HEDONIC QUALITY	#
Obstructive	OOOOOOO	Supportive	1
Complicated	OOOOOOO	Easy	2
Inefficient	OOOOOOO	Efficient	3
Clear	OOOOOOO	Confusing	4
Boring	OOOOOOO	Exciting	5
Not Interesting	OOOOOOO	Interesting	6
Conventional	OOOOOOO	Inventive	7
Usual	OOOOOOO	Leading Edge	8

Note. The diagram is based on the Schrepp et al. (2017) representation. This figure is the author's own work.

Due to the pre-programmed structure of the online form (Microsoft Forms) used for developing and sharing the Post-experience Questionnaire, it was difficult to represent the UEQ-S in the 7-point sematic differential format. So, I had to modify the format, while still trying to preserve the value of the response. In my questionnaire, the eight items as shown in Table 2 were separated into sixteen items (8 positive and 8 negative selections) with response following a 5-point Likert scale (None, Not Much, Neutral, Much, Very Much). According to Friborg et al. (2006), splitting up a semantic scale and writing items as negations might introduce new systematic errors as individuals may react differently to positive and negative items. Fortunately, the results from these questions in the instrument showed that the reactions coincided with the opposing ends for positive and negative selections.

Questions modelled after Crawford and Henry's (2004), Positive and Negative Affects Schedule (PANAS) were included to capture participants' emotional responses to the experience. When using the PANAS, participants gauge their feelings and respond via a questionnaire with 20 items. A 5-point Likert scale is then used for scoring, which includes the options: Very Slightly or Not at All; A Little; Moderately; Quite a Bit; Extremely (Crawford and Henry, 2004).

In determining the application's effectiveness in conveying the learning content, it was important to explore the effectiveness of integrating the educational content

into the story so that the participant did not overlook the information. The following learning objectives (LOs) were established for the experience:

At the end of the experience, participants should be able to:

1. Describe specific traditional Carnival characters.
2. List the different stages of the costume fabrication process.
3. Give an account of the connection between The Old Yard event and the history of Mas'.

The content to address these objectives was distributed across the different story worlds (see Table 3).

Table 3

Distribution of the Learning Objectives in the Experience

Learning Objectives	Cindy Storyworld	Val's Back Story	The Classroom	The Callaloo Mas' Camp	The Old Yard
Describe specific traditional Carnival characters	✖		✖		✖
List the different stages of the costume fabrication process			✖	✖	
Give an account of the connection between The Old Yard event and the history of Mas'		✖	✖		

Note. Establishing learning objectives for an experience can be useful for integrating the experience into a wider lesson planning exercise on the subject matter.

To gain insight into what participants were doing in the virtual space during the live sessions, observations were made using two methods. The Oculus HMD had the capacity to cast its screen to a mobile app, which allowed me to view what a participant was doing. I was also able to join the participants in the space from my laptop, where I could communicate with them in-situ and view their activities in the spaces.

7.1.3   The Procedure

An email call to participate in the demonstration was distributed and interested participants accepted the invitation. A Participant Information Sheet and consent form were then sent to them to complete, sign and return before the demonstration. A link to the Pre-experience Questionnaire was emailed to them with the requirement to complete before the session.

Prior to participating in a session, participants were briefed on the experience and demonstrations were done on the use of the headset and controllers. Questions were asked about their comfort level and the visual quality experienced once the headsets were put on. Adjustments were made accordingly prior to launching the experience. Participants were also advised to ask questions of me during the demonstration and were briefed that they were free to terminate the session at any time if they encountered any discomfort or difficulties.

The demonstrations were conducted in a large classroom with sufficient space for free movement and free from outside disturbance. Two Oculus Quest 2 fully immersive VR headsets with built-in earpieces and touch controllers were used. This system utilised inside-out tracking to power the headset without the need to tether the system to a PC or external sensors. The Quest also enabled room-scale tracking. This meant that both user position via the headset, and the user movements via the controllers, were tracked. This facilitated a highly immersive experience that allowed users to physically move around while in an experience in the virtual space. The Guardian system ensured that they did not encounter physical obstacles while exploring the virtual space. Participants had access to:

1. Inside-out tracking.
2. Room scale motion tracking capability.
3. 6 degrees of freedom.
4. 110-degree diagonal field of vision.
5. Responsive wireless controllers.
6. Built-in audio set.

The method used in the pilot demonstration sessions was to establish a room scale boundary where participants could physically move within, without coming in contact with external objects.

A problem-based learning strategy was also included in the experience through the introduction of an information scavenger hunt feature to find the answer to a key question presented to the participant in each story world. This was introduced as a question that had to be answered to solve the quest at each stage. This was designed to motivate the participant to explore the environment by giving them a mission.

7.1.4   Pilot Demonstrations

The questionnaires were pilot tested with 6 participants referred by the DCFA (5 women and 1 man). The majority of the participants did not fill out the online Pre-experience Questionnaire prior to the demonstration and this exhausted valuable time that was allotted for the experience, on answering the questions on-site. The time taken on these questions revealed a need to reduce the amount of questions and to ensure that the instrument was completed before a demonstration was scheduled.

Both questionnaires were subsequently edited after the pilot to capture the most relevant information needed for each category. The Pre-experience Questionnaire was reduced to 19 questions, while the Post-experience Questionnaire was reduced to 32 questions.

The pilot sessions also allowed me to refine the execution method for the demonstrations. To ensure the effective use of time, a specific timeframe was established for each session, which was 1 hour. This allowed for a more effective

management of participant involvement, as the duration in the story worlds was dependent on how long a participant took to explore a space. Because only two persons could be accommodated at one time in a demonstration (based on the availability of headsets), a schedule was later introduced for participants to select a time slot. With an appropriate period established, participants were able to explore selected content to get an understanding of the application and build their user experiences.

The pilot also demonstrated the need to focus on the comfort of the participant. This led to the decision to use a swivel chair format over a room scale format to have the experience. The swivel chair format allowed participants to look around in 360° but not physically move around. A stationary boundary was established around the chair, which could facilitate a more secure and relaxed feeling in participants, while allowing 360° views. Physical movement of participants was not necessary because their movement in the virtual spaces was based on the use of the left controller's thumb stick (see Figures 7.1, 7.2, and 7.3).

In all, the full demonstration sessions were spread over three days to accommodate the availability of participants.

Figure 7.1

Room Scale Format

Figure 7.2

Independent Physical Movement

Note. These images were captured during the demonstrations with the students.

Figure 7.3

Swivel Chair Format Using Thumb Stick for Motion Control

Note. This images was captured during the demonstrations with the students.

7.2   Results

7.2.1   Cultural Interest and General Lifestyle Results

Questions were posed to gain insight into the participants' artistic preferences and cultural involvement in order to observe any connections between their interests and the cultural content of the VR experience. This was also an indication of whether they would be appropriate examples of real-case users of the application. The response revealed that four out of nine participants had an interest in music/singing/calypso, while two were interested in dance and two indicated steelpan playing.

Other independent interests included calligraphy, films, RPG and Massively Multiplayer Online Role Play-playing Games (MMORPG), theatre, painting, acting,

emancipation celebrations and physical arts (e.g., sculpture). One participant, in particular, had an interest, which aligned with the context of the experience, which was costume design/making.

The majority of participants (6), were categorised as culture consumers because they had not been involved in producing any creative projects over the last five years. One participant, however, had a keen involvement in steelband music arranging and in developing/delivering teaching content on these techniques. Another had minimal involvement in building a Carnival costume. Two others were involved in independent creative projects including a monologue for theatre called 'They call me the rat' and poetry writing. These responses demonstrated that participants had a strong interest in arts and culture and as such were suitable to evaluate the experience.

7.2.1   Technology Interests Results

The questions on technology interests were designed to determine how the VR application would align with the participants' experiences and preferences. The responses revealed that eight out of nine participants were interested in learning with technology and a similar amount had experience with VR connected to playing video games. This indicated that their exposure to the technology was mainly through entertainment and recreational pursuits. It was further noted that fewer participants (2) owned some form of VR/video games technology and a similar number had experience with VR or 3D applications. This provided an indication that lack of access to the technology may have contributed to their limited experience with VR and would therefore be an issue to address for future initiatives. It was concluded, however, that there was positive interest in the technology, particularly for entertainment, which could evolve into a growing appreciation for its use in educational contexts.

7.2.2   User Experience Results

From a practical perspective (pragmatic), the results outlined in Table 4 indicate that most participants felt that the application was neither complicated nor confusing. They were clear on what they needed to do and the application supported them to do it. The application, therefore, was able to efficiently on-board participants. From

a pleasurable perspective (hedonic), all felt very intense feelings of interest and excitement and most considered it very inventive and leading edge. It can be concluded that the user experience was very positive with most participants recording most of the positive terms on the higher end of the scale (Much, Very Much).

Table 4

Percentage Results of the UEQ-S Modified

Item	Pragmatic	Hedonic
Obstructive	4 - Not Much	
Supportive	5 - Much	
Complicated	6 - None	
Easy	4 - Much; 4 - Very Much	
Inefficient	7 - None	
Efficient	6 - Very Much	
Confusing	5 - None	
Clear	5 - Much	
Boring		8 - None
Exciting		9 - Very Much
Not interesting		8 - None
Interesting		9 - Very Much
Conventional		3 - None; 2 - Neutral
Inventive		7 - Very Much
Usual		4 - Not Much
Leading edge		7 - Very Much

 Note. This table was created from the Global Experience Quality question- To what extent did you find the application?

With respect to positive or negative emotions from the experience, measured by the PANAS questions, the majority of participants registered positive affect on the higher end of the spectrum (Quite a bit and Extremely) and the negative affect on the very lowest end of the spectrum (Very slightly/Not at all).

Overall, participant interaction with the content of the experience was very positive, where six participants were extremely excited during the experience and the experience kept their interest. Five participants indicated that the application was successful in engaging them in activity, which made them attentive. Six participants stated that the application instilled the feelings of being determined. Four participants experienced feeling strong. Six participants felt inspired and four participants felt proud (see Table 5).

Table 5

Results from the PANAS Questions

Item	Positive Affects (highest responses)	Negative Affects (highest responses)
Interested	6 - Extremely	
Excited	6 - Extremely	
Strong	4 - Moderately	
Enthusiastic	6 - Extremely	
Proud	4 - Moderately; 3 - Quite a bit	
Alert	4 - Quite a bit	
Inspired	6 - Extremely	
Determined	6 - Quite a bit	
Attentive	5 - Extremely	
Active	5 - Quite a bit	
Distressed		6 - Very slightly/Not at all
Upset		8 - Very slightly/Not at all
Guilty		9 - Very slightly/Not at all
Sacred		6 - Very slightly/Not at all
Hostile		9 - Very slightly/Not at all
Irritable		6 - Very slightly/Not at all
Ashamed		8 - Very slightly/Not at all
Nervous		6 - Very slightly/Not at all
Jittery		5 - Very slightly/Not at all
Afraid		6 - Very slightly/Not at all

With respect to perspectives on the effect of the story on feelings of immersion and engagement (pre-experience question 11), most of the participants indicated that they felt this held significant importance (3 participants very and 3 participants extremely important). In fact, during the demonstrations, all nine participants gave a rating over the median (3) that the application held their attention (post-experience question 11) and six participants rated over the median (3), that they lost track of time (post-experience question 13). These results are an indication that the experience accomplished a sense of transportation and immersion, as participants were able to put the outside world on pause while lost in the experience. In fact, eight participants indicated that they felt immersed (post-experience question 18).

The affordance of presence was also significant as seven participants felt that the experience was something they were participating in rather than viewing (post-experience question 15).

With respect to interactivity, responses were collected on participants' abilities to explore and move around the virtual environments. All nine participants felt sure that

they were moving through the experience according to their will (post-experience question 16). Many of the participants indicated very low levels of motion sickness (3 participants none to minimal; 2 participants not much; 1 participant moderate – post-experience question 19). There were, however, two cases which scored above moderate. This may have been an indication of virtual reality sickness which results in physical discomfort when the brain receives conflicting signals about the participant's movement in the digital environment. For some people this could be disorienting. Participant SSX indicated that pre-existing issue with her vision may have also contributed to her discomfort. She indicated that the images were difficult for her to see. Recognizing that this is an important issue to be addressed, VR developers have been working on improving the performance of headset, especially through the reduction of sensory conflict aggravated by latency issues. In spite of this, all participants were intrigued by the ability to move around the virtual worlds, to the extent where external fears of falling off the edge of a virtual world became very real to them.

Data were also collected on the navigational efficiency participants enjoyed. With the ability to move around independently, this meant that the application had to be very intuitive or had to provide useful directions, so that participants could effectively engage with the experience. The majority stated that the information to guide them was self-explanatory (post-experience question 21). One participant (JMX) stated, "Yes, all the information given was very easy to understand and made using the application easier". All nine participants felt confident to move around on their own accord and they all stated that there were no missing instructions on the use of the VR technology (post-experience questions 16 and 29).

To determine whether the participants' immersion in the virtual environment could motivate their progression through the experience and enhance their learning, the question was asked on their degree of interest in seeing how the events of the experience unfolded (post-experience question 17). All nine participants indicated high interest. The following comments from participants also revealed this:

> Yes - the process was planned in a progressive way where you were rewarded at the end of each segment. It was fun as well. (AFX)

Absolutely, the diversity of the various experiences presented a well-rounded approach visually, auditory, kinesthetic. (SFX)

In following the progress of the story therefore, participants were introduced to questions and in finding the answers; learning was promoted.

To obtain more feedback on whether learning occurred because of the experience, the Post-Experience Questionnaire repeated pre-experience questions, which asked participants to give a brief description of selected traditional Carnival characters. This allowed for the benchmarking of a participant's knowledge prior to the experience and whether that information improved after the experience.

With respect to describing the Soumayree character in the pre-experience questionnaire (question 18), for example, four participants either did not know the character or described it incorrectly. In the post-experience question (question 9) most of them, eight participants, were able to give an accurate description of the character. The following provides an example of this improvement in learning:

Pre-experience: Do not know of the Soumayree. (MHX)

Post-experience: Costume that portrays a woman on a horse or donkey, like the burrokeet costume, which are both similar to the centaur in Greek mythology. (MHX)

In describing the Pierrot Grenade, it was noted that while the majority knew the character, they were able to refine their post-experience responses and included more imagery in their accounts. The following demonstrates this:

Pre-experience: This character is known for his scholarly knowledge and his speeches. (SSX)

Post-experience: The Pierrot Grenade is a colourful character that personifies a parrot and tells dramatic stories. (SSX)

Overall, all nine participants indicated that they had learned something new (post-experience question 23). Some of the new learning was related to the technology affordances, for example:

Movement as if I were actually in motion while, in reality, I was not. Sound effects; Ability to manipulate virtual objects and interact with them in a physical manner. Certainly did not expect to be able to operate in a 3D Virtual World and learn so much in such little time. (MHX)

Yes. I did not expect to be able to choose which story I viewed next. (CPX)

Yes - In terms of how realistic and how immersing the experience was. (AFX)

Finally, to determine the quality of the esthetical elements and the repeatability of the experience all nine participants highly rated the enjoyment of the imagery (post-experience question 25). Seven participants gave the clarity of the images a high rating (post-experience question 26). The majority of participants (8) rated the functionality of the application highly and all nine participants indicated that there were no un-necessary steps involved in the use of the VR technology (post-experience questions 27 and 28).

Based on the feedback of the participants it can be concluded that the application successfully met its objectives, with all nine participants indicating that they were glad for the experience and stating that they would like to experience the same or similar content in the future. Some of the closing comments were as follows:

Great! Fantastic! Mind blowing! Profound implications for use in the field of education and culture. (MHX)

It was quite an enjoyable experience especially since I was free to look and move around, this made it feel very engaging. (CPX)

I am very grateful for this experience, it was very fun as well as an education. (JMX)

The whole experience was worth the while which peaked ones interest in VR technology. (AFX)

This was indeed a very interesting experience that I strongly believe can assist in many various aspects in not only cultural arts but can be extended to other aspects of academia. (SSX)

7.2.3 Observations

During the demonstrations, I documented the actions and reactions of the participants to provide another perspective of their experiences, in addition to the questionnaires. Key areas of interest included how they navigated the environment and their reactions to the story worlds.

Most of them, seven participants, easily adapted to moving in the virtual environment, selecting hotspots, and tracking their progress. For example, participant MHX quickly acclimated to the movement and interactivity in the space; participant VNX easily adjusted to the procedural requirements – how to move, how to select items, how to move from one story world to the other; and participant EMX was competent in moving, selecting and teleporting. This demonstrated that for them, the procedural aspects of the application were relatively seamless to the experience.

The two participants who did encounter some navigational difficulties were mature, had less experience with similar technologies (e.g., gaming and entertainment) and were more apprehensive of this new experience. For example, participant SFX was very animated in her fears, entering the space. Her main concern was not to fall off the edge of a virtual environment. Participant AFX, although apprehensive, was more open to be guided and took any difficulties in their stride.

On entering the virtual environment, it was observed that, for participants, constructing a sense of place in this complex, dynamic space was an active process. When participants entered a new story world, they would devote a few seconds to viewing the introductory video and then they would start looking around and moving around while the video played. It was noted that this might be a natural human instinct to look around and get familiar with a new environment before feeling secure enough to spend more time on a specific activity. According to Haskins et al. (2020), humans actively sample their sensory environment to build an understanding of their surroundings and gain information relevant to their behavioural goals. The hypothesis here is that active viewing conditions would increase a viewer's exploratory information-seeking behaviour in a real-world scene. This active viewing

includes every aspect of gaze behaviour from the way we move our eyes to what we choose to attend to, as we construct a sense of place in a new space.

Haskins et al. (2020), in studying active and passive viewing experiences in immersive 360 real-world environments, found that when participants are unconstrained and free to choose their field of view, their behaviour is most guided by meaningful, semantic properties of the environment, as compared with passive viewers. Moreover, in service to this information-seeking behaviour, active viewers employ shorter, more entropic fixations.

Once participants were acclimated, they seemed to be more relaxed in the virtual environment, got involved in conversations with other participants in the space, and were able to describe and comment on what they were seeing. Participant JBX, for example, expressed her reactions to images encountered and commented on the visual brilliance of the 3D worlds. Participant JMX was very animated and from her expressions seemed to have had experience in game playing. JMX commented on the significant improvement of the VR experience over what she had experienced to that date, and could then see being physically in a car in one of those driving games. She was impressed with the 3D environment encountered and kept up a running commentary on what she was seeing and what she liked.

Motor responses to the content were also observed when, for example, participant MHX began dancing in her chair when the music track of a video was played.

7.3   Discussion and Conclusion

From the autoethnographical account in Chapter 6, and the results in this chapter, it is concluded that the Storymaking Framework was successfully applied in this study. The experience, in fact, aligned with perspectives shown through Jordan's (1997) concept of a Hierarchy of User Needs. This hierarchy bares similarities to Maslow's (1943) Pyramid; however, it has three main tiers. The first tier focuses on the *functionality* of the application, which includes its basic technical features. The second tier focuses on the application's *usability,* which looks at the ease and efficiency of use. Finally, the top tier or peak of the pyramid focuses on *pleasure*, which is the joy the application brings to the user. This hierarchy in fact inspired me

to adapt the concept into a model for the immersive storymaking art form, which has six tiers.

At the first tier of the Immersive Storymaking model (see Figure 7.4), the focus is on the functionality of the application. Here the selection of the appropriate VR technology is important to minimising any distractions that may disrupt immersion.

Figure 7.4

User Experience Components in Immersive Storymaking
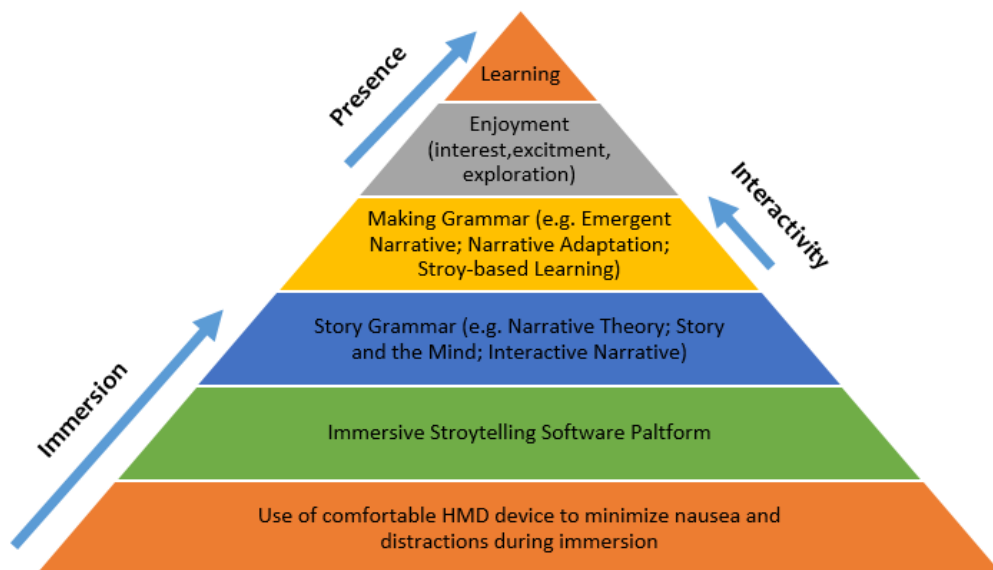
Note. This figure is based on Jordan's (1997) Hierarchy of User Needs. This figure is the author's own work.

Functionality also extends to the second tier, which involves the selection of an appropriate storytelling platform. This provides the foundation for creating the story environment through the addition of resources including assets, hotspots, hyperlinks, coding, directional symbols and navigation controls.

The third tier focusses on the elements that will add to the ease of use of the application. The experience starts to build at this point with the development of the story grammar that will take the participant through a narrative journey. Core story

144

elements, including the theme, plot, characters, tone and scenes are developed at this level.

At the fourth tier, there is a focus on the making grammar which includes the interactive elements of the experience, such as the activities to be engaged in and the goals to be accomplished. This can also be supported by the use of narrative vectors that are able to connect preceding elements of the narrative to segments to come. Narrative vectors are useful for conveying significant aspects of the experience to the participant and can serve to guide participants or prevent them from getting lost. For example, in the application a narrative vector used was a quiz element in each story world, which served as a signpost to direct participants to important information in the environment.

By effectively completing the activities in the first four tiers, it is likely that the remaining top tiers may be successfully achieved. At the top two tiers (tiers 5 and 6) the enjoyment factors that often create the effect of being a part of the experience are encountered. These factors contribute to the characteristic of presence in the experience. This feeling of being present may lead to creating memories of the events encountered based on the information received and the activities executed. At the peak (tier 6), participants should be in a stronger position to recall these encounters, which may lead to memory making and learning.

In the next chapter, I bring the discussion back to the question in the first chapter, on whether the essence of Trinidad Carnival can be effectively captured for retelling through VR technologies. The use of the Storymaking Framework is reviewed for its contributions to resolving this question. This discussion then identifies the key takeaways of the work, its limitations and contributions to the Future of Storytelling and the wider Virtual Reality movement.

Chapter 8 - Discussion and Conclusion

8.1   The Goal

Going through the process of putting this study together and executing the empirical research yielded, for me, a clearer appreciation for how educators can use affordable VR technology to transform the teaching and learning process. Through the bourgeoning magical forest of technologies and applications, useful nuggets of information, breadcrumbs of advice and techniques have been collected that can clear a usable path to successful creative ventures. Bucher (2017) noted that the only way that we eventually stop wandering around in the dark is when someone begins to create a map around the area they have found and someone else shines a light on it.

The review of the literature (Chapter 2) revealed the elements of a new era in media and communications technologies, particularly through the influence of Artificial Intelligence which is more efficiently simulating human action through digital devices. Bucher (2017) noted that traditional communication media such as novels and movies have become mainstream overtime because of the elements of their technology, which have been successful and enduring. The VR format is, however, being described as nascent and as such, these definitions and language are still developing. However, Bucher (2017) was optimistic that if we continue to move forward and become more advanced through experimentation and by increasing the volume of stories being told in its space, the medium would find its calling.

At the start of this research study, I was interested in the ability to present cultural aspects of my country, such as Trinidad Carnival, in new formats that can effectively capture these experiences. In choosing VR technology as the focus of this examination, I articulated the view that a new art form beyond storytelling would be useful because VR facilitated the immersion of a participant in a story world. This changed the dynamics of a story from telling to doing. The goal was to identify elements of a new art form that aligned with the transition from the teller-listener to the builder-participant format that VR is embracing. I called the new art form

storymaking and then worked on compiling a Storymaking Framework that could guide the evolution of techniques for producing immersive experiences.

In coming up with a new art form, it was tempting to consider simply adding on to the established practice of storytelling. According to Bucher (2017):

> Too often, storytelling is considered basic addition. While it would be tempting to try to establish a simplistic approach to storytelling within immersive space, something that resembled (a + b = c), experience tells us that the reality is closer to (a + x = c). We are then tasked to solve for x. In essence, storytelling more closely resembles algebra than addition. Our x factor can sometimes be a moving target with a number of variables that affect its form, shifting with genre, audience, and creation purpose. This is, of course, not to say that there are not standard principles that guide the use of algebra. There certainly are. In the same way that mathematicians use truths about the use of numbers in order to consider incredibly complex equations, we can take a similar approach with crafting narratives. (Chapter 6: Solving for X, para.1)

The following discussion summarises the work I executed in solving for the X factor, using the Storymaking Framework for a Trinidad Carnival experience. According to the Framework, the four key characteristics to consider were Immersion, Interactivity, Presence and Agency and the overarching theories of Embodiment and the Narrative.

8.2 Discussion

8.2.1 The Narrative Influence on Immersion

The spectacle that is Trinidad Carnival is a wonderful test case for establishing immersion, as there are so many dimensions to attract a participant; from the music, to the vibrant and colourful costumes, to the movement of people on the road. It was noted in Chapter 2 (section 2.3.1), that narrative immersion can be influenced by the setting, as well as by the interplay of story, characters, and viewer integration

(Elmezeny et al., 2018). However, I found that conceptualising a story around Trinidad Carnival that could accomplish immersion was not an easy exercise.

Carnival as a cultural craft can be an amorphous being. There are no established step-by-step procedures that a participant can follow in the creation of a masquerade. The procedure is individualised in its creative output (this was highlighted in Chapter 5, section 5.3.1 in the reference to Fournillier's (2009) study of Mas' Making and Pedagogy).

I found that this creative process was difficult to translate into a narrative about the art and practices of costume fabrication. To resolve this issue, I used a story-based learning approach, as referenced by the Storymaking Framework. I started by defining an overall theme so that a story could emerge, as noted in the following journal entry:

> The focus is on **Creativity** and what can come out of seemingly dismal circumstances. The Trinidad Carnival is an example of how people found creative avenues to tell their stories in spite of impoverished and constraining circumstances. At the end of the experience, participants should feel encouraged to explore their creative sides. (Director)

This theme of being creative in impoverished or dismal circumstances triggered my memory of the Cinderella fairy tale, where her fairy godmother was able to transform everyday mundane items into wondrous objects. This to me represented the ethos of mas' making where costumes are often developed from simple materials. Another parallel was that of Cinderella escaping her reality by dressing up for a fancy ball. This also represented for me the experiences of masqueraders during Carnival, where even if they are not able to afford their costumes, they still make the sacrifice just to be a part of the spectacle. This seemingly irrational but personally rewarding behaviour led to the name for the experience – *We Live to Dress-up.*

Following this theme, I was then able to conceptualise a narrative for a localised version of the Cinderella story. In this case, it was what goes into getting dressed-up for the Dame Lorraine Ball of The Old Yard. This was the high-level plot of the story, which allowed for an exposition on the historical significance of the concept of The

Old Yard, tracing back to the barrack-yards of Port-of-Spain where the holy trinity of Trinidad Carnival – mas', calypso and steelband music was incubated (see sections 1.3.2, 1.3.3, 1.3.4 and 1.3.5). With the Dame Lorraine Ball being the main event of The Old Yard, virtual participants could also be introduced to the traditional yard characters who always perform at this event.

I was then able to define a context for the narrative, which was to reveal the art form of costume fabrication through activities leading up to The Old Yard event. Participants of the virtual experience would be encouraged to explore the spectrum of this creative process through the works of the university students who dedicate their energies every year to recreating The Old Yard event.

Having decided on a theme and defined a context for the narrative, it was then easier to visualise the settings in which participants could encounter the story (e.g., in a mas' camp or the gayelle of The Old Yard). These settings are similar to set designs for theatre, film and television productions. They provide the visual background that may contain elements that convey temporal, geographic or other contextual information. Depending on the way this information is presented, participants may be able to go beyond observing to interacting with the information. Members of the design team noted from this method, the influence of narrative on immersion, as follows:

> Immersion is supported with the narrative as the users' interactions and engagement increases as they connect with the content. (SME)

> The experience was an immersive one that allowed the users to feel like they were in an art gallery and when you were transported into the 360° video, it felt as though you were transported to that place and time. (Videographer)

It is important to note here that narrative structure also provides a natural chemical reward to the brain when a viewer sees patterns in the narrative they are receiving. These patterns allow the viewer to create meaning from the experience. Intrinsically, Freytag's Pyramid (see Figure 3.1) satisfies this need to have chronological order in

an unfolding story and aligns with Aristotle's (2016) single whole action of a beginning, middle and end, which is the plot.

A plot, however, works well if the story is being told because control can be exercised over the content and the progress of events. As Meyer (1995) rightly predicted, however, having participants interacting with a story creates tension with the plot, because their decisions may not always align with the vision of the author. This creates the Narrative Paradox (see section 3.2.1), and according to Barthes (1977a), the death of the author.

8.2.2   Narrative Interactivity through Embodiment

For interactivity to be accomplished in VR experiences, the Storymaking Framework indicated that the narrative had to move beyond conveying a story to directing participants' activities in the unfolding drama. In other words, the narrative had to cater for what participants could do when immersed in a story world, such as providing direction and meaning for actions to be undertaken.

In Chapter 2 (section 2.4), I noted that immersive practitioners, such as Unseld (2015), were in fact envisioning virtual worlds where people could interact with characters in real time so that these stories could be told through their senses. The technology at this point allows for a digital representation of participants in virtual environments as avatars. Avatars are the closest, so far, to our embodiment in a virtual space as they allow for the mind to be present in the space through visuals and narrative embodiment. The physical body, of course, is not present, so physical participation has to be replicated through varying degrees of narrative interactivity and haptics. This is done through either the proximity of the characters and the story, or their influence over the story. Participants can engage with the content with simulated physical-like connections and their emotional involvement. The Storymaking Framework was able to reference practices in media and theatre that can facilitate the inclusion of participants in an unfolding drama, to influence interactivity in a 360°VR experience (e.g., RPG, Improv. & Interactive Drama).

From a procedural perspective, I started by defining a role for a participant, which was an interventionist user accompanying the protagonist through the experience.

Participants, however, would carry out actions and make decisions on-behalf of the protagonist. Ryan's (2001) Interactivity Classification (Chapter 2, Figure 2.1) was very useful here. However, I later came across Dolan and Parets's (2016) Observant Participant Matrix (see Figure 8.1) which also helped me to define the participant's existence and influence in the story.

In this Matrix, the role of the participant in the top left quadrant is described as *Observant Active*, which is someone who exists outside the story but still has a degree of storytelling power in the experience. In the top right quadrant, *Participant Active*, the participant has an identity in the story and also some power over the story events. In the bottom left quadrant, *Observant Passive*, participants have very limited roles because they neither exist in the story nor have any influence over its events. Finally, in the bottom right quadrant, *Participant Passive*, although participants have a digital existence in the virtual environment, they have no authorial control over the story (Dolan & Parets, 2016).

For the *We Live to Dress-up* experience, for example, I chose the **Participant Passive** role, where the participant can interact in the story world without affecting the overall storyline. However, to facilitate the full engagement of participants in a story, roles will have to become more **Participant Active,** where participants have control with respect to their *Existence* and *Influence* in the story. Through this focus on the role of a participant in the story, the art form moves beyond mimesis – "showing" with its implications for passive involvement to "experiencing" with implications for self-motivated active exploration. Experiencing becomes a mind-body connection that contributes to a new narrative grammar for virtual reality learning environments.

Figure 8.1

The Observant Participant Matrix
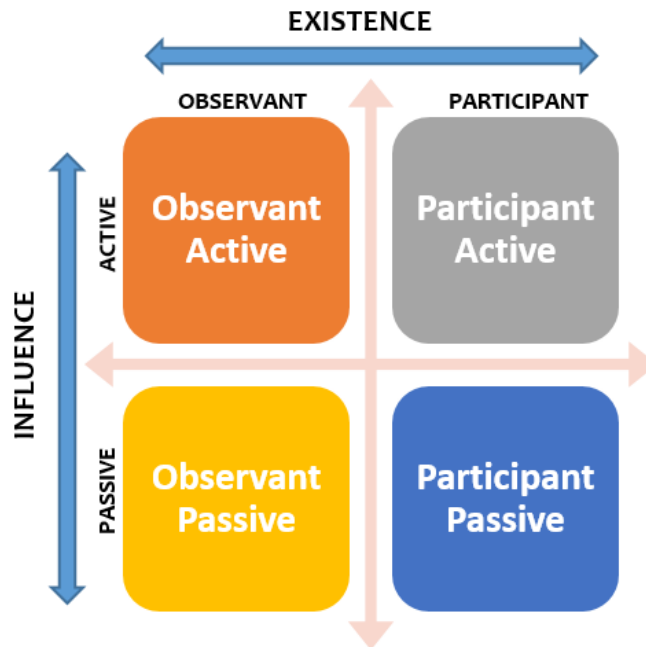
Note. This figure was based on Dolan and Parets' (2016) Observant Participant Matrix. Own work.

After the completion of the **We Live to Dress-up** experience, members of the design team were asked to articulate their views on narrative and interactivity in the creative process:

> I believe that at this point with the technology, we should include "leading narrative" or narrative that points to the type of interaction the user may wish to undertake without always making it obvious. Guiding the participant along builds better familiarity than being told. (Videographer)

> I believe a narrative enhances the interactivity, as the viewer will naturally progress through the story versus needing visual clues. (SME)

> There was interactivity in terms of sharing a space with other participants and communicating with them. There is room to interact with objects within the space and possibly gain learning from that interaction. (Videographer)

The last comment in fact highlighted the functionality of the software platform which allowed for spatial sessions where more than one participant could be in the story world at the same time, represented by avatars. Participants were therefore able to see and talk with each other in real time, which contributed to their multisensory stimulation.

8.2.3   Embodied Narrative Influence on Presence

As previously discussed, embodying an avatar is made possible by embodiment induction (e.g., motion, attention, relaxation – Roth & Latoschik, 2020). Roth and Latoschik (2020) stated that accurate responses to a participant's movement (e.g., body, face and eye motion) fosters the perception of self-location or presence. Following the Storymaking Framework, I used a character-based approach for the narrative to generate the feeling of presence as a participant accompanies the protagonist on her journey of enlightenment about Trinidad Carnival.

Aylett and Louchart's (2003) Emergent Narrative (EN) provided a useful perspective for creating character-based narratives. Aylett (1999), for example, suggested using a bottom-up approach starting with the physical behaviour of a participant, which could be cognitively or reactively determined. Next comes work on the character-level abstract action sequences, which is the order and the timing in which actions are carried out by the characters in a scene. Then there is need to define the overall plot.

I started with activities that prompted a participant to act, interact and make decisions in the story worlds, e.g., a prompt to play the starting video to get an introduction to the story world. Through the participant's exploration I was then able to work out how to reveal the backstories of the characters in the scene and their overarching intentions. These intentions finally shaped the high-level plot. In this way, the narrative becomes process, ever changing according to the interactions of the participants.

Implementing the EN approach, however, requires a lot of narrative planning and more importantly the use of intelligent narrative systems to trigger events in a story based on character interactions. I did not fully utilise the EN approach in my work as

the requirements for such a system were too technically demanding, involving the use of an intelligent agent approach for continuous planning and multi-agent interactions in the story.

8.2.4 Embodied Narrative influence on Agency

To engender agency in participants, it was important to note that agency corresponds to the coordination between the intention expected by people through their bodily actions, and the effective responses manifested in the virtual environment. According to Roth and Latoschik (2020), the more the movements performed in the real sphere correspond to those observed and reproduced in the virtual sphere, the greater the agency experienced by the users.

In my use of the Storymaking Framework, I was able to design activities that engaged participants through a learning-by-doing method. In the scenario-based environment of the story worlds, participants are guided to agency through making choices based on decisions, such as what to focus on; where to move to; what happens if I click this hotspot. Participants are able to explore different options through trial and error, in a safe space in which they can grasp the learning outcomes. It should be noted, however, if participants are assigned a protagonist role in a story they must feel as though they are the driving force in moving the narrative and are capable of making changes to its progression.

During the 360° VR demonstrations, I further discovered that making the procedural and navigational requirements of the environment as seamless as possible supported participants' information seeking behaviour in virtual environments.

Haskins et al. (2020), for example, noted that semantically relevant features guide attention in immersive, naturalistic environments. As such, when participants are free to seek out information and choose their field of view, their behaviour is most guided by meaningful, semantic properties of the stimulus, or scene. They also found that active viewers make quick entropic fixations and shift their gaze nearly twice per second. They attribute the observed increase in exploratory, information-seeking

behaviour in active viewing conditions to differences in the affordances available to active viewers, not differences in their action goals.

During the demonstrations, I observed, for example, that participant VNX very quickly adjusted to the navigational procedure to the extent where he was comfortable to wander through the story worlds on his own volition and engage in the activities of the experience.

8.2.5 Bringing the Pieces Together

The Storymaking Framework was able to guide the creation of a virtual experience that brought the participant into a symbiotic relationship with aspects of Trinidad Carnival. Short of having to be physically present during the Carnival season to truly appreciate it, VR technologies offer us new possibilities to create simulated experiences that seem just as real. To achieve this therefore, the Framework identified approaches that supported the four main VR characteristics of immersion, interactivity, presence and agency.

Creating experiences that accommodate these characteristics, however, required an understanding of the embodiment of the participant in a virtual story world and the influence of narrative to trigger patterns in the brain that we can recognise and draw meaning from. According to Boyd (2009), this takes the story from being *a thing that is* to *a thing that does.* The narrative becomes transformed from artefact to process delivered through the participant's encounters.

As such, in the **We Live to Dress-up** experience, Narrative Theory guided me to employ diegesis to convey the high-level plot in 2D videos at the start of each scene. Immersion was supported through the inclusion of 360° VR videos in scenes, which transported the participant from the 3D story world into the spherical representation of real-life environments and activities. Action and agency were guided by background and navigational information in the form of images, text and hotspots. This functionality was in addition to the technical affordances provided by the HMDs and controllers for participants to move around, select, and activate assets in the environment. Particularly in the VR mode, participants felt that they were really in the space (8 out of 9 participants indicated that they felt immersed) and that they

had a connection with the events and activities in the environment (7 out of 9 participants felt that the experience was something they were participating in rather than viewing).

The primary goal for this application was to educate through creating a deeper connection with the subject matter. I found that the different sensory stimuli that the technology supported (e.g., using the eyes, ears and mobility) were quite useful here. One example was the use of sound. Binaural audio in fact creates a 3D audio spatial effect where the sound can be experienced from the actual direction it came from. Another example was the use of music where it was observed that when participant MHX recognised a particular song played in the space she responded to the beat of the music with her own movements in the chair. Although this may have had little significance to the content, a connection was still formed. Music, therefore, was just one of the layers that added atmosphere to the experience and may have contributed to memory making.

Memory making was also supported by giving participants the opportunity to execute tasks, using their virtual bodies. When asked whether they encountered anything they did not expect (post-experience question 24), participant MHX responded in the following way:

> Yes: Movement as if I were actually in motion while, in reality, I was not. Sound effects. Ability to manipulate virtual objects and interact with them in a physical manner. Certainly did not expect to be able to operate in a 3D Virtual World and learn so much in such little time. (MHX)

The experience also included specific activities to capture feedback on memory making. In each story world, a question was posed to participants connected to the subject matter (see section 6.2.1 – The Narrative Design). Correct responses demonstrated that the content was internalised. Participants MHX, VNX, SFX, EMX and CPX answered all questions correctly. JMX got most of the answers. As such, it was notable that recall of information during the experience was high for most participants.

Information recall after the experience was captured by post-experience questions (15, 16, 17, 18), which were matched against the same questions in the pre-experience survey. In describing selected Carnival characters, marked improvements were noted in the post-experience descriptions. Notable was MHX's description of the Soumayree (see section 7.2.2 – User Experience Results).

In conclusion, I found that the prominent factors which contributed to making a memorable experience involved being specific about the target audience and its alignment with the subject matter of the experience. In addition, a goal needs to be established, whether to entertain, persuade, or inform. Finally, narrative and technical elements must facilitate emotional connections between the participant and the story. All these factors are in the service of conveying meaning. Human beings want meaning, which is the neurological reward we feel when we resonate strongly with an idea or feel we are slightly different in some way from when we began the experience. That is why we tell stories. We want to make sense of the world.

8.3   Contributions to the Future of Storytelling

Did the empirical project of this research study represent a dynamic system that responded adequately to the demands of user interaction, be it at story or character level? Although it did not approach a fully interactive character-based narrative, with real-time process-based systems, which the EN concept supports, the research results support an answer to this question in the affirmative.

What was impactful on participants was immersion through spatial presence in the VR experience, where they enjoyed the affordance of locomotion. However, movement without meaning is useless. In this context, the key contributions of the thesis were the processes included in the Storymaking Framework, to meld story and interactivity to create meaning through narrative. Storymaking is a relationship between the creator's vision and the participant roles in the experience. The study provided evidence that the focus is shifting and narratives are now to be studied for their potential to engage user interactivity.

Participants in virtual environments now play a central part in the building of the story. Their actions or reactions contribute to narrative progression and meaning for the overall experience. However, there must also be an innate respect for the part of the creator, who has the larger responsibility to create virtual worlds that are ethically sound, engaging and informative. Striking the balance between deep immersion and a level of comfort, enjoyment and safety of participants, should continue to be of great importance when constructing stories in VR.

At the academic level, the study offers the Storymaking Framework (see Figure 4.3) to guide educators to use 360° video in more interactive and engaging ways. This capability is anticipated to become more relevant as educational institutions continue to explore the potential of building virtual story worlds in the Knowledge Metaverse[13]. To support these efforts, institutions should invest in VR technologies, software platforms and training for faculty and students.

There are emerging opportunities for higher education institutions to conduct research and development for new experiences in the Knowledge Metaverse and to become leading hubs for VR and Augmented Reality (AR) technologies to support the creation of new businesses and new jobs. It is heartening to note that this support has already begun in my own institution, which implemented a Community of Practice (CoP) called the UWIVERSE, to engage relevant talents and resources of the University towards this end. The goal is to create a regional testbed to explore the efficacy of Extended Reality (XR) in knowledge transfer that can help students and workers to learn better and faster.

8.4   Limitations and Future Work

Conducting an empirical study during a worldwide pandemic was a challenge, particularly when the work required collaborating in-person with participants. The actual event, The Old Yard, which the experience was expected to capture, was the first casualty. It was cancelled. This had a significant impact on the empirical exercise as it reduced the opportunity to capture these rich, creative experiences in 360°

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[13] The metaverse is a concept of a persistent, online, 3D universe that combines multiple different virtual spaces.

video. It is likely that the output would have been much more impactful if The Old Yard experience was captured live. The study, as such, had to rely on incorporating existing 2D video footage from a previous event with the 360° videos that were eventually captured. This situation reduced the opportunity to truly explore immersion and interactivity, in different ways, to the point where I felt that the performative features of this Carnival experience were totally missed. However, the purpose of this exercise was not so much to create, as it was to understand the creative process. In this regard, just by having the opportunity to film and produce a 360° VR experience yielded significant insights into the processes which were invaluable to the study's objectives.

I used the research method of autoethnography to present this information, which was a fairly new approach for me. I have been accustomed to using traditional research methods such as surveys, interviews and focus groups, which can yield quantifiable results. While autoethnography offers a way of giving voice to personal experience, which can add to a wider sociological understanding, the method can be questioned with respect to issues of representation, objectivity, data quality, legitimacy, and ethics.

The original method I intended to use was Interpretive Phenomenological Analysis (IPA), which could offer insights into the perspectives of the group of people who were involved creatively, to make sense of the process. I had anticipated that I would have had the chance to work with a much larger group who would be carrying out a variety of roles in the planning and presentation of The Old Yard event and the 360° VR production exercise. This would have provided excellent sources of information based on their different experiences. However, because the creative team was substantially reduced due to the cancellation of the event, the scope of this approach was limited. However, as the original intention for this project was to understand the creative process, which I was a part of, I then selected an autoethnographical approach as an appropriate alternative to capture these insights.

Autoethnography, however, has its limitations and criticisms, which have included questions on the absence of formal regulations regarding the writing of an account.

This in turn has meant that evaluating an autoethnography is not a straightforward task. There are also questions on whether it is research or a self-indulgent, narcissistic, introspective and individualised exercise (Atkinson, 1997, Coffey, 1999). From this perspective arose concerns of the influence of the researcher's bias and objectivity in the research. However, according to Denzin and Lincoln (2000), "Objective reality can never be captured. We can know a thing only through its representations" (p.5). Therefore, in light of the fact that reality emerges from the interaction between self and its own experiences, which reflects the cultural and social context in which these events take place, autoethnography has the ability to effectively capture this understanding of a particular phenomenon (Mendéz, 2013).

Another area where the empirical work can be improved is by having photo-realistic representations of local environments for the story worlds. The scenes used by the application did not look like Trinidadian storyscapes. Authenticity in the use of local imagery to create these virtual worlds can only enhance the overall narrative experience. On the matter of realism, according to Chris Milk[14] in an interview with Bucher (2017), participative narrative models will be able to present different techniques for the management of the real-time simulation of environments, in the dynamic understanding of the story. Artificial Intelligence (AI) is expected to play a major role in generating appropriate algorithmic response to participants in real-time. In the near future, therefore, it is anticipated that systems will be able to endow participants with the capability to puppeteer a photo-realistic digital human and beyond that, the entire narrative.

Social experiential storytelling in virtual space will also likely be a significant outcome of these innovations in VR. This is where we experience stories together that are participatory, and not observational. In fact, the study's empirical exercise was able to observe the beginning of this social interaction when two participants were able to go through the experiences together from independent headsets and converse with each other (see Figure 7-3). Options for using the advantage of having more than

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[14] Chris Milk is an American entrepreneur, innovator, director, photographer, and immersive artist. He is co-founder and CEO of Within, a virtual reality technology company, and co-founder of Here Be Dragons, a virtual reality production company.

one participant in the space, can promote collaborative or competitive goals for these experiences.

On the technical end, access to the technology still poses a clear division between the haves and have-nots. At present, VR experiences require the use of an HMD. While there will likely come a time when virtual experiences can be had without a headset, this requirement is a necessary component of VR experiences at this time. Although HMDs effectively seal off external distractions (light and sound) for users, the disadvantage, however, is that they can be heavy and cumbersome on the face. Making sure that participants were comfortable with the fit of the HMDs was an on-going issue. Adjusting for different hairstyles and head shapes was a constant challenge.

With respect to future work associated with this study, I envision that with on-going advances in VR technologies, the creative process will be simplified and include more life-like interactive and immersive experiences. In particular, when VR opens the door to everyone to have full-body experiences, I anticipate that the focus will be on using the virtual body more completely beyond locomotion. Agency will substantially improve with the ability to pick up and manipulate objects; to try on garments, and to dance, sing and play music. These are the qualities for truly engaging in virtual Carnival experiences. As such, in the second edition of **We Live to Dress-up**, participants and Cindy may be able to sign up with a mas' camp to play mas' at Carnival time, try-on costumes, and join other revellers on the streets on Carnival Monday and Tuesday, jumping to Soca music[15]. They may even have new capabilities to design and build virtual costumes for Carnival in the Metaverse.

8.5   Quality and Trustworthiness of the Research

Elliot, Fischer, and Rennie (1999) indicate that the quality characteristics of the quantitative-qualitative continuum include "explicit scientific content and purpose, appropriate methods, respect for participants, specification of methods, appropriate discussion, clarity of presentation, and contribution of knowledge" (p.220).

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[15] Soca music is a genre of music invented by Trinidadian calypsonian, Lord Shorty. It represents the "Soul of Calypso", and has influences of African and East Indian rhythms in it.

Choudhuri, Glauser, and Peregoy (2004) and Ponterotto (1994) included other characteristics such as an up-to-date and accurate literature review, a conceptual framework and rationale for the study, as well as clear and well-articulated research questions. Trustworthiness, on the other hand, is closely linked to the paradigmatic underpinnings of the discipline in which the investigation is conducted.

Qualitative research is paradigm bound and as such, there are standards of trustworthiness that are applicable to a particular paradigm (Morrow, 2005). However, according to Morrow (2005) regardless of the paradigm there are certain research qualities that are indispensable, such as "sufficiency of and immersion in the data, attention to subjectivity and reflexivity, adequacy of data, and issues related to interpretation and presentation" (p. 250).

With respect to the trustworthiness of this work, it should first be noted that the study was conducted within the discipline of Technology Enhanced Learning, which considers such major learning theories as behaviourism, cognitivism, constructivism, constructionism and connectivism. The major underpinning theory on which the study was based was constructivism and as the researcher, I used the primary lens of culture to interrogate the research topic. The study used an emergent design for the methodology due to the need to gather experiential data at stage 1 - the 360° VR design and development process, and at stage 2 - the user experience evaluation. This included the use of autoethnography at stage 1 to capture my experience as a key member of the creative team, and user surveys of the experience at stage 2.

A range of criteria have been suggested to provide trustworthiness in constructivist research:

> Authenticity criteria (Guba & Lincoln, 1989), referred to by Lincoln (1995) as intrinsic criteria, appear to be more relevant. Authenticity criteria include fairness, ontological authenticity, educative authenticity, catalytic authenticity, and tactical authenticity. (Morrow, 2005, p.252)

Each dimension focuses attention on different aspects of possible change in participants, systems, or power structures that may be associated with the inquiry

process. The following provides a summary of the trustworthiness findings based on the application of these dimensions to the study.

8.5.1 Trustworthiness

8.5.1.1 *Fairness*

At stage 1, selective sampling was used to determine who would participate in the creative project. Due to the cultural requirements of the study, the DCFA was the only department in the University that had the capacity to work on the project. However, there was evidence that a process was followed to ensure the fair representation of the department's views through consultations and brainstorming sessions with key faculty and administrators. These sessions also facilitated member checking of the empirical work, which followed an iterative process. There was prolonged engagement, over a year, with the faculty and students of the programme – The Art and Practice of Costume Fabrication in particular, which provided the subject matter materials for the work. Prolonged engagement has long been recognised as desirable. Over this period, I maintained a journal, which captured daily accounts of this relationship and my own thoughts about the experience. This demonstrated that I followed a reflective process, which was a main source of information for the autoethnography. This approach positioned me as a co-constructor of meaning. At stage 2, there was evidence that the study used informed consent during the engagement of participants who were provided with a participant information sheet and a consent form prior to sharing any data for the surveys conducted.

8.5.1.2 *Ontological Authenticity*

The development of an interactive 360° VR experience was new to all stakeholders of the creative project. It was noted at the pre-production stage that ontological perspectives on the tasks to be executed were influenced by the procedures associated with film and television and behaviourism learning theory. I held the view that a constructivist approach would work better. When it came to deciding on the method to create the experience, there was disagreement among team members due to these ontological underpinnings. This in fact brought an awareness to the team of the complexity of including immersion, interactivity, presence and agency in

a story. Following this phase, roles for the creation of the experience were redefined to facilitate two different approaches. The study was able to capture and include direct quotes from this phase from the team's electronic communications. On completing my version of the VR experience, which used the storymaking framework, team members reviewed the application and completed a debriefing survey to capture their post-production perspectives. These responses featured personal growth responses particularly with respect to their views on immersion, interactivity and the use of narrative, and also what they would do differently in future projects.

8.5.1.3 Educative Authenticity

The surveys that were used at stage 2, the user experience phase, were designed to capture data for this dimension. Participants were asked to complete a pre-experience questionnaire to establish their starting knowledge about the topic and their experience with the technology. They then participated in a demonstration of the experience after which a post-experience questionnaire was completed. These instruments provided the study with an insight into the effectiveness of the application and demonstrated an increased awareness among participants about the effects on memory making. Ultimately, this user evaluation stage contributed to the conceptualisation of a model for the user experience components in immersive storymaking (see Figure 7.9).

8.5.1.4 Catalytic and Tactical Authenticity

Nolan et al. (2003) revealed that there is difficulty in assessing catalytic and tactical authenticity because these dimensions required evidence of the inquiry's ability to effect change and empowerment. As Shannon and Hambacher stated:

> Catalytic authenticity is assessed by examining whether the inquiry process stimulated action on the part of stakeholders. Tactical authenticity is assessed by examining whether a redistribution of power among stakeholders occurred. (Shannon & Hambacher, 2014)

The interaction between the students, the administrators and the teacher revealed some level of catalytic and tactical authenticity. Catalytically, all nine participants indicated that they would like to experience the same or similar content in the future (post-experience question 31). One administrator in particular was very interested in the HMD and eventually acquired one for personal use. Tactically, it was noted that the lines between teacher, administrators and students were blurred during the demonstrations, where at certain times students helped the teacher and administrators during their virtual encounters, reversing roles. All, however, enjoyed the experience as equals (post-experience question 30) exhibiting playful banter when encountering each other in the environment.

8.5.2   Quality

The quality of the study was demonstrated by the effective inclusion of the general criteria for qualitative research. According to Choudhuri et al. (2004), this included establishing the background for the study; providing information about how the approach provided for an emic (local and individual) perspective; describing the inductive approach used in the investigation; and explaining the recursive nature of the analysis.

The first chapter of the study concentrated on establishing the thematic context of the study, which involved the Trinidadian cultural expression of the storytelling art form. The emic approach, which provided an insider perspective on these cultural expressions, was applied in Chapter 3 (see Section 3.4 - A Trinidad Story – Technology in the River Mas'). Here, the experiences of a prominent mas' man, in presenting his Carnival band, highlighted the beliefs, values, and practices of culture. It also demonstrated the complexity of representing the essence of these cultural expressions through traditional media formats. This problem informed the purpose of the study, which was designed to demonstrate how VR technology could advance the reproduction of similar subject matter through methods that engaged audiences in immersive experiences.

The theory base for developing this topic was the paradigm shift in storytelling from teller-listener to participant-builder, which VR notably brought to the art form. This

new paradigm formed the underpinning for the research questions, which guided the study. These questions allowed the study to interrogate the nature of the technology and the new affordances of immersion, interaction, presence and agency, and their influence on memory making.

The thesis, which underpinned the study's method, was the emergence of a new art form, storymaking, which acknowledged the influence of the new features that VR brought to the telling of a story. This built a case for conducting a qualitative investigation to determine a conceptual framework for the storymaking art form. The research design sought to evaluate the storymaking art form based on lived experiences involved in the creation of a 360° VR experience. For this empirical work, the researcher-as-instrument was used to capture information on this lived experience. My approach to subjectivity included not only using data from my research journal, which demonstrated reflexivity, but also data from email communications, with permission, and a de-briefing survey with the creative team members (see Section 6.1.1), which yielded rich data on their perspectives. This facilitated a degree of data triangulation for this stage of the work, where more than a single source of data was used to establish findings. This also made sure that my bias did not skew the interpretation of what the other participants said to fit a certain narrative. These findings, along with the assumptions, expectations, and biases that I brought to the investigation were captured in the autoethnographical account (see Chapter 6), which I managed through my reflective practice and brainstorming with the creative team.

This stage of the work, however, motivated me to go deeper into understanding how the storymaking framework could be effectively applied during post-production. I adopted an inductive approach at this stage where I stepped back from the information I had previously collected and reviewed some practical applications in virtual storytelling to get a bird's-eye view of the design challenge. This allowed me to identify what storymaking tools I could use for the story and making grammar aspects of the VR experience. This aligned with Lincoln and Guba's (1985) view of transferability where patterns and descriptions from one context can be applicable

to another. Qualitative inquiry, in fact, seeks to expand understanding by transferring findings from one context to another.

Finally, the dependability of the empirical work was scrutinised through demonstrations and user evaluations. It has been said that for research to have merit it must be believable and truthful. The output of the research must therefore be put to the test with stakeholders. Based on the model for user experience components in immersive storymaking created from this evaluation (see Figure 7.1), stakeholders indicated that the HMD equipment used was very effective in immersing participants. All nine participants gave a rating over the median (3) that the application held their attention and six participants rated over the median (3) that they lost track of time. The virtual storytelling platform also effectively facilitated interactivity, where for example all nine participants felt sure that they were moving through the experience according to their will. This in turn supported a sense of agency in participants, which made the experience enjoyable and memorable. In fact, the results in Chapter 7 revealed that all of the participants were glad for the experience and would like to experience the same or similar content in the future.

8.6   Conclusion

Ryan (2005) was noted saying that Aristotle (2016) had written the rules for traditional drama; however, there were to this day no poetics and no set of guidelines for interactive drama.

Working on this thesis was quite a rewarding process for me. As an informal storyteller in my own right, I was assured that storytelling would endure once humans continue to communicate and share experiences. What is changing, however, is the desire within us to have more intense experiences where we are actively engaged. Virtual Reality tools allow a new level of intensity, which is challenging the traditional storytelling art form. The best storytellers, however, will find ways to tap into that intensity by embracing this technology in different ways and by overcoming a tendency to lean back into the past.

The thesis, as such, introduced the novel concept of storymaking as an emerging art form to guide educators in a forward direction. Without the advantages of big

budgets and expert design teams, educators are guided to start simply with an engaging story. The sources for potential immersive stories are as vast as the purposes behind them. VR stories can be designed around any subject matter to create narratives that can entertain, engage and ultimately improve our knowledge and understanding. An important question to ask therefore is what will be the role of the participant in these stories.

Bucher (2017) expressed the view that telling good stories can never be about the technology available to us. It must always remain the tool with which we tell powerful stories. Experimentation and working with others both inside and outside of virtual space will provide essential guidelines for moving storytelling into the future. I therefore look forward to contributing to a taxonomy of virtual story projects and applications according to their level of authorship and activity through **Storymaking.**

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Appendices

Appendix 1:   A Comparative Review of Interactive Storytelling Platforms

Application Name	Features	Comments
Stornaway.io https://www.stornaway.io/	This storymaking application consisted of story islands comprising a scene, location or clip. In the development phase, these islands were shown as boxes with arrows to indicate how they linked to the other islands. These connections created the story map, which allowed the development of the paths that a user might take. This then led to story layers, which were different variants of each story island, which depended on what path was selected. This in turn facilitated non-linear scripts. The application allowed for the addition of clickable words or images, up to 4 onscreen choices for each video. There was also a countdown time bar to control the length of time a user could make a decision.	**Cons:** A trial version was available for a limited period after which a paid license was required to use the application.
Odyssey https://cartodb.github.io/odyssey.js/ sandbox/sandbox.html	This application used a visual map or timeline to help users navigate within the video. This Sandbox provided an easy way to test the Odyssey library and mix written narrative, multimedia and map-based interaction into a map driven story. Developers could enhance the narrative and multimedia of their stories using Actions (e.g. map movements, video and sound control).	**Cons:** This application was too page-based.
Klynt https://www.klynt.net/	Klynt is an interactive editing & publishing application dedicated to creative storytellers. Key features include a Visual Storyboard, which allows the editing of your storyboard like a Mind Map to organize the narrative structure. Also Mixed Media Editing which allows for	**Cons:** This platform did not have the ability to incorporate 360° videos in a project.

	the editing of projects with texts, images (png, jpeg, gif), audios (mp3), videos (mp4, webm, ogg) and any web based content (e.g. rss feed, YouTube videos, google maps, Wikipedia pages) using iframes. Klynt uses the WYSIWYG approach of the Sequence Editor for simple and quick editing. Within each sequence, you can include hyperlinks, text, video, photo and audio clips using separate tracks on the timeline. Projects can be previewed instantly in a browser using Klynt's HTML5 player.	
Interlude (EKO Studios) https://eko.com/	This is a browser-based platform for immersive storytelling that is free to use. Interlude/Eko uses nodes (i.e. video sequences) and connections (links between nodes) to help build the interactive story. The software has built in elements that can be placed on top of a video such as buttons and timers.	**Cons:** Interlude did not facilitate an immersive experience consisting of 360° videos and 3D environments.
Unity https://unity.com/	This is a real-time development platform used for creating virtual reality experiences. This platform can be used for creating and publishing 360° projects. Key features of Unity include Virtual Gaze interaction, which creates movement between a series of 360 videos; Ray Tracing which is an advanced and lifelike way of rendering light and shadows in a scene; Mesh Colliders – collider components define the shape of an object for the purposes of physical collisions; Scene Activation which determines how to trigger a scene change and VR Reticles which are small points at the center of the screen used as visual aids for aiming.	**Cons:** The Unity platform required a high level of familiarity with graphic design and development concepts and as such presented a learning curve that was too steep for this study's timeline.
Wonda https://www.wondavr.com/	Wonda features special templates (e.g. Weekly Meeting, Art Gallery, and Project Room) that allow users to organize	**Selected**

| | immersive meetings, events or galleries by customizing the assets in the room and using a main screen to share content. 360° media can also be added to a project. The platform also has a template for creating a 360° virtual tour, which included sample virtual tour assets with 360 images and videos to walk through. Wonda also has an immersive lab, which is a shared community space, free to use by students and freelancers. | |

Appendix 2: We Live to Dress-up - The Story-Based Learning Template

STORY ELEMENTS	DESCRIPTION
Theme The "**moral of the story**"; What is the "**talking point**"? What should the resultant mood of the learner to be?	The focus is on **Creativity** and what can come out seemingly dismal circumstances. The Trinidad Carnival is an example of how people found creative avenues to tell their stories in spite of impoverished and constraining circumstances. Learners should feel encourage to explore their creative side.
The Plot	Cindy lives in a foreign land, in not very happy circumstances with her stepmother and stepsisters. Her fairy godmother is in fact her grandmother - **Val** who is the reason why Cindy is eventually visiting Trinidad today. The country where her parents were born. After her mother passes, Cindy's father remarried and things went downhill for her subsequently. Val has been aware of Cindy's situation for some time and has tried to cheer her up with her stories about herself growing up in difficult circumstance but being able to escape her reality through her favourite activity of "dress-up". This eventually led to her getting very involved in Mas' making and masquerading at Carnival time. When Cindy gets to Trinidad, Val decides to immerse her in practical experiences where she meets people preparing costumes for the annual Old Yard event at the University. Having had no prior exposure to Carnival, Cindy is both excited and apprehensive about the outcome. Cindy as such takes advantage of any opportunity to learn more about costume fabrication and traditional Carnival characters. She can visit a mas 'camp; sit in on a class at the university and tour a virtual gallery of traditional mas' characters. The ultimate goal is to have a "jump up" in the Dame Lorraine Masquerade Ball in the Old Yard and to enjoy the process of dressing up for Carnival.
Characters	**Cindy** – young adult. British by birth, Trinidadian by heritage. **Val** – Wise old grandmother of Cindy and veteran masquerader. She lives in Trinidad **Faculty and students** – The UWI, Department of Creative and Festival Arts involved in the Old Yard. Location - Trinidad
Tone	Drama. An exploration of real life experiences that may offer useful insights that are not generally accessible to the average on-looker of the Trinidad Carnival.

THE FIRST EXPERIENCE – ENTER INTO CINDY'S WORLD			
SCENE	**DESCRIPTION**	**CONTENT**	**SCRIPT**
Scene 1 - Cindy's Backstory	Cindy has a flashback to her time in Trinidad when she connected with students involved in a programme at the University in costume design. Cindy is finally coming to Trinidad to visit her great grandmother Val (Valerie) who is now in her twilight years. Cindy had not connected with anything Trinidadian, having grown up abroad. Her father who was from the islands, had remarried after her mother passed. After he himself passed on, Cindy has been living unhappily with her stepmother and two stepsisters. Val, her father's mother, has been her greatest link to his past. Cindy feels she knows Val well simply from the many stories she has told her in her letters and over the phone. However, Cindy had never meet her. This is her first trip to Trinidad and she feels optimistic, as it is Carnival time, Val's favourite time of the year.	Video of airplane landing. Interior cabin footage. Caribbean Airlines newest plane https://youtu.be/S8BtZuEgQtQ Take-off and landing from NY to T&T https://youtu.be/f-FNIWl5BfE	Welcome to Cindy's Storyworld. Cindy's experience may be familiar to you, as it is similar to Cinderella's story just with a Trinidadian twist. We pick up the story as she makes her first visit to Trinidad to see her Grandmother Val at Carnival time. Val, her father's mother, has been her greatest link to his island roots. After he passed on, she has lived unhappily with her stepmother and stepsisters.

THE SECOND EXPERIENCE – VAL'S BACKSTORY			
SCENE	DESCRIPTION	CONTENT	SCRIPT
Scene 2 – Val's Back-story	Val has always called herself a Carnival baby. Ever since she has known herself, she has had a strong connection to the spirit of the Mas', which is short for Masquerade. Val always wonder about this. Where does this spirit come from? Why did it have such a powerful effect on her? How would she now convey this to her foreign 'great-grand'? Would Cindy even understand and appreciate it?

Val casts her mind back to growing up in the Red Dragon Barrack Yard within the Duke Street/Princes Street block of George Street, Port-of-Spain. In those days they didn't have much but every hour was | Carnival Baby: :Lost Tribe Carnival Road Video 2019 https://youtu.be/RYXCDGLe5_8

1950s – Port-of-Spain – Trinidad and Tobago – Carnival – 1950er – Karneval – 8 mm https://youtu.be/yAF8SpeFf0I

Old Port-of-Spain 1950s – Port-of-Spain – Trinidad and Tobago – 1950er – 8mm Footage – Karibik - Caribbean

https://youtu.be/EKqJFOKFENg

Old time days – Trinidad. Everything must change, but we love the old time ways https://youtu.be/BfdyLtjgFL8

Still images of barrack yards and POS

Information on Behind de Bridge http://www.triniview.com/TnT/CityLife.htm

Wack Ole Mas Competition https://youtu.be/4VDLe00zoww (57:37) Bek - The Best Way to Stop D spread of D Virus | Val has always called herself a Carnival baby. She has had a strong connection to the spirit of the Mas', which is short for Masquerade.

Where does this spirit come from? Why did it have such a powerful effect on her? How would she now convey this to her foreign granddaughter? Would Cindy even understand and appreciate it?

Flashback to her growing up in the Red Dragon Barrack Yard. This was on George Street, Port-of-Spain, when times were hard and they didn't have much.

She recalls passing the time dreaming of a better life. |

SCENE	DESCRIPTION	CONTENT	SCRIPT
Scene 2 – Val's Back-story	filled with make believe of a better life and better circumstances. She remembers she was a master at mimicking people she saw in the streets of Port-of-Spain and in the Yard. Her mother always said that Val would be creative because - she had a very active imagination, which was a polite way of saying that Val was a dreamer.

Val's favourite past-time was "dress-up". The old clothes her mammie stored away in the press (cupboard) became her costume wardrobe. She recollected concocting elaborate re-enactments of the daily scenes and activities she | The Old Yard

Trinidad Old Yard 2020 – A tribute to Legendary King Sailor Mas dancer Ralph Dyette

https://youtu.be/OmXPw9AS_G8

Information on the Barrack Yards

Images:
• Barrack Yard 3 edited. | She use also mimicked people in the streets in town and would "dress-up" in old clothes to re-enact scenes that she found amusing. |

THE SECOND EXPERIENCE – VAL'S BACKSTORY			
SCENE	DESCRIPTION	CONTENT	SCRIPT
Scene 2 – Val's Back-story	found interesting or amusing. Cindy would be here soon and Val considers how best to pass-on the lesson she has learned along the way to Cindy. She senses that Cindy shares similar interests and creative passions. Val decides that the best way to hone Cindy's creative talents is to get her involved in the "dressing-up" process for a Carnival Masquerade event called the Old Yard. The Old Yard was in fact a modern day recreation of what Val would have lived in the Red Dragon Barracks on Carnival Sunday night.	• Barrack Yard 1 • East Dry River 2 edited • Steelpan in the yard	Val decides that a good way to introduce Cindy to the spirit of Carnival is to get her involved in the "dressing-up" process for a Masquerade Ball called the Old Yard.

THE SECOND EXPERIENCE – VAL'S BACKSTORY			
SCENE	DESCRIPTION	CONTENT	SCRIPT
Scene 2 – Val's Back-story	Back then, these barracks consisted of rows of rooms either facing each other about ten to fifteen feet apart or formed angles and quadrangles. Single people or families of the lower income bracket occupied these facilities where they shared a common barrack-yard and common conveniences. These barrack-yards were a feature of the hilly eastern end of the old Port-of-Spain which was generally called "behind the bridge", or "Dry River district" – officially known as the East Dry River District.		The Old Yard was in fact a modern day recreation of what Val would have lived in the Red Dragon Barracks on Carnival Sunday night.

THE SECOND EXPERIENCE – VAL'S BACKSTORY			
SCENE	DESCRIPTION	CONTENT	SCRIPT
Scene 2 – Val's Back-story	Val eventually tells Cindy of her plans. Cindy feels both excited and sceptical, at the same time. She desperately wants to be included in the festivities but she knows very little about these traditions. Val quiets her fears by telling her that she will arrange for her to visit places and meet people to get more information and guidance.		

THE THIRD EXPERIENCE - A VISIT TO UWI DCFA			
SCENE	DESCRIPTION	CONTENT	SCRIPT
Scene 3 – Meeting the people getting ready for the Ball	Cindy gets an opportunity to sit in with a class at the Department of Creative and Festival Arts at the University of the West Indies, St. Augustine. They talk about their designs for the upcoming ball. She hears about their costumes that portray characters that are either picturesque, grotesque, theatrical, or burlesque.	2D video – Intro to Costume Fabrication (Wonda Folder) 360 video – Class Session Part 1 Optional – Supporting materials: • Celina's Costume • Celina's Puppet • Jaelee's Costume	Val now introduces Cindy to her old friend Larry who teaches at the University. Larry invites Cindy to sit in on one of his classes. He believes that Cindy will love the chance to connect with his students who will be presenting their designs for the upcoming Old Yard.

THE FOURTH EXPERIENCE – THE COSTUME FABRICATION PROCESS			
SCENE	DESCRIPTION	CONTENT	SCRIPT
Scene 4 – Visit to a Virtual Gallery of Traditional Carnival Characters	Cindy wants to get more familiar with the inspiration for these student designs so she then decides to visit a Virtual Gallery of Traditional Carnival Characters. She gets to know the stories behind these characters but she is concerned that she may not have the talent to create costumes like what she has seen. How can she get some hands on experience with costume fabrication?	Traditional Characters Virtual Gallery (Wonda Spaces)	

THE FIFTH EXPERIENCE – A VISIT TO CALLALOO MAS' CAMP			
SCENE	DESCRIPTION	CONTENT	SCRIPT
Scene 5 – A Visit to Callaloo Mas' Camp to see how costumes are built	Val who has been a veteran mas' player with Peter Minshall's band suggests a visit to his Callaloo Mas camp in Chaguaramas. Cindy welcomes this opportunity and arranges to also meet up with one of the DCFA students who has agreed to take her through the fabrication stages for her own costume.	Callaloo Mas Camp footage (Wonda Folder) 2D video – Going to find Callaloo Mas Camp 360 video – Touring the Callaloo Mas Camp 360 video – Sketching Lesson 360 video – Wire Bending Session 360 video – Construction Session 360 video – Costume Assembly 360 video – Play Mas	Val who has been a veteran mas' player with Peter Minshall's band suggests a visit to his Callaloo Mas camp in Chaguaramas. Cindy welcomes this opportunity and arranges to also meet up with her friends from the university to go the stages of costume fabrication in more detail.

FINAL EXPERIENCE – THE MASQUERADE BALL			
SCENE	DESCRIPTION	CONTENT	SCRIPT
Scene 6 - The Masquerade Event	Cindy is now finally ready for the Dame Lorraine Ball of the Old Yard. From what she has gathered, this event historically played out not in the streets but in the private barrack-yards. At midnight on Carnival Sunday the performances started. The main act was a parody of a scene in a schoolroom. The schoolmaster calls the roll as the pupils assemble, and marks down their presence in a big book. The pupils wear ill-assorted clothes, mock crinolines, rag upon rags, and show the exaggerated physical characteristics suggested by such names as Misie Gwo Koko, Ma Gwo Bunda, Misie Gwo Lolo, Ma Chen Mun, Gwo Patatt, Koja, Bunde, Toti or Misie Mashwe Tune. There was much horseplay, with the schoolmaster finally licking them with his whip. Cindy enters the Old Yard where she joins with the DCFA students she met earlier, as they present their costumes. It is indeed a magical experience. She has been transformed and hope to continue participating more fully in the Carnival in future visit to Trinidad.	The Old Yard – Viey La Cou (Wonda Folder) 2D video – A Sense of Home Students Individual Presentations: • Daughter of the Douen • Moth Protector • Lucifer Morning Star • Psyche and Cupid • Queen Ashari • Beastly Beauty 2D video – Masquerade Ball 2020	The Dame Lorraine Ball is finally here. From what Cindy has gathered, this event was historically played out not in the streets but in the private barrack-yards. At midnight on Carnival Sunday the performances started. The main act was a parody of a scene in a schoolroom. The schoolmaster calls the roll as the pupils assemble, and marks down their presence in a big book. The pupils wear ill-assorted clothes, mock crinolines, rags upon rags, and show the exaggerated physical characteristics suggested by such names as

FINAL EXPERIENCE – THE MASQUERADE BALL			
SCENE	DESCRIPTION	CONTENT	SCRIPT
Scene 6 - The Masquerade Event	Val is pleased at what has been accomplished. She feels sure that Cindy will continue the tradition and pass on her love for dressing-up for Carnival.		Misie Gwo Koko, Ma Gwo Bunda, Misie Gwo Lolo, Ma Chen Mun, Gwo Patatt, Koja, Bunde, Toti or Misie Mashwe Tune. There was much horseplay, with the schoolmaster finally licking them with his whip.

Storymaking Art Form:
Pre-Experience Questionnaire (new)

The following questions are designed to gather socio-demographic information and your interests in art, culture and technology, prior to the Virtual Reality experience.

* Required

Personal Information

Socio-demographic data

1. First Name *

2. Surname *

3. Age *

○ Under 20

○ 20-25

○ 26-30

○ 31-35

○ Over 35

4. Where do you reside at present? *

○ East Trinidad

○ West Trinidad

○ Central Trinidad

○ South Trinidad

○ Tobago

5. Gender *

○ Woman

○ Man

○ Non-binary

○ Prefer not to say

6. Highest level of education *

○ CSEC

○ CAPE

○ Pre-University (Certificate Level)

○ Associate Degree

○ Undergraduate

○ Postgraduate

○ Other

Interests in the Arts, Culture and Technology

Questions on cultural attendance and participation, general lifestyle and attitudes towards

7. List any arts and cultural activities that interest you *

8. List any arts and cultural content that your have created/produced in the last 5 years. *

9. Do you enjoy learning with new technologies? *

○ Yes

○ No

○ Maybe

10. Have you played any video games? *

○ Yes

○ No

11. How significant is the story/script to your engagement in a film or video game? *

- ◯ Somewhat important

- ◯ Neutral

- ◯ Very important

- ◯ Extremely important

- ◯ Not so important

12. Have you experienced 360 degree and/or 3D applications? *

- ◯ Yes

- ◯ No

13. Do you own or have access to Virtual Reality technologies (e.g. headset, hand controllers, game console) *

- ◯ Yes

- ◯ No

- ◯ Maybe

Knowledge of Traditional Carnival Experiences and Characters

Previous experience with the subject matter of the VR experience

14. Have you ever designed and/or built a Carnival costume or contributed to the making of a costume? *

    ◯ Yes

    ◯ No

15. Give a brief description of a Pierrot Grenade *

16. Give a brief description of a Dame Lorraine *

17. Give a brief description of a Jab Molassie *

18. Give a brief description of a Soumayree *

19. What is the significance of the Old Yard in Carnival? *

Storymaking Art Form: Post-Experience Questionnaire (new)

The following questions are designed to record your reflections immediately after going through the Virtual Reality experience.

* Required

Personal Information

Names

1. First Name *

2. Surname *

Global Experiential Quality Evaluation

Questions on the user's experience

3. To what extent did you find the application: *

	None	Not much	Neutral	Much	Very much
Obstructive	◯	◯	◯	◯	◯
Supportive	◯	◯	◯	◯	◯
Complicated	◯	◯	◯	◯	◯
Easy	◯	◯	◯	◯	◯
Inefficient	◯	◯	◯	◯	◯
Efficient	◯	◯	◯	◯	◯
Confusing	◯	◯	◯	◯	◯
Clear	◯	◯	◯	◯	◯
Boring	◯	◯	◯	◯	◯
Exciting	◯	◯	◯	◯	◯
Not interesting	◯	◯	◯	◯	◯
Interesting	◯	◯	◯	◯	◯
Conventional	◯	◯	◯	◯	◯
Inventive	◯	◯	◯	◯	◯
Usual	◯	◯	◯	◯	◯
Leading edge	◯	◯	◯	◯	◯

Acquisition of Cultural Knowledge

Questions on the underlying cultural information of the experience

4. What in your opinion are the three most important skills involved in mas making? *

5. Give a brief description of a Pierrot Grenade *

6. Give a brief description of a Jab Jab *

7. Give a brief description of a Dame Lorraine *

8. Give a brief description of a Jab Molassie *

9. Give a brief description of a Soumayree *

10. To what extent did you feel emotionally involved in the experience? *

	Very slightly/not at all	A little	Moderately	Quite a bit	Extremely
Interested	○	○	○	○	○
Distressed	○	○	○	○	○
Excited	○	○	○	○	○
Upset	○	○	○	○	○
Strong	○	○	○	○	○
Guilty	○	○	○	○	○
Scared	○	○	○	○	○
Hostile	○	○	○	○	○
Enthusiastic	○	○	○	○	○
Proud	○	○	○	○	○
Irritable	○	○	○	○	○
Alert	○	○	○	○	○
Ashamed	○	○	○	○	○
Inspired	○	○	○	○	○
Nervous	○	○	○	○	○
Determined	○	○	○	○	○
Attentive	○	○	○	○	○

Jittery	○	○	○	○	○
Active	○	○	○	○	○
Afraid	○	○	○	○	○

Presence Related Experiences

Questions on the user's engagement

11. To what extent did the application hold you attention? *

☆ ☆ ☆ ☆ ☆

12. How much effort did you put into going through the experience? *

☆ ☆ ☆ ☆ ☆

13. To what extent did you lose track of time? *

☆ ☆ ☆ ☆ ☆

14. To what extent where you aware of yourself in your surroundings? *

☆ ☆ ☆ ☆ ☆

15. To what extent did you feel that the experience was something you were viewing rather than something you were participating in? *

☆ ☆ ☆ ☆ ☆

16. To what extent did you feel as though you were moving through the experience according to your will? *

☆ ☆ ☆ ☆ ☆

17. To what extent were you interested in seeing how the events of the experience would progress? *

☆ ☆ ☆ ☆ ☆

18. How immersed did you feel? *

☆ ☆ ☆ ☆ ☆

19. Did you experience any motion sickness or any other negative physical effects? *

☆ ☆ ☆ ☆ ☆

Sense/Meaning Making Impact

Questions on the user's interpretation of the content

20. Did the content make sense? Yes or No, please explain *

21. Was the information to guide the use of the application self-explanatory? Yes or No, please explain *

Expectations

Questions on whether the user's expectations were met

22. Did you enjoy the experience? Yes or No, Please explain *

23. Do you think you learned anything new from this experience? *

○ Yes

○ No

○ Somewhat

24. Did you encounter anything that you did not expect? Yes or No, please explain *

The Technology Experience

Questions on the quality of the technical implementation

25. To what extent did you enjoy the imagery? *

1	2	3	4	5

26. How clear was the imagery? *

1	2	3	4	5

27. To what extent did the application run smoothly? *

1	2	3	4	5

28. Where there any un-necessary steps involved in using the VR technology? *

○ Yes

○ No

○ Somewhat

29. Where there any missing instructions on the use of the VR technology? If yes please specify? *

Repeatability

Questions on the desire to repeat the experience

30. Are you glad you had this experience? *

  ◯ Yes

  ◯ No

  ◯ Somewhat

31. Would the like to experience the same or similar content again? *

  ◯ Yes

  ◯ No

  ◯ Maybe

32. Closing Comments *

Appendix 4: Details of the Participants

MHX (mature female).

She had a background in steelpan playing and involvement in carnival) – Easily navigated the oculus environment and was successfully able to enter the experience without any hitches. Became quickly acclimated to the movement and interactivity in the space; was impressed with this feature of the environment; was procedural in her investigation of the story world elements. Noted that she had a natural engagement with the music played in the spaces. She responded to the beat of the music with her own movements in the chair. She got all the answers correct; she was fully engaged with the experience. As a member of the teaching/administration operations, MHX saw tremendous potential for VR in teaching and learning and was impressed with what could be accomplished with the technology.

SSX (young female).

She had problems with her vision based on pre-existing circumstance. Image may have been difficult to see. Adjustments were made to the lens of the HMD and she proceeded with the experience. She was fully engaged with the experience and was able to go through some of the story worlds. She quickly got the hang of movement and interaction in the spaces and picked up the procedural requirements of the spaces fairly quickly.

VNX (young male).

He played video games and had exposure to PlayStation and Wii systems). He very quickly adjusted to the procedural requirements – how to move, how to select items, how to move from one story world to the other. He was competent enough to be allowed to wander through the story worlds on his own volition. He was able to answer all the questions correctly. He enjoyed the experience and the sense of immersion.

SFX (mature female).

She had no experience with VR and games. She was very animated in her fears entering the space. She voiced her many concerns but was ably supported or reinforced by the verbal assistance of another participant SSX who communicated with her through the experience. Her main concern was going too close to edge of the environments where she felt she would fall off the space. She eventually adjusted to the procedural requirements and her confidence improved significantly over her time in the experience. She was able to operate fairly independently and was able to correctly answer all questions. As the teacher involved in the exercise SFX saw remarkable opportunities for using similar experiences to bring her courses to life through virtual tours and simulated theatrical experience in investigating poetry and Greek mythology.

N.B. SFX and VNX were in the spaces simultaneously at one point and communicated animatedly with each other when they encountered their avatars, with SFX warning VNX to keep away from her in a fun way.

EMX (young female).

She was very quiet and conservative, no outward expressions of fears. She competently engaged with the experiences, without needing much assistance. She was competent in moving, selecting and teleporting. She was able to be left to explore the space at her own pace and was able to answer the questions correctly.

JBX (young female).

She was very engaging, she expressed reactions to images encountered and commented on the visual brilliance of the 3D worlds). She easily got accustomed to using the controls and understood the procedural rules for the space. She was very engaged with the story and the various elements in the story worlds.

CPX (young male).

Although he seemed reserved he was confident in his expression during the experience. He had some background in playing games but did not consider it very significant. He was competent in adjusting to the HMD and controllers and picked up the procedural requirements easily. He moved fluidly from space to space and answered all of the questions correctly.

JMX (young female).

She had a background in traditional mas' characters. Played a Baby Doll and a Dame Lorraine in the past. She was a very animated participant. From her expressions, JMX seemed to have experience in game playing and made comments to the significant improvement of the VR experience. She could see now how she could be physically in a car in one of those driving games. She was impressed with the 3D environment encountered and kept up a running commentary on what she was seeing and what she liked. She demonstrated competence in navigating and using the controllers effectively. She answered most of the questions correctly.

AFX (mature male).

He had no experience in gaming or VR but was very open to the challenge of experiencing VR. I was impressed with AFX's willingness to try and figure out how to do things, which did not come easily to him. He expressed no frustration and was eventually successful in to navigating and using the controllers. He truly enjoyed the experience and was very impressed with the VR environment.