Experiencing Architectural Interiors and Exteriors in Computer Games

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This paper looks at the design of "place" in a game-environment. It sets out to present a way of analyzing and evaluating game environments using Brian Sutton-Smith's seven rhetorics of play as a framework. The question this paper investigates, is what can be learnt from our intrinsic ability to navigate our environment in relation to play? Physical architecture offers the game designer metaphors for virtual worlds that have meaning based on experiences people associate with them. True innovation in game-world design requires an understanding of our built environment that extends beyond the surface aesthetic appeal of architecture, through concentration on the way we experience architecture and interact with our built environment.

1. Introduction

This paper looks at the design of "place" in a game-environment. It sets out to identify ways in which an understanding of the broader cultural aspects of play can be used as a framework to recognize elements from architectural design, which can be incorporated into game design to support a more immersive and engaging game experience. Games exist to entertain, and the imaginary setting of a game contributes to the entertainment that the game provides [1]. At a superficial level, the visual aesthetic of a game-world can enhance the overall game experience by creating a visually stimulating environment. However, the elements that make up the construction of a game-world can be designed to be both visually appealing, and improve the game-play.

The diverse nature of play phenomena, which extends into numerous spheres of life, has been analysed according to the disparate play interests of different academic disciplines [2]. In the *Rules of Play*, the latest large compendium on play within the field of game design, Katie Salen and Eric Zimmerman [3] state, "[t]he play of a game is the experiential aspect of a game". The way in which a player interacts with a game is closely linked to the visual experience provided by the graphic style as well as to the game-play. Level design is where the different aspects of the game's components come together and it is the responsibility of the level designer to ensure the levels are designed to bring out the best aspects of the game engine, the art, and the game-play [4]. Level design could be likened to mis-en-scene in cinema, which refers to everything that appears before the camera, including the sets, lighting, props, and actors.

The direction, by Robert Wiene, of *Das Cabinet des Dr. Caligari* in 1920, is cited as a seminal moment in cinematic history because the design of the film-set did not imitate reality but portrayed its own dream world. The architecture of the film-set was seen not merely as an inert background, but was used to manipulate the viewers' emotive perception of the film. "The surroundings no longer surrounded, but entered the experience as presence" [5]. Whereas films are viewed passively, games are experienced interactively. Therefore, level designers have the opportunity to further exploit the players' perception of the environment to accentuate the game-play, and interaction with the dramatic events in the game.

We have been conditioned from birth to interact with the natural world and have learnt to interpret the social and cultural cues associated with our built environment. In his book, *Image of the City*, Kevin Lynch lists the kinds of sensory cues man and animals use to structure, and organise the environment. These cues include the visual sensations of colour, shape, motion and light as well as other senses such as smell, sound, touch, kinaesthesia, sense of gravity, and perhaps electric or magnetic fields [6]. The sensory cues used to navigate the environment are further characterised by the perception of the individual through personal memories and

associations. Gordon Cullen, an influential townscape consultant, describes the city as a dramatic event in the environment, where elements: buildings, trees, nature, light, water, traffic, advertisements and so on, are woven together in such a way that drama is released. He states our awareness of our environment is instinctive and continuous, and our perception of the environment can induce an emotional reaction, with or without our volition [7].

The question this paper intends to investigate, is what can be learnt from our intrinsic ability to navigate our environment in relation to, another inherent human function at the centre of game design, that of play? The framework adopted for this research is based on the work of Sutton-Smith [2], a prominent scholar of play in the twenty-first century, who has set out to categorise the implicit cultural rhetorics found in the language of play theory, which he presents as the seven rhetorics of play: progress, fate, power, identity, imaginary, self and frivolity. Today's popular fascination with play is preceded by a lengthy literature on the subject. The intent in using Sutton-Smith's seven rhetorics of play is to test the hypothesis that understanding how architectural design influences the player's navigation through the game environment can support game play. It is not intended to suggest that this is the definitive definition of play by disregarding the work undertaken by many respected scholars in this domain.

2. Game-environment design

In his essay, Henry Jenkins bridges the divide between the Ludologists, who argue in favour of the mechanics of game play, and the Narratologists, who prefer to consider games in the context of other storytelling formats. Jenkins favours the theory that games are spaces rich with narrative potential, where the rhythm of the game play can be varied through the features in the game environment. He contends that memorable moments in games depend on sensations or perceptions as well as narrative hooks. The topography of a well designed game world can draw a player to established settings that create challenges by impeding progress but ultimately the environment can support the player in the successful resolution of the defined goals and conflicts [8]. The generation of a compelling place results from the interplay between, the overall aesthetic, the game play function and the emotional impact on the player. Rouse explains the interplay in good level design as the balance between the components of a level's game-play in terms of action, exploration, puzzle solving, storytelling, and aesthetics [4]. The details of these components vary depending on the game genre. For the purposes of discussion in this paper the game genres of interest are 3D action, and adventure games. Usually, in these games, the game player sees the environment from either a first-person perspective, where the camera gives the impression of the view from the avatar's eyes, or from a second-person perspective, where the

camera follows behind the avatar in a 3D world [1]. When done well, both perspectives can provide the game player with an intense impression of immersion in the game environment.

In the creation of a simulated 3D environment, architectural design methods and techniques for modelling world interiors or exteriors don't translate directly and a degree of design amplification or manipulation is typically used. All games, no matter how visually realistic in look, are abstracted in design and represent a modification or simplification of the real world because time, scale and physics are manipulated to suit the purpose of the game. In some games the temporal dimension is incorporated into the game play to include the concept of time passing. For example, the avatars in *The Sims* [9] require rest and sleep to function in the game so day and night are an integral part of the game. However, time in games has to be compressed, or expanded to balance the purpose of the action with the game-players concentration. Marching an army through a long valley in real time is unlikely to sustain a player's suspension of disbelief; consequently, the temporal dimension of the game is compressed to enhance the game-play. The physical dimensions of a game must be of a finite size and the objects within the environment must correspond to the scale of the game-world. The relative size of objects within a game-world are frequently distorted to enhance visual clarity so that the scale of the avatar is large enough to be clearly visible in the game environment [1]. The cues we use to navigate the real world extend beyond the physical and sensory dimensions and include cultural associations. Yehuda Kalay clarifies the distinction between the definition of space and place by stressing the cultural and social meanings we attach to a physical space through our intervention as human beings.

> *People imbue spaces with social and cultural meaning, transforming a mere space into a place; it is a sense of place, not space, that makes it appropriate to be naked in the bedroom but not classroom, and to sit at our window peering out but not at other people's windows peering in...Places frame our actions by providing cues that organise social behaviour in the world* [10]

In a simulated game-world, the cultural context is fashioned to support the rationale of the game, and the game-culture could deviate considerably from our own culture. However, because comprehension of, and navigation through a game environment is conditioned by life experience in spatial worlds, an extreme degree of design abstraction in a game-world can have a negative effect on the player experience because without real-world references, navigation is impaired, and it is hard for the player to comprehend a sense of place [11]. To avoid user disorientation, a game design requires enough clues from physical reality to enable users to discover and navigate the virtual environment [12]. To understand how the design of the physical surroundings in a game-world can support the

navigation and game-play in that world entails a deeper understanding of the cues we use to structure and identify our own environment.

3. The seven rhetorics of play and their application to game-environment design

The next section focuses on the cultural ideologies of play, and proposes that a taxonomy of play can help form a structure for the way environmental space works within computer games, and suggests how this structure can enhance game-play.

For centuries, architects and urban designers have deliberately manipulated their designs to dramatise the sense of progression from one space to the next. We are instinctively aware of our position in the environment, and the voluminous literature on architectural theory provides an abundant catalogue of design devices, which can be shown to embellish our sense of exposure, and enclosure. The scope of this paper is insufficient to give a detailed analysis of every design device and how it could be incorporated into level design. Therefore, key elements have been identified and these are considered within the context of the cultural ideologies of play.

According to Sutton-Smith's taxonomy the overall concepts conveyed by the seven rhetorics of play, and the form they each take, are as follows:
1. Progress: play as adaptation, in the form of play and games
2. Fate: play as existential optimism, in the form of chance
3. Power: play as hegemony, in the form of skill, strategy and deep play
4. Identity: play as social context, in the form of festivals, parties and new games
5. Imaginary: play as transformation, in the form of fantasy
6. Self: play as peak performance or micro-performance, in the form of solitary and extreme games
7. Frivolity: play as the world upside down, in the form of nonsense [2].

3.1. Progress

A sense of progress within a game results from advancement through improved ability to confront set challenges, within specified rules, and boundaries of time and space. The form of challenge is dependent on the genre of game, but in 3D game-worlds, spatial awareness and the ability to navigate through a simulated environment are usually basic components of the game-play challenge. Continual movement through the game-world is a trait of action and adventure games, where the player views the world as a sequence of scenes. This is similar to the way in which we experience the real world; when moving through a town or city, the environment is exposed to us in a sequence of revelations, and the city comes alive through a series of juxtapositions [7]. The environment is reveled in a physical sense by progressing through the built surroundings but elements of a city's

historical progress can also be distinguished. Edinburgh is an interesting example where different ages of the city can be discovered by traversing from the crescents of the Georgian New Town, across the Victorian railway line that is dominated by Edinburgh Castle, towards the high, tightly packed tenement housing of the Old Town that date from the medieval town plan.

However, moving through a game, in itself, does not constitute engaging game-play. In his study of animal play behaviours, Robert Fagan identified rising levels of complexity in play, which includes both solitary and social forms of play. The first level of play is expressed by isolated and repeated actions without defence or counterattack by others. In a game environment, providing a calm, conflict, and challenge free space gives the player the chance to explore the surroundings and practice navigation skills [13]. The structure and design of places within a game can encourage exploration and set the scene for puzzles leading to discovery. Marcus Novak suggests the use of walls can be ways of building mystery, exploration, and discovery into an environment because discovery requires a degree of concealment [14]. The assembly of walls to create places can be organised in different configurations to affect the direction and path of progression through the game. Linear organisation concentrates navigation along paths and suggests a street, or corridor, with a beginning and an end, that links to other spaces. In contrast, centralised organisation introduces compactness, and implies hierarchy, the shape often taking the form of a square or circle [15]. In the real urban environment, centralised places form a focal point or meeting place for social interaction, and usually represent a goal for movement and signify a sense of arrival. The spatial organization of Frank Lloyd Wright's *Guggenheim Museum* presents an intriguing hybrid solution that combines linear and centralized organization. The museum's display areas are located on spiral ramps that are organized around the open, central area, which concentrates the path of navigation around the central point of the museum [15].

In his analysis of play behaviours, Fagan identifies social play as a complex form of play [13]. Social play is sometimes without contact, such as chasing, and sometimes with contact, such as sparring or wrestling. In a game-world, areas that are organised linearly, provoke game-play such as chasing an opponent. One flees from an enemy down a labyrinthine catacomb in *Quake 3 Revolution* [17]. Whereas centrally organized spaces set the scene for conflict or drama. One anticipates contest in a sports arena or in the wrestling ring of *WWE SmackDown! vs. Raw* [18] or unexpectedly encounters conflict in a scientific laboratory in *Half-Life 2* [19].

Game-play challenges can be made even more engaging when the environment is designed to enhance the dramatic tension of events in the game and thus provide a sense of progression through the game narrative. In *Pause and Effect*, Mark Meadows, argues that architecture and narrative have been interlinked for centuries, and in architectural design the feelings of suspense and tension are provoked using compression and expansion in

the built structures [14]. Contrasts and extremes in spatial qualities such as narrowness or width can control atmosphere, manipulate perspective or change the point of view through variations in scale, volume, complexity, and lighting. Meadows cites the *Athenian Acropolis* as an example, where the complex design of the buildings and sculptures constitute a specific architectural narrative where religious tradition is expressed through the procession and orders of the architecture.

Other forms of complex social play involve games with objects and features in the landscape. Examples of this type of play in the physical world include *Hide and Seek* and *King of the Castle*. Hiding and concealment are recurring features in game-play and a game-environment can be designed to incorporate areas such as recesses, loggias, alcoves and other subspaces opening onto a major space to make temporary spatial isolation possible [15]. The designers of *Thief Deadly Shadows* [20] use lighting and appropriate architectural features inspired by Gothic architecture to create a convincing medieval atmosphere that requires concealment and stealth tactics to navigate safely through the shadowy kingdom.

3.2. Fate

Introducing an element of chance or fate into a game can heighten excitement because the player has a passive role and cannot depend on intelligence or skill to affect the outcome. Dice throws and random draws are recurring features in traditional games; chance forms a big element of play. The definition of fate as predestination also implies a helplessness in the face of destiny, and so the description of "being born into the ghetto" brings with it, cultural associations to the physical location. Game-play can be structured to toy with our ideas of power and mortality by empowering the game-player to make their own choices which could change his or her fate, within the context of the game. The recurring themes in games of sorcery and magic reflect real life attempts to influence fate through divination, prayer, superstition, and gambling. By tradition, architecture has been used to symbolize the importance of religious preferences. Some of the world's most enduring buildings were built as sacred spaces to celebrate religious rituals associated with the cycle of life, and the struggle between good and evil. The game strategy in *Black and White 2* [21] compels the player to make moral choices to rule over the entire game-world as a good or evil deity. This technique keeps the player actively involved because their every decision can affect the environment, including the buildings, flora and fauna to reflect the player's moral choices [22].

Changes of level in the environment are particularly symbolic because gravity and the ground have conditioned our orientation in the world from birth. Pierre von Meiss contends that because of this, "vertical and horizontal do not, therefore, have the same force. 'To go up', 'to be at the top', 'to look down', 'to go down into a crypt', are more significant

movements than turning and looking to the left or the right, moving forwards or backwards" [15]. Norberg-Schulz corresponds with this view and states, "The vertical, therefore, has always been considered the sacred dimension of space. It represents a "path" towards reality, which may be "higher" or "lower" than daily life, a reality that conquers gravity, which is earthly existence, or succumbs to it" [23]. The vertical dimension in a game environment can be stage-managed to imply the existence of a higher order through the relationship of the elements in the game environment with the ground and the sky. Von Meiss identifies several possible relationships. "A building can give the impression of 'springing from the ground', of 'sinking into the ground', or being 'placed on the ground' or 'hovering above the ground' [15]. The architects, Herzog & Demeuron deliberately set out to design a building that appears to float above the ground. *HOUSE*, as the building is known, is built on a platform that rests on piles and the resulting visual impact challenges our intrinsic perception of gravity because the building appears to float above the ground [24].

The definition of fate is intertwined with that of destiny. The notion of destiny suggests a presence that is beyond our reach but which determines our actions. In his book, *The Concise Townscape*, Gordon Cullen introduces the intriguing notion of "thereness" which he describes as a quality of the environment that is perpetually out of reach but always there. As examples, he uses the sea that lies beyond a sea wall and the Scottish wilderness that lies beyond a man-made road [7]. Game worlds are of finite size and one of the design challenges is to create a convincing "edge of the world" in a way that maintains the player's suspension of disbelief [1]. Including areas in a game that are there, but always out of reach must be done with consideration because rather than creating a wistful longing for the unobtainable, being able to see but not access large areas in a game environment could lead to player frustration. In the vast game-world for *The Elder Scrolls IV: Oblivion,* Bethesda Softworks solved this design problem by creating an impenetrable boundary for the edge of the world using a sheer mountain range that is impossible to climb [25].

3.3. Power

Winning a game, such as *King of the Castle* requires progression to a higher level and it implies a degree of power over the conquered players. Hegemony in games is established through forms of contest, which demand physical skill and/or intellectual strategy. In both solitary and social play, progress is often rewarded by objects that give the player additional power to confront the challenge or to augment the player's score.

Buildings have been analysed within the context of power relations because architecture in the physical world has long been used as a tangible mode of expressing the ancient ideology of power. History shows many examples of where extreme forms of architecture have been used

to symbolize extreme forms of power. The display of power and ownership of place is frequently expressed through territoriality. The occupation of a building implies possession by a person, or group, who have control over the events that occur inside the building. A physical barrier in the form of a façade or wall usually delineates the boundaries of the territory. Frequently the visible signs of power are expressed through physical hierarchy, grandiose scale, desirability of situation, ornamentation, and formality, symmetry and complexity in design. In 17th C France, *The Palace of Versailles* became to be seen as the archetypal vision of power. Its vast scale and extravagance dominated its surroundings, intimidated neighbours, and fellow royals alike. In a game environment the visible expression of power can be made unambiguous when large, sophisticated edifices are contrasted against smaller and less elaborate structures. Will Wright of The Sims and Sim City fame designs *Spore*, the revolutionary new game under development by Maxis. The previews of the game describe the City Phase where players are given the power to design the city architecture. The game includes a suite of creation tools, which gives players a range of design choices so they have control over the scale and degree of opulence in the city architecture [26].

A less obvious expression of power in the environment is the authority of the threshold. In society, the scale and imposing nature of the door is frequently used to give visual evidence of the inhabitant's prosperity and social status. The threshold enforces power in the environment because it controls access between exterior and interior, through a physical barrier, to the occupied territory beyond. Gates, doors, balconies, and windows are all architectural elements that penetrate the barrier and allow one to cross boundaries physically, and visually. Thresholds hold deep cultural significance and numerous rites are associated with passing the domestic threshold. In Roman mythology, Janus is the god of the doorway and holds the keys to the power of opening and closing [27]. Mircea Eliade, has studied the ritual linked to the threshold and he states, "The threshold has its guardians – gods and spirits who forbid entrance both to human enemies and to demons and the powers of pestilence. It is on the threshold that sacrifices to the guardian divinities are offered." [15]. The symbolic nature of the threshold continues to beguile contemporary architects and designers. A striking example of a symbolic threshold is the entrance to Tao Ando's *Water Temple in Hyogo*, which descends beneath a lily-covered pool, signifying the junction between the secular world and the spiritual domain [28]. In a game, the existence of a threshold can introduce the power of suspense because its very existence automatically creates anticipation of something unknown beyond the door. Human Head Studios, the developers of *Prey*, use portals in the game to add another dimension to the game world. Looking through a portal gives the player views into distant locations, and passing through a portal can literally turn the game-world upsides down because the gravity in the game is flipped [29].

3.4. Identity

The overall concept conveyed by the identity rhetoric is play as social context. Massively Multiplayer Online Games (MMOGs), which enable thousands of players to play in virtual worlds, demonstrate interesting instances of how identity can be expressed through play. Complex social dynamics have evolved within such virtual communities because of the immense popularity of these games. A deeper analysis of the convoluted nature of online identity is beyond the scope of this paper. However, within the context of seeking instances of virtual architectural design that support the identity rhetoric, then good examples can be found in MMOG environments in the form of virtual cities and villages which mimic real world forms of community bonding. Each realm in *World of Warcraft* [30] includes towns, forts, outposts and cities. Every major city in the game represents the capital and social hub for the races that inhabit them [31]. The strong narrative back-story associated with each of these places provides a sense of unique character that helps differentiate one place from another.

Our built environment influences our sense of identity and architecture plays a role in strengthening or reducing our sense of belonging. A decisive characteristic of identity is that it is only effective when known and recognised by others. Certain buildings in the fictional world perform easily identifiable functions such as transportation-hubs, banks, taverns and shops, and their underlying identity provide the player with familiar conventions, and real-world rules of behaviour. Whereas other locations that have a specific purpose in the game environment, such as combat-areas and class-headquarters are associated with less recognisable forms of social convention and these have to be learnt from within the context of the game.

In the physical world, the functional identity of buildings has been established by recognising characteristics in the built environment that have become familiar and comprehensible through experience and societal, collective memory. We learn to perceive the function of a building by interpreting meaning that is associated with features of the architectural design, which includes the colour, texture, scale, style, character, and articulation of the building materials. For example, we recognize the function that is associated with the cavernous train shed at *St. Pancras Station*, and we understand the behaviors that are associated with travel and public train stations.

Where game-specific locations, for example, the class-headquarters in the *World of Warcraft*, are used, then the game-play must incorporate opportunities for the game-player to learn the unique behaviours appropriate for such places. The creators of *LocoRoco* have an abstract view on environment design because rather than giving the player control over the game characters, the player controls the environment. Although the levels are very stylized in design,

the player quickly learns to manipulate the environment because the orientation in the game complies with real world physics [32].

3.5. Imaginary

The imaginary rhetoric is play as transformation, which takes its form through fantasy. It could be argued that all genres of video games contain an element of fantasy, and the degree of verisimilitude in a game-world varies according to the genre of game. The more a game represents the real world, the more accurately its objects, interiors, and exteriors need to mimic the real world [1]. The commercial success of "realistic" vehicle and flight simulation games, such as *GT Legends* [33] and *Microsoft Flight Simulator: A Century of Flight* [34], indicate the demand for experiencing the fantasies of driving and flying at high speed. Other games such as the *Monkey Island* [35] series are located in a fantastical and stylised visual land, that features distorted perspectives, rendered in vivid colours, which sets the scenes for equally eccentric game-play challenges. In Kalay's terms, this ranges from the design of "hyperreallity cyberspaces" that attempt to mimic the physical world, through to highly abstract worlds, he describes as "hypervirtuality", where all real world references are intentionally disregarded to create extremely imaginary settings [10].

In the physical world, contemporary architects have the opportunity to realise previously unimaginable shapes and forms using modern technology. Ross Lovegrove, the progressive contemporary designer, proposes that forms are no longer limited by man's imagination, and through the availability of new synthetic materials expressive, or essentialist forms, could make our world stranger and less predictable [36]. Gehry and Hadid, leading architects, accused by some of creative disobedience, defy convention and reject established ideas of architectural space, representation and construction. Critics of Gehry and Hadid 's work, frequently use dynamic metaphors when describing their buildings. Clair Enlow's review of Gehry's *Experience Music Project* in Seattle, induces a vision of a living building made of undulating layers that shimmer, ripple and pulsate [37]. Furthermore, Hadid's designs have been described as fragmented geometry, and fluid mobility that combine to create an abstract, dynamic beauty which creates space that appears to morph and change as it's passed through [38].

Free from the need to comply with real world physics, and with the advent of physics engines in games that can simulate Newtonian physics, [39] game designers are in the position to realise previously unimaginable fantastical worlds that really could morph and change as the game-world is traversed.

Games are being developed using physics engines that allow the player to interact with the game-world in novel ways. In Half-Life 2 the sense of immersion is deepened because a variety of physical phenomena such as gravity and realistic explosions creates a more emotionally credible environment [19].

3.6. Self

Sutton-Smith [2] states the rhetorics of the self in play theory focus on play as having its basis in the psychology of the individual player. This he describes as play as peak performance or micro performance where play occurs as an optimal experience that is intrinsically motivated to gain escape and release. Characteristics of play most relevant to the self-rhetoric include a loss of self-consciousness during play where the player becomes so absorbed other realities are forgotten. Attention is focused on the relevant operations and motivations that are bounded by the rules of the game, making everything outside the play immaterial. Good game design can intensify the player's absorption by supporting the illusion of being immersed in an alternative universe. While a game world may have its own laws of physics that don't apply in the real world, applying the laws of the game-world consistently is a key issue in maintaining the player's suspension of disbelief. It is important to avoid including unnecessary features within the context of the game because their presence could destroy the illusion of the game. The designers of *Beyond Good and Evil* [40] have created a visually and emotionally rich place by carefully considering the overall mis-en-scene of the game. The player's suspension of disbelief is sustained by the combined effect of the engaging game-play, the ambient game sounds and the atmospheric surroundings.

Our individual, aesthetic experience of our environment is derived from our senses - hearing, smell, tactility, and vision - combined with the kinaesthetic experience of motion. In his book, *Existence, Space and Architecture*, Norberg-Schulz, defines architectural space as the 'concretization' of existential space. He uses the term, existential space, to describe a psychological concept whereby man perceives a mental diagram of the world, through interacting with the environment, in order to get along satisfactorily [23]. Von Meiss presents a similar idea and describes architecture as an experience. "Architecture is image only in a drawing or photograph. As soon as it is built it becomes a scene and sometimes the scenario of comings and goings, of gestures, even of a succession of sensations" [15]. A deeper discussion of the way in which we experience our environment crosses into the discipline of social philosophy and is beyond the scope of this paper. However, from our individual knowledge it is reasonable to state that our experience of the environment can induce an emotional response in us. If we are disorientated, and lose our way, the sense of getting lost can bring on feelings of anxiety and even terror [6]. In extreme situations the formation of our surroundings can provoke symptoms of agro-phobia, claustrophobia, and vertigo [7]. Whereas other settings can induce a sense of relaxation, calm and well being, or even curiosity, anticipation and drama. The makers of Resident Evil 4 pride themselves in their ability to create environments that induce a sense of foreboding and dread [41].

3.7. Frivolity

The core of play from the stance of frivolity is based on nonsense and inversion [2]. A frivolous expression of architecture can be seen in follies built purely for the whimsical pleasure of a wealthy owner. In games, the deliberate inversion of real-world expectations can lead to pleasure through surprise and nonsense, or black humour through grotesque realism. Environmental features that could be seen as being frivolous from an architectural perspective could enhance the player's experience by supporting progression through a game. Nintendo has managed to maintain the successful formula of their *Super Mario Brothers* series [42]. One of the winning features of this amusing action-adventure game is the deliberate fantastical and colourful environment where real world conventions are subordinate to playful rules such as transportation through warp pipes concealed in a mushroom kingdom.

In architecture, the influential but perhaps controversial arts movements of Mannerism, in the 16thC, and Post-Modernism, towards the end of the 20thC, both deliberately played with the commonly accepted design principles of the preceding arts movements. Elements found in both styles include irony and surprise, self-mockery and contradiction. Von Meiss talks about, "contradiction used as an intellectual game, as provocation. Where expectations of architectural meaning are thrown into confusion by the expression of ironic conflicts" [15]. Architects of the Mannerist movement delighted in breaking the established rules of the Renaissance period and set out to deliberately play with architectural forms for expressive purposes. Stage management of scenic effects is a feature of Mannerist architecture, where vistas are contrived for dramatic impact, and interiors feature illusionist decoration that distorts expectation. Giulio Romano applied Mannerist methodology when designing the Palazzo del Te Mantua [43]. Post-Modernist architects rejected the "less is more" concept of Modernist architecture and instead celebrated the decorative and pastiche, which emphasized the elements of metaphor and symbol, and embraced a language of cultural allusions. When Philip Johnson was commissioned to design the AT&T Headquarters in New York the resultant sleek skyscraper decorated with a baroque pediment caused controversy because it was seen, by some, as being frivolous [16].

In a sense, Mannerism and Post-Modernist architecture use visual gags to introduce a degree of frivolity into the built environment and the elements become remarkable in terms of their setting in the whole because the contrast and contradiction to the surroundings heightens their visual impact and as a result demands the spectators' attention. Introducing humor into a game design can help to sustain a player's concentration. An example of a delightfully frivolous game is Lego Star Wars where the most memorable scenes from Star Wars are humorously recreated using Lego [44].

4. Conclusion

This paper presents a way of analyzing and evaluating environments using the framework of Sutton-Smiths seven rhetorics of play. Game-play is made more immersive when places within games are designed as settings that accentuate a sequence of dramatic events. When structuring a game-environment, unless it is a simulation game, the game designer does not need to adhere slavishly to real-world references but can operate within a framework of commonly accepted symbols and features from which we identify real world behaviors. Within that framework, it is then possible to manipulate the nuances of style, scale, character, texture and complexity, depending on the degree of verisimilitude demanded by the genre of game, so that the game-player can identify a sense of place and navigate the game-world accordingly.

While it is obvious that Sutton-Smiths seven rhetorics of play is not a definitive list, recognition of the cultural rhetorics of play can provide an alternative starting point for game-level design. Key points include:

Progress - Game-play challenges are more engaging when the environment is designed to enhance the dramatic tension of events in the game and thus provide a sense of progression through the game narrative

Fate - Changes of level in the environment are particularly symbolic because gravity and the ground have conditioned our orientation in the world from birth

Power - The threshold enforces power in the environment because it controls access between exterior and interior, through a physical barrier, to the occupied territory beyond

Identity - The identity of places in game-world design demands that a distinction is made between the use of symbols, and environmental features, which are comprehensible to everyone, and those that are recognizable only to the initiated, where the objects in the environment guide the behavior only of those who know its associated rituals

Imaginary - With the advent of physics engines in games that can simulate Newtonian physics, game designers are in the position to realize previously unimaginable fantastical worlds that could morph and change as the game-world is traversed

Self - Careful consideration of the overall mis-en-scene is crucial to creating emotionally rich places that when combined with engaging game-play can enhance the player's suspension of disbelief

Frivolity – In games, the deliberate inversion of real-world expectations can lead to pleasure through surprise and nonsense, or black humor through grotesque realism.

Urban design, architectural theory, and contemporary architectural practice are sources of rich ideas for game-level designers. Physical architecture offers the game designer metaphors for virtual worlds that have meaning based on experiences people connect with them. Combining

the cultural characteristics of play with the social understandings of our built environment can help identify ways to support a more immersive and engaging game experience. However, true innovation in game-world design requires an understanding of our built environment that extends beyond the surface aesthetic appeal of architecture through concentration on the deeper cultural meaning associated with way we interact in our built environment.

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References

1. Rollings, A. and Adams, E, *Andrew Rollings and Ernest Adams* on Game Design, New Riders, Indianapolis, 2003

2. Sutton-Smith, B, *The Ambiguity of Play,* Harvard University Press, Cambridge and London, 1997

3. Salen, K. and Zimmernam, E, *The Rules of Play: Game Design Fundamentals,* The MIT Press, Cambridge, Massachusetts, 2004

4. Rouse, R, *Game Design: Theory & Practice,* Wordware Publishing, Inc, Plano, 2005

5. Edited Neumann, D, *Film Architecture: From Metropolis to Blade Runner,* Prestel, Munich, London and New York, 1999

6. Lynch, K, *The Image of the City,* MIT Press, Cambridge, Massachusetts, 1960

7. Cullen, G, *The Concise Townscape,* The Architectural Press, Oxford, 1961

8. Jenkins, H, *Game Design as Narrative Architecture.,* http://web.mit.edu/21fms/www/faculty/henry3/games&narrative.html [26 September 2005]

9. Maxis, *The Sims 2,* PS2, Electronic Arts, 2005

10. Kalay, Y.E, *Architecture's New Media,* MIT Press, Cambridge, Massachusetts, 2004

11. Roudavski, S.and Penz, F, *Space, Agency, Meaning and Drama in Navigable Real-Time Virtual Environment.* http://www.digra.org/dl/db/05150.54561 [26 September 2005] 2003

12. Jakobsson, M, *From Architecture to Interacture,* http://www.informatic.umu.se/nlrg/to_interacture_ir3.pdf [26 September 2005] 2002

13. Fagan, R, *Animal Play Behaviour,* New York: Oxford UP, 1981

14. Meadows, M.S, *Pause and Effect: The Art of Interactive Narrative,* New Riders, Indianapolis, 2002

15. Von Meiss, P, *Elements of Architecture: From Form to Place,* Chapman & Hall, Lausanne, 1991

16. Galinsky: people enjoying buildings worldwide, AT & T Building, http://www.galinsky.com/buildings/att/index.htm [31st January 2007]

17. Bullforg Prod, *Quake 3 Revolution,* PS2, Electronic Arts, 2001

18. Yuke's, *WWE SmackDown! vs. Raw 2006,* PS2, THQ, 2006

19. Valve Corporation, *Half Life 2,* PC, Vivendi Universal Games, 2004

20. Ion Storm, *Thief: Deadly Shadows,* PC, Eidos Interactive, 2004

21. Lionhead Studios, *Black and White 2,* http://www.lionhead.com/bw2/about.html [3 June 2006] 2005

22. Lionhead Studios, *Black and White 2,* PC, Electronic Arts, 2005

23. Norberg-Schulz, C, *Existence, Space and Architecture,* Praeger Publishers, New York and Washington, 1971

24. Jodidio, P, *Architecture Now!,* Taschen, 2001

25. Bethesda Softworks, *The Elder Scrolls IV: Oblivion,* PC, 2K Games, 2006

26. Maxis, *Spore,* EA Games, Release date September 2007, http://www.gamespot.com/pc/strategy/spore/story.html?sid=6156325 [31st January 2007]

27. Livius: Articles on Ancient History, Janus, http:// www.livius.org/ja-jn/janus/janus.html [31st January 2007]

28. Slessor, C, *Contemporary Doorways,* Octopus Publishing Group Ltd, 2002

29. Human Head Studios, *Prey,* PC, 2K Games, 2006

30. Blizzard, *World of Warcraft.* PC, Blizzard, 2005

31. Blizzard Entertainment, *World of Warcraft,* http://www.worldofwarcraft.com/info/basics/cities.html [3 June 2006] 2006

32. SCEJ, *LocoRoco,* PC, 2006

33. SimBin, *GT Legends,* PC, Viva Media, 2005

34. MS Game Studios, *Microsoft Flight Simulator: A Century of Flight,* PC, MS Game Studios, 2004

35. LucasArts, *Escape from Monkey Island,* PS2, LucasArts, 2000

36. Edited Fiell, P. and Fiell, C, *Designing the 21st Century,* Taschen, Cologne, 2005

37. Clair Enlow, Frank O. Gehry Rock Temple, www.architectureweek.com/2000/0712/design_1-1.html [4 November 2006] 2000

38. Design Museum and British Council, Zaha Hadid, Designing Modern Britain – Design Museum Exhibition. www.designmuseum.org/design/zaha-hadid [4 November 2006] 2005

39. Physics Engine, http://en.wikipedia.org/wiki/Physics_engine [4 November 2006] 2006

40. Ubisoft, *Beyond Good and Evil,* PC, Ubisoft, 2003

41. Capcom, *Resident Evil 4,* PC, Ubisoft, 2006

42. Nintendo, *Super Mario Brothers,* DS, Nintendo, 2006

43. Italian Mannerism or Late Renaissance (1520-1600). Encyclopedia Britannica, www.cartage.org.lb/en/themes/arts/Architec/MannerismArchitecture/ItalianMannerism/ItalianMannerism.htm [5 November 2006]

44. Traveller's Tales, *Lego Starwars,* LucasArts, PC, 2006

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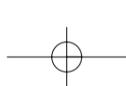
Deep Space

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