

Stage Magic as a Performative Design Principle for VR Storytelling

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Abstract

This article examines The VOID's *Star Wars: Secrets of the Empire* (2017) VR arcade attraction, and analyzes the intermedial magic principles employed by co-founder and magician Curtis Hickman to create the illusion of a fictive world with impossible space and liveness. I argue that The VOID (Vision of Infinite Dimensions) functioned like nineteenth century magic theaters run by Georges Méliès and others, by employing magic principles of misdirection that directed player attention towards the aesthetics of an illusion, and away from the mechanics of the effects generating technology. Narrative framing and performative role play transported multiple players into a believable Star Wars immersive experience, creating an aesthetics of the impossible that reflected the goal of many stage magic tricks, and was foundational to trick films in the cinema of attractions of the early twentieth century. Using game studies concepts like Huizinga's magic circle and theatre arts concepts like Craig's über-marionette, this article suggests that The VOID and other stage magic approaches to VR, like Derren Brown's *Ghost Train* (2017), are a new medium for participatory theatre that incorporate immersive features from both cinema and games.

Keywords: VR Magic Circle; Impossible Aesthetics; Immersion; Space in VR; Liveness.

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1 Introduction

Before they closed their doors in 2020 due to the COVID19 pandemic, one of the most popular virtual reality arcade attractions was The VOID (Vision of Infinite Dimensions) VR Theaters. Co-founder and Chief Creative Officer Curtis Hickman has spoken extensively about how stage magic was central to adapting transmedia blockbuster franchises like Ghost Busters, Star Wars, and Marvel's Avengers into believable VR experiences. Other popular VR attractions have used stage magic, such as Derren Brown's *Ghost Train* (2017) in the UK, but The VOID theaters were unique in scope and quality, with small theaters popping up in high-end malls across the US, Canada, and the UK. Given that stage magicians were foundational to the early development of film as an entertainment spectacle, their trick films and cinema of attractions influencing visual effects in blockbuster movies throughout the twentieth century, it seems more than a coincidence that magicians are again center stage in the development of VR as a new kind of immersive attraction. Using an intermedial lens of video game and performing arts studies, I will examine The VOID's *Star Wars: Secrets of the Empire* (2017) VR experience, and the stage magic principles Hickman employed to create the illusion of transporting visitors to an alien world in the Star Wars universe. I argue that performative mise-en-scene design principles from stage magic create an aesthetics of the impossible, and that the embodied first-person perspective of VR is particularly suited to such theatrical illusions, especially for fantastic worlds and characters that are the staple of blockbuster transmedia narratives like Star Wars.

2 Stage Magic's Influence Beyond the Cinema of Attractions

The influence that nineteenth century stage magicians had on early cinema is well documented as trick films (Gunning 1989), "up-to-date" magic that incorporated film (Solomon 2006), and actuality films of live stage magic performances (Solomon 2010). Gunning's cinema of attractions (Gunning 2006: 381-388), where a Vaudevillian series of performative attractions like trick films and live acts were the main draw over dramatic narratives, was pioneered by the silent films of Georges Méliès and other magicians, and continued by non-magicians like Buster Keaton (Gilhooly 2016). Gaudreault noted that Méliès used cinema in the service of magic principles by not revealing the trick (Gaudreault 2007), and Barnouw argued that the phantasmagoria and other themes of magicians became media (Barnouw 1981). North showed how cinema magic as visual effects evolved from the techniques developed by magicians for trick films, and that blockbuster movies from King Kong to Star Wars have foundations in stage magic illusions, including the illusion of liveness in animated digital characters (North 2008). Holmberg points out that early cinema was particularly concerned with the illusion of immersion, and that each cinematic development from wide screen to Smell O' Vision to VR has continued towards that aesthetic goal, including video games (Holmberg 2003). Leddington argued that the "antinomic" illusions of stage magicians create an "aesthetics of the impossible" for spectators, resulting in a "logical conundrum" that produces "mental excitation" (Leddington 2016: 254-261).

Stage magic principles and aesthetics have been studied much less in relation to video games and interactive media experiences than in cinema. However, magic principles have been advocated for interface design (Tognazzini 1993), interaction design (Marshall et al. 2010), and games (Kumari et al. 2018). Though Murray's *Hamlet on the Holodeck* called for a theatrical approach to VR storytelling (Murray 1997), and VR was considered an "illusion machine" by early VR theatre researchers (Dixon 2006: 24), the platform has been underutilized for live performance, and little VR research has been done on magic theatre applications that specializes in portraying illusions. Most VR research on immersion and interaction has been from a psychological perspective, and has emphasized that immersion is a perceptual illusion (Slater 2018: 432). The psychological effects of stage magic have been studied since the nineteenth century (Thomas et al. 2016), and magic theatre simulations that hide the mechanism through dissimulation have been the subject of social science technology studies (Smith 2015: 326). Popular VR experiences like The VOID and Derren Brown attractions have only been publically available since 2017, so there is a need to study these recent applications of stage magic. Kumari et al. did look at the narrative framing of Brown's *Ghost Train* experience, and how it misdirected the player's attention from the technology to enhance the illusion (Kumari et al. 2018: 2), which aligns with the simulation-dissimulation practices of nineteenth century magicians. Recent work by Bakk advocates the science of magic as a framework for creating impossible state transitions in VR that have immersive qualities and creates wonder (Bakk

2020: 329-330), and that putting on the VR headset is a performative act similar to live action role play (LARP) to enter a storyworld. This impossible state transition approach is echoed by Smith et al.'s logic-based analysis of how conjuring tricks are constructed (Smith et al. 2016: 3).

3 Conjuring an Über-marionette in the Magic Circle

Because The VOID seemed to be designed as a VR magic theatre in order to create an aesthetics of the impossible, my analysis of *Secrets of the Empire* will focus on how principles of stage magic were used to design a performative experience of being transported to an alien world populated by Star Wars characters. The latest virtual production technologies for real-time interactive media require the convergence of several artistic mediums, including cinema, video games, and live theatre, so my approach will be interdisciplinary. There are two focus points for my analysis: 1) how magic principles like misdirection were used to perceptually expand a room-scale space into an impossibly scaled but tangible VR world, 2) how performative stage magic principles cast the player as a protagonist in a fictive narrative with uncanny life-sized automatons. My main focus will be on understanding how stage magicians approach illusions of impossible space and character liveness, and how their mise-en-scene design assigns a performative role for the player in the illusion. This is a very different approach to VR interaction and immersion than most psychology studies because I am focusing on the artistry involved. Stage magic has a puzzle-game play dynamic: where there is a competition between the magician to hide the mechanics of a trick from a volunteer-player who is challenged to solve the mystery. I will apply concepts from game design such as the MDA framework to consider the mechanics, dynamics, and aesthetics of magic principles like misdirection, and also use game studies concepts such as Huizinga's magic circle to show how magicians invite the player into a playful space to experience illusions for entertainment. Since stage magic is a subset of theatre, I will also apply performing arts concepts like Craig's über-marionette or super puppet to show how performing life-sized avatars in a VR world with game AI controlled non-player characters (NPCs) is like masked or puppet theatre, and is in line with the magic tradition of displaying automaton attractions that have an uncanny illusion of liveness.

I attended The VOID's *Star Wars: Secrets of the Empire* attraction at Disney Springs in Orlando during the summer of 2018. The experience started as most stage magic tricks do, with myself and three others being invited onto the stage to play a central part in the illusion. In this case, we were cast as protagonists in the VR storyworld through a video transmission from Star Wars actor Diego Luna portraying Cassien Andor from *Rogue One* (2016). Cassien urgently recruited us for a mission to infiltrate Darth Vader's base on the volcanic planet Mustafar. As rebel spies disguised in stormtrooper armor, we were asked to retrieve classified stolen cargo needed to defeat the empire. The transmedia narrative framing cast us as protagonists in the Star Wars universe, and reinforced our role in the narrative with a gamified goal. The physical weight of wearing a VR headset and backpack reinforced the feeling of wearing stormtrooper armor in the VR simulation, and was a good example of dissimulation where misdirection and spectacle obscured the mechanics of the technology (Smith 2015: 326). The effect was enhanced by real-time tracking of your group in stormtrooper armor, and hearing chatter through the headsets with other diegetic sounds. While walking through each scene, we were prompted to open doors and touch virtual objects that had physical counterparts in the real world set, which reinforced our embodied presence and agency. In addition, when we ventured outside the base in one scene, the temperature on the lava planet of Mustafar felt hot and smelled of sulfur. As we interacted with virtual characters like droids, stormtroopers, and even a larger-than-life Darth Vader, the NPCs reacted to our blaster shots and seemed to perform with us, producing a performative liveness that was beyond film or video game characters. It felt like a new kind of participatory theatre, as echoed in many online reviews, "...legitimately feels like starring in a Star Wars movie or TV show of your very own" (Bishop 2017), and "I don't feel like I went on a ride, I feel like I stormed an imperial base...but if you'll forgive the cross-franchising, this is some real-life holodeck stuff we're playing with here" (Silliman 2019).

4 Staging Impossible Transmedia Worlds in VR Theaters

Scale matters in both VR and games because it changes the perspective of players, which shifts the aesthetics of their play. A thematically appropriate example is wizard's chess in *Harry Potter and the Sorcerer's Stone*

(2001), where the change in scale of the chessboard has a dramatic effect on the perspective of Harry and his companions. When playing on a regular sized board in the Great Hall, Harry and Ron were outside the field of play, moving pieces from a God's eye point of view. Their movements were analytical and detached, displaying a casual style of play. But later in the film when the board became larger-than-life, the players became immersed in the action, and their movements became more performative as embodied combatants in the game. The rules of the game did not change, but the style of their play shifted with the change in perspective. VR experiences also shift the perspective of players compared to other screen-based media like cinema and video games, where instead of being outside the scene looking in through a window, you are transported to the middle of the 3D world. This immediately makes VR more performative and theatrical, because the embodied perception of the player shifts to center stage in a full-scale scene.

Perspective is also important in the believability of stage magic illusions, and visual effects on any stage set, because most optical tricks must be viewed from specific angles to look convincing. The Pepper's Ghost effect originally used in nineteenth century magic theatres and made popular by Disney's *Haunted Mansion* (1969) ride, was done on a dark stage by an angled piece of glass reflecting a lit figure in the orchestra pit (Barnouw 1981: 27), and could only be seen at the angle perpendicular to the reflection. In The VOID's VR theater experiences, former magician turned visual effects artist Curtis Hickman used magic principles to create the illusion of VR worlds that were "bigger on the inside than on the outside" (Hickman 2016), meaning a tangible embodied experience of playing inside a virtual space that was scaled larger than the physical theater. Hickman and The VOID engineers designed a new kind of participatory theatre space, where multiple players would experience synchronized perceptions of space in two realities, the room-scale physical and the impossibly-scaled virtual, targeting different senses but choreographed for a unified multisensory aesthetic they called "hyper-reality" (Pancrazio 2017). This theatrical VR effect aligns with Smith's research into the technologies of nineteenth century magicians that created supernatural illusions through simulation-dissimulation (Smith 2015: 326), by making the mechanism absent in the design of the apparatus. By separating The VOID's magic theatre apparatus from the VR media simulation, they applied dissimulation by hiding the mechanics that created the illusion of a tangible world.

The problem with room-scale VR is that players can only move around naturally in a small space, which breaks the effect of an expansive world to explore. Most VR games must resort to teleporting or gliding for locomotion in the world, which is unnatural and can lead to VR motion sickness. To solve the room-scale space problem, Hickman used the concept of a magic box that creates the illusion of being bigger on the inside than on the outside. He demonstrated this trick on stage by pulling a box out of another box, and then appeared to place the bigger box inside the smaller box (Hickman 2016). Using this stage magic principal, he designed the "infinite hallway" illusion, which has players walk along a curved wall in physical space while appearing to be a straight wall in virtual space by subtly pivoting the virtual 3D perspective. This perceptual effect allowed the VOID designers to create an elaborate maze of hallways and rooms in a very small theatre space, giving players the perception of moving in a much larger space than they were actually inside. To make the world feel real, they created a narrative that forced the players to touch objects and structures in the virtual environment that had physical props in the theater space.

Hickman describes misdirection as "That which directs the spectator away from the method and towards the effect" (Hickman 2016), or guides your perception away from reality to a fantasy. He breaks misdirection down to both physical and psychological types, with the magician controlling how information is perceived and believed. Physical misdirection is created by the VR hardware and theatrical apparatus, including the tracking and system software that make the infinite hallway effect possible. The trick utilizes redirected walking and touching, which was an active area of research demonstrated at SIGGRAPH in 2016 (Robertson 2016), but not previously applied by magicians. This follows the tradition of magicians using new inventions to facilitate a trick before the technology is widely known to the public. Hickman showed that using a one quarter circle of curved hallway that can be rotated around the central perspective of the player in VR will double the space of a room-scale experience, and that "It looks correct, it feels correct, it is virtually completely correct, but it is physically contained" (Hickman 2016). Since the theatrical space is a skinless shell, multiple virtual environments can exist in the same physical space, allowing The VOID to misdirect movement through an entire Star Wars base in a small theater.

Psychological misdirection is “The arguments that convince you that the virtual is real” (Hickman 2016), such as setting up the hyper-reality scene so players simultaneously experience media effects with physical effects like temperature, fans, smell dispensers, and solid props. Hickman called these “5D effects” that make the mundane parts of a VR world feel believable:

A big portion of creating the illusion of this new reality is convincing your mind that it’s actually happening. If there is a storm, then we want to have wind and moisture. If you’re in a pine forest, we want you to smell pine trees. It doesn’t have to be a myriad of things; we don’t have to replicate everything. It just has to be enough to make a simple argument for your brain to be convinced. If you can do this consistently, you’re able to establish a world that is much more immersive and impactful than just seeing it with your eyeballs (Pancrazio 2017).

In the history of magic, this would be the performative patter or showmanship the magician portrays when setting up a trick. But in VR, even a bottle of soda sitting on a table has no physical reality, “nothing is there, it’s all impossible. So our first job is to convince people, when they walk into the VOID, is that normal stuff is real” (Hickman 2016). So simple performative actions like having players push a physical button to open a virtual door, but then feeling wind rush in through the opening, or sitting down in a spaceship that is transporting you to Mustafar, creates an accumulation of perceptual illusions or “convincers” that make a cognitive argument for surrendering disbelief in the theatrical sense. This dynamic of The VOID can be framed as a literal interpretation of the play and game studies’ magic circle concept as “world building activities” (Stenros 2012: 6) in VR, by using magic principles to build belief in the reality of an impossible 360 space. As Hickman puts it, “Because people have been conditioned so much that the normal is real, that they start to believe the impossible is real too” (Hickman 2016).

Johan Huizinga originally described his magic circle concept as a consecrated space marked off by ritual, for “performance of an act apart,” which pertains to both games and theatre:

The arena, the card-table, the magic circle, the temple, the stage, the screen, the tennis court, the court of justice, etc., are all in form and function play-grounds, i.e. forbidden spots, isolated, hedged round, hallowed, within which special rules obtain. All are temporary worlds within the ordinary world, dedicated to the performance of an act apart (Huizinga 1955: 10).

Bakk frames wearing a VR headset as ritualistic behavior to conjure an “impossible act” which creates “body illusions as a mode of immersive spectatorship.” The experience may override cognitive disbelief, “...even if the experiencer is fully aware of the illusory nature of the immersive environment, she nevertheless produces some responses as if she took the environment as not virtual but real” (Bakk 2020: 330).

Huizinga considered a games arena, theatrical stage, or cinema screen to be magic spaces where participants agree to play by sacred rules, but makes it clear that the rules are an illusion. A player who breaks the rules “robs play of its illusion — a pregnant word which means literally ‘in-play’ (from *inlusio*, *illudere* or *inludere*)” (Huizinga 1955: 11). Live theatre has a long tradition of illusions and game-like “what if” interactions, with performers using what theatre anthropology theorist Eugenio Barba termed “extra-daily” techniques that are an act apart, conveying stage presence (Barba 1995: 9). A “spoil sport” would enter the theatre but not engage in the illusion, either by believing in supernatural magic or by discounting the experience as “nothing but a trick” (Gunning 1989: 3). An aesthetics of the impossible can only be created in stage magic if the audience perceives a contradiction they cannot explain. Illusionists in the tradition of Robert-Houdin, such as contemporary magicians Penn and Teller, do not represent magic as existing in the real world. They create the illusion of everyday realism in the framing of their tricks, much like The VOID first establishes the mundane in VR, and make a point to inform their audience that the trick is theatrical deception. This creates a gamified puzzle dynamic that challenges the spectator to catch the magicians in the act of trickery, or explain the real mechanics that are behind the impossible aesthetics of a trick. Leddington prefers Teller’s “unwilling suspension of disbelief” that magicians cultivate in their audience, so that if the illusion is successful, the result is a “conflict of belief” between what spectators are perceiving and what they know to be impossible, which can generate a deep emotional reaction (Leddington 2016: 257).

The psychological effects of stage magic on spectators has been studied since the 1890s, when French psychologist Alfred Binet published “The Psychology of Prestidigitation” (Binet 1894). Binet interviewed and

used chronophotography to study magicians of the “Golden Age” of magic who performed at the Theatre Robert-Houdin, after the venue was acquired by aspiring illusionist Georges Méliès, who went on to explore the modern style of magic in early twentieth century cinema. More recently there has been renewed interest in the psychology of magic principles like misdirection (Thomas et al. 2016), and the aesthetics of spectator engagement in suspension of disbelief (Leddington 2016). Illusionists use misdirection to create “inattentional blindness” in the spectator “to prevent people from noticing the method of a magic trick whilst still experiencing this effect” (Thomas et al. 2016: 317). Robert-Houdin explained misdirection as using gestures and gaze to “attract the audience’s attention to a point far away from the place where the prestige is taking place,” and through “patter” or miscommunication “he says what he doesn’t do, doesn’t do what he says, and does what he is careful not to say” (Robert-Houdin 1864: 88, 94). Other techniques of misdirection include manipulating spectator’s expectations, perceptual anticipation through repetitions, and mechanisms like physical occluders that hide a key part of the trick (Thomas et al. 2016: 317).

Méliès was especially prolific and influential in popularizing magic illusions using cinema effects, creating up to 1200 trick films from 1895-1913 (North 2001: 74), starting in the Theatre Robert-Houdin and then in 1896 moving to a new film production studio in Montreuil, just outside of Paris. His Montreuil studio was the first of its kind, constructed out of glass to take advantage of natural light, and modeled after the Theatre Robert-Houdin with trap doors and other stage technology to facilitate both theatrical and cinematic illusions:

Méliès built a studio for the production of his indoor fantasies, enabling an increased level of control over the mise-en-scene, in stark differentiation from the Lumière aesthetic of exploratory, globe-trotting quasi-actualities (North 2007: 184).

Méliès most famous and influential trick films were “feerie” pictures that went beyond just representing stage magic in cinema, but instead added narrative elements of fantasy, comedy, and horror as a vehicle for the visual effects. Méliès was “an artist who blended story and spectacle in a way which can be seen as prescient of today’s cinematic special-effects attractions” (North 2001: 74). The most famous Méliès’ feerie film was *Le Voyage Dans la Lun* (1902), which portrayed an impossible voyage to the moon populated by aliens, and was the inspiration for a century of science fiction films, including blockbusters like Star Wars.

Trick films by Méliès and other magicians were shown on the larger Vaudeville theatre circuit at the turn of the twentieth century with animated films and live acts. Some performers seamlessly combined film and live action with staged interaction between the mediums, such as magician Horace Goldin’s 1907 act where he stepped out of a filmed taxi arriving to the theatre, and then proceeded to argue over the fair with the cinematic cabby. Solomon writes “Goldin’s illusion seamlessly merged film and performance, suggesting both the permeability of the boundary between the respective media and their reciprocal relationship to each other” (Soloman 2006: 595). Animator Winsor McCay appeared on stage with his hand-drawn animated character *Gertie the Dinosaur* (1914), wearing evening clothes and snapping a whip to command Gertie to perform tricks for the audience. Other animators like the Fleischer Brothers and Walt Disney created trick or “gag” films that portrayed cartoon characters stepping out of the page to play with real actors shot on camera.

The Fleischers invented new rotoscoping technology in 1914 to facilitate experiments that resulted in their *Out of the Inkwell* animated series (1918-1927). Rotoscoping, the technique of tracing or painting on top of each frame of a filmed performer, created a more realistic aesthetic for animated characters similar to the effect of motion capture technologies today. In *The Tantalizing Fly* (1919) a stop-motion fly prompted comedic interaction between animator Max Fleischer and his drawing of a clown, by rotoscoping his brother Dave who had worked as a stage clown at Coney Island. The magic was to create believable interaction between the live scene and animated page, with the frame of the drawing board serving as a virtual cartoon stage for sight gags. Continuity between the filmed simulation of the real and the animated world of the clown required cutting from one character reaction to the other, such as when the clown sprayed cartoon ink from a pen and the animator jumped back with real ink on his face.

Animator Walt Disney reversed the dynamic established with Fleischer’s popular *Out of the Inkwell* shorts by placing a filmed girl inside of a cartoon world in *Alice’s Wonderland* (1923). In this short, Disney himself plays the magician role, and child actor Virginia Davis as Alice represents the audience volunteer when she asks for a tour of his Kansas City studio. However, Disney’s main innovation is when Alice dreams of traveling

into Cartoonland as a live girl and appears to interact with all the drawn characters there. Disney employed Ub Iwerks to animate the characters, whose fluid hand-drawn style lent itself to impossible transformations and sight gags (Merritt and Kaufman 2000). The animated shorts by Disney, Fleischer, and others in the early twentieth century display a mutability of objects and figures that extend the transformation illusions of stage magic and trick films. In Disney's *Alice On the Farm* (1926), when Alice enters the magic circle of Cartoonland, the tail of an anthropomorphic cat functions as a magic wand, transforming itself into a sword, a hand crank, a telegraph wire, or a fly swatter as needed:

So the wand's "meaning" (which might conventionally be thought of as metonymic symbol of the magician's power), is embedded within its very thing-ness, with what it does or is seen to do. Within a highly specialized and (stylized) setting, the theatrical magic act retains a conception of objects as intrinsically meaningful, agentive and fluid (Gilhooly 2013: 4).

The VOID continued the tradition of nineteenth century magic theaters that involved spectators in the illusion, and employed the impossible aesthetics that early cinema and animation artists developed to portray the illusion of traveling to fantasy worlds. VR hyper-reality experiences like *Secrets of the Empire* used simulation and dissimulation (Smith 2015: 326) to hide the theatrical apparatus through the immersive effect and narrative framing of the VR technology, similar to Hecker's game design concept of decomposing structure from style (Hecker 2008). The VR simulated world created the experiential style, and the dissimulation misdirected attention away from the structure of The VOID's hyper-reality apparatus. A game design interpretation of *Secrets of the Empire* using the MDA framework (Hunicke et al. 2004) is that The VOID used magic principles with narrative framing and role play to hide the mechanics of world building and body illusions, affording players RPG and FPS game dynamics that generated the impossible aesthetics of performing in a cinematic Star Wars adventure.

5 Performing Avatars and Automatons in VR Narratives

If the first major illusion in The VOID's *Secrets of the Empire* was creating the perception of an impossibly scaled Mustafar that felt believable, the second was populating the world with iconic figures from the trans-media Star Wars universe that seemed impossibly live. Narrative framing combined with the first-person perspective of a stormtrooper avatar situated the player's perception at the center of the VR space, a literal magic circle, where players performed with life-sized Star Wars characters as a protagonist in the storyline. Everyone who entered The VOID knew that droids, stormtroopers, and Darth Vader only existed in fantasy and science fiction media that was not live, so when these full scale figures moved like live actors in VR, it had a magical effect. Nineteenth century stage magicians like Robert-Houdin featured automatons in his live shows for a similar uncanny effect,¹ and the theatrical history of humans performing through automata and puppets should inform our understanding of how VR figures can display an illusion of liveness. VR real-time NPCs use game AI to trigger source animation from performance capture data of live actors, but there are many layers of refinement that happen in the process. The base acting data is iteratively refined by animators, who manipulate a virtual puppet rig according to principles of animation originally developed by Disney cell animators. Therefore, the aesthetic lineage of the VR characters portrayed in *Secrets of the Empire* include automata, animation, puppetry, stop motion, animatronics, and live acting. The performance of such real-time characters can be refined until it consistently reflects the director's vision, even when interacting with live players improvising a role through an avatar. British theatrical director-designer Edward Gordon Craig predicted this type of refined puppetry in 1907, when he made the argument that theatrical acting will not become an art form until live actors are represented on stage by "über-marionettes," or life-sized super puppets that remove the actor from direct view and only leave the refined character portrayal.

Edward Gordon Craig was not a stage magician, but he understood the importance of illusions for creating art: "A great poet has told us that all Art is a trick; therefore do not despise tricks" (Craig 1919: 197). Craig was an influential English theatrical designer, practitioner, and theorist working at the turn of the twentieth century to establish theatre as high art, like painting or music, for which he proposed removing actors in his controversial

1. "Robert-Houdin's Antonio Diavolo." Vintage Magic Archives, 2014. <https://youtu.be/Y4ktw1GFewA>.

essay “The Actor and the Über-marionette” (Craig 1907). For Craig, the ‘Theatre of the Future’ would be expressive and symbolic, with gigantic mutable sets derived from moving screens and sculpted with light, and performed to perfection by a life-sized puppet which he called the über-marionette. Craig understood that his vision was impossible with existing theatre technology, and required a new invention:

If you can find in Nature a new material, one which has never yet been used by man to give form to his thoughts, then you can say that you are on the high road towards creating a new art. For you have found that by which you can create it. It only remains for you to begin. The Theatre, as I see it, has yet to find that material (Craig 1907).

Though Craig tried to build the über-marionette throughout his lifetime, conventional puppets always fell short of his original concept. “What the wires of the Über-marionette shall be, what shall guide him, who can say?” (Craig 1919).

As a director, Craig became frustrated with actors that relied more on personal charisma than faithfully portraying the role of a character in a performance. He drew from East Asian shadow puppetry and avatars to describe the über-marionette as displaying “a deathlike Beauty while exhaling a living spirit” (Craig 1907), being manipulated by a skilled artist that showed no stray emotions or accidental gestures. Craig wanted the same control over an actor as he did over his stage drawings, making the performance both iteratively refined and repeatable. Some have speculated that Craig was using a metaphor for a disciplined actor or a Decroux-style mime, but after thoroughly examining Craig’s notes and correspondences in the National Library of France Craig Collection, curator Le Boeuf points out Craig indicated it was a performer in a full-body mask. In his writings, Craig describes a “Performer. Face and form hidden from gaze,” between 4.5 to 6.5 feet tall, and an “actor or manipulator” who “is so highly skilled in his whole being that he no longer exhibits himself upon the Stage” (Le Boeuf 2010: 106, 112-113).

Early Disney animators known as the Nine Old Men were also trying to develop acting as an iterative art form, and developed twelve animation principles to give their characters a believable “illusion of life” (Thomas and Johnston 1981). Some of Disney’s animation principles pertain to the mechanics of portraying living figures through a sequence of poses (timing, arcs, solid drawing, straight ahead/pose to pose, follow through, and slow-in/slow-out), while other principles are based on performative and expressive acting techniques from stage and screen (staging, exaggeration, appeal, anticipation, secondary action, squash/stretch). The squash and stretch principle is the bridge to the fluid mutability of forms seen in the early Disney and Fleischer cartoons, while the other expressive principles address what magicians considered showmanship and what Barba termed “extra-daily” acting technique:

In an organized performance the performer’s physical and vocal presence is modelled according to principles which are different from those of daily life... These principles, when applied to certain physiological factors — weight, balance, the use of the spinal column and the eyes — produce physical, pre-expressive tensions. These new tensions generate an extra-daily energy quality which renders the body theatrically “decided,” “alive,” “believable,” thereby enabling the performer’s “presence” or scenic bios to attract the spectator’s attention before any message is transmitted (Barba 1993: 9).

While Craig would have never classified Disney’s animated characters as über-marionettes because they lacked interaction with live spectators, Disney animators were working on character-acting problems similar to what Craig was trying to achieve with puppetry, by simulating expressive liveness in an iteratively refined visual representation. Craig with puppetry, Disney with animation, and Robert-Houdin with his automatons, were all using different mediums to portray an aesthetic of impossible liveness in a dead figure. Disney’s principles of animation became an industry standard and were applied to 3D digital characters by former Disney animator John Lasseter (Lasseter 1987), in some of the earliest Pixar shorts like *Luxo Jr* (1986). Pixar was a spinoff of Industrial Light and Magic (ILM), the company George Lucas founded to create the special effects for *Star Wars: A New Hope* (1977), and whose logo was a classic stage magician waving a wand. ILM transformed traditional stop-motion creatures to virtual dinosaurs performed by Phil Tippett’s puppeteers in Steven Spielberg’s *Jurassic Park* (1993), which created the puppetry and animation foundations for today’s 3D digital characters, including the NPCs in The VOID’s VR experiences.

There has been a steady development of the technology and techniques for representing impossibly live figures in a believable manner since Disney animators developed the principles of animation and Pixar applied them to digital characters. Reaction shots of spectators to a virtual young Mark Hamill as Luke Skywalker revealed at the end of *The Mandalorian* season 2² display cognitive dissonance followed by excitement that is a common reaction to magic. In each reaction, there is a moment when the spectators know that what they are seeing is impossible but cannot quite understand how it was done, and then surrender disbelief with the acknowledgement that it was a sophisticated trick. This was the reaction that Robert-Houdin's automatons cultivated and Craig envisioned from über-marionettes in the theatre of the future. Performance-capture driven digital figures are starting to create this illusion in non-interactive media, and even some video games, but AI driven NPCs in VR have the most potential for fulfilling Craig's vision because of their scale and presence with performative players in virtual space.

When a VOID player put on VR equipment to become a stormtrooper in *Secrets of the Empire*, they started role play immersion in a magic circle, which has been compared by game researchers to a social contract (Stenros 2012: 13). Players "take on roles that are very dissimilar from themselves" that allow a "discontinuation of the self," so that they perform extra-daily character actions that may be "awkward or strange" (Sihvonen 1997: 7). This socially constructed contract of losing oneself in a character role required trust, something magicians like Hickman designed into the mise-en-scene experience of The VOID simulation using convincers. The role was reinforced aesthetically by wearing VR equipment that was perceived by the player as a full-body mask or costume of a stormtrooper in the simulation. Kumari et al. note that other magic-based VR games have used "narrative framing" in a similar way, like in British magician Derren Brown's *Ghost Train* (2016), which framed the VR headset as a gas mask to protect players from poison fumes on a subway car ride, and that it "offers a nice demonstration of how magic techniques can be implemented in a game environment to help enhance the user illusion" (Kumari et al. 2018: 2).

Narrative framing asks the player to willingly ignore the mechanics of an illusion, suspending disbelief by framing the headset as a stormtrooper helmet or gas mask, so that it became part of the narrative. By making the player perceive the VR equipment as stormtrooper armor in the Star Wars world, the illusion supported aesthetic immersion on both a narrative and perceptual level. Sunderland calls being transported to a virtual world in cinema "diegetic immersion," and that it is a "transmedial aesthetic ideal" that is "central to our engagement with art" (Sunderland 2019: 8-9, 13). Cinematic magic created by visual effects can contribute to perceptual immersion, while cognitive engagement with a cinematic narrative, including identification with a character role, can trigger narrative immersion:

The spectator's immersion in the scene is therefore activated by two immersive narrative responses — empathy and suspense — which stimulate the spectator's involvement with the drama unfolding on screen. Where perceptual immersion is primary and immediate, narrative immersion is secondary and conceptual, operating largely through cognitive processes resulting from the temporal development of narrative (Sunderland 2019: 11).

A VR cinematic experience like *Secrets of the Empire* incorporated perceptual and narrative immersion in a Star Wars adventure where the player was the protagonist, which was enhanced by gamified tasks that required fighting and puzzle solving that have been associated with Mihaly Csikszentmihalyi's psychology concept of flow (Csikszentmihalyi 2014). Sunderland notes the shared psychological aspects between flow and diegetic immersion, but Csikszentmihalyi's work was associated with interactivity and goal-directed behavior, and did not necessarily involve fictive worlds (Sunderland 2019: 14). While flow has been a focus of video game design research (Chen. 2007), it has also been studied in theatrical acting (Martin and Cutler 2002), with similar experiences reported for actors getting into a role. When reviewers of *Secrets of the Empire* claim they felt like they were in a Star Wars movie or that the experience was too short, these reactions may indicate experiences of immersion and flow.

The main difference between immersive VR and screen-based media like cinema and video games is the embodied performativity afforded to players within a 360 degree virtual space. The performativity of being

2. "Reactors Reaction to Seeing Luke Skywalker on *The Mandalorian*, Season 2 Episode 8." *Mixed Reactions*, 2020. <https://youtu.be/BTSsul8tPvU>.

cast as a Rebel spy on a Star Wars mission may produce narrative immersion and psychological flow through multimodal play factors, reinforced by the illusion of interacting with uncanny figures in impossible worlds. The latest virtual production technology used for the Star Wars live-action television series *The Mandalorian* (2019) is an LED soundstage called The Volume that transports the actors literally within a Star Wars magic circle. Rather than using a green-screen where performers have to imagine the impossible world around them that will be composited in post-production, their bodies are immersed within the volume of a game engine scene that also illuminates everything. Actors have reported that the new technology helps them to play their roles in the scene. The VOID created a similar magic circle in VR, for players to perform with other live actors and NPCs through avatars. Role play connected the narrative arc to gamified objectives, so that the multimodal play experience avoided Hocking's "ludo-narrative dissonance" (Hocking 2007). As long as the player accepted their character role and performed as a Rebel spy on a Star Wars mission, the game play supported the narrative and vice versa.

6 Conclusion

Using the popular *Star Wars: Secrets of the Empire* VR arcade experience as an example, I have shown that The VOID functioned as a contemporary magic theater, creating an aesthetics of the impossible in a cinematic multi-sensory illusion. This room-scale VR entertainment application of stage magic principles created the twin effects of simulation and dissimulation through misdirection, effectively hiding the mechanics of the world building and character controls using the VR interface, role play dynamics, and narrative framing. This approach required the design of a physical magic theater with highly choreographed practical effects, synchronized with the VR system, to build the illusion of a believable world. The theatrical stage design employed perceptual and physical convincers to persuade players that the virtual space was real in order to suspend disbelief in impossible world scale and figurative liveness. The VOID served a similar design purpose as nineteenth century magic theaters run by magicians like Robert-Houdin, and incorporated immersive cinema magic pioneered by Méliès and continued by animators and visual effects artists throughout the twentieth century. I also analyzed *Secrets of the Empire* according to game design and performing arts concepts, and argued that the experience placed the player in a literal interpretation of Huizinga's magic circle, and character role play began to fulfill Craig's theatre of the future performed by über-marionettes. Reviews of *Secrets of the Empire* suggest that The VOID achieved aesthetics that were more immersive than typical VR entertainment, transporting players bodily into a tangible Star Wars world that approached a holodeck-style interaction with iconic characters.

Though I have focused on fantasy VR entertainment applications of stage magic, my analysis implies that room-scale VR installations should be researched as a new medium of participatory theatre arts composed in multiple acts. In both The VOID's *Secrets of the Empire* and Derren Brown's *Ghost Train*, a pre-VR staged performance invited players to accept a role in the narrative, which cognitively primed them for entering the magic circle of the VR storyworld. In *Secrets of the Empire*, video of a popular Star Wars actor recruited players as stormtroopers, while in *Ghost Train*, a projection of Darren Brown told visitors about fracking disasters. Other innovative VR installation experiences have designed pre-VR spaces that cast visitors into a performative role in the narrative. Alejandro Iñárritu's *Carne y Arena: Virtually Present, Physically Invisible* (2017), an academy award-winning VR edutainment experience on undocumented immigrants, had a pre-VR space designed as an immigrant detention room. Immigrant shoes and other real objects found in the desert near the Mexico-US border were theatrically displayed, and guests were asked to remove their shoes before going into the main VR dark room, which was covered in cold sand and looked like a desert at night. The performative act of taking off their shoes physically cast guests as immigrants in the main VR scene, which according to reviews had an embodied and emotional impact. These examples indicate that performative role play can serve as a bridge to narrative immersion, and that designers can approach VR experiences like a multi-act theatrical production where the players perform on a virtual stage.

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