Imaging Gameplay – The Design and Construction of Spatial Worlds

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Abstract

From the two-dimensional mazes of early game design, to the simulation games of emergent behaviour, and the complex societies of massive multiplayer games, players interact in environments that are spatially represented and configured. In game studies there has been a tendency to associate the spatial in computer games with older forms of media such as film and television (Bolter 1999, Jenkins 2004, Murray 1997). This has resulted in a misplaced focus on narrative structures, art direction and audience reception, that excludes the broader range of spatial practices encountered in gameplay.

This paper proposes that an understanding of game space must take into account not only the representational form of space on screen, but also the movement in and around spaces performed by the player. The confluence of screen design elements, player navigation, spatial perception and game agency presents a hybrid form of spatiality initially structured by the game designers and then reconstituted by the player during the processes gameplay.

The paper firstly explores a number of spatial design strategies used in games such as the panorama (*Exile*) the 3D Cartesian grid (*Splinter Cell*) and the orthogonal (*The Sims*). It addresses how these spatial geometries produce a plurality of perceptions that provisionally shape player engagement. It considers how this shaping of player engagement is reworked by the spatial praxis or performance of the player. Here spatial praxis is understood as the player's engagement in game challenges, on-screen action and navigation. Such a focus on spatial praxis is concerned with changes and dynamics, involving as it does, the reconfiguration of space through the apparatus of the player's body. As such, the paper argues for a move away from a static model of point and click interaction represented by a series of static objects bounded by empty space towards a more phenomenologically informed concept of the player's engagement in space. It suggests that in order to take account of the complexity of gameplay, the player's experience of space might more usefully be considered as a form of spatial practice that

takes account of the complexity of gameplay and the players embodied experience of space.

Paper

Introduction

This paper is an investigation of visual representation in computer gameplay. From the scrolling screens of *Super Mario Brothers* (Shigeru Miyamato, 1985), to the two dimensional photorealism of *Myst* (Rand and Robyn Miller 1993), and the isometric viewpoint in *The Sims* (Will Wright 2000), players interact in environments that are spatially represented and configured. This spatial landscape can be understood on a number of levels – as a form of representation, as user experience and as spatial practice or performance. Taken together these form a hybrid experience of spatiality initially structured by the game designers and then reconstituted by the player during the processes of gameplay.

Writers such as Bolter and Grusin have understood computer games as a remediation of pre-existing visual language from older forms of media such as film and television (Bolter 1999). However, while film and television are important visual antecedents such an approach largely ignores the different characteristics of player agency or the modes of spatial practice in interactive environments. Rather than the sensuous immersion of the cinema viewer, the game player has an active stake in the navigation of space. Gameplay also demands the development of spatial memory, knowledge of the rules of the space and the affordances associated with certain kinds of spatial trajectories.

This paper is part of a larger project that investigates how the player's movement within computer games might be theorized. My starting point is that the spatial is one of the fundamental properties of game environments and that movement in and around spaces is one of the key pleasures for many players (see Bartle 1997; Manovich 2002). A theorizing of spatial practice concerns the spatial actions performed by the player when they engage in the active matrix of play. The background to this is an understanding that spatial experiences are not limited only to the forms of visualization but need to take into account the phenomenological and perceptual dimensions associated with player agency (Flynn 2004).

The first stage in understanding player engagement is to explore the visual language of the screen. As a contribution this paper traces how the spatial has been framed through certain styles of visual representation and investigates how aesthetic and compositional elements might effect player movement and spatial practice. Much of the context and initial motivation for the player is derived from the representational form on the screen as a way of understanding the spatial morphology of the world and the challenges of the game environment. For exploratory and strategy games winning is intrinsically tied to such a mastery of space. In order to better understand the impact of visual representation the specific focus in this paper is on three familiar visual tropes in computer games. These three areas are: - the panorama, isometric space and what is known as 3D. These will be approached in turn in reference to cultural formations of space and histories of visuality. Associated questions that arise from this discussion such as: what imaginary sense of self/other is constructed through spatial

devices; what are some of the spatial elements that elicit particular movements from the player, and what are the affective dimensions of spatial engagement while hinted at in the paper will be explored in more depth at a later date.

Panoramic space

The panorama as a spatial device has been used in early games from the horizontal scrolling axis in *Defender* (Eugene P. Jarvis1982) and *Stampede* (Williams 1981) to the horizontal focused 360 degree multi-node panoramas in *Exile: Myst 111* (2001). Wolf conceptualises the history of the horizontal scroll in relation to tracking shots and off screen space in early film (Wolf 2001). Another related and equally important panoramic lineage is the traditional scroll paintings of China and Japan. As Ehrlich and Desser observe in classic Chinese and Japanese (*Emakimono)* hand scrolls space has a multi-focus perspective rather than a singular focus with a flatness of composition and a horizontal extension (Ehrlich and Desser1994). The seamless visual image of the hand scroll slowly unravelled horizontally revealed a story or narrative. Based on a pictorial synthesis of space and time the scrolls had a continuous space that navigated the viewer through a story scenario revealed as a flow rather than as a series of separate images. An example is Gu Hongzhong's Han Xizai's Night Banquet from the 10th century where the host appears five times within a time-space continuum to represent successive stages of the host's feast (Ehrlich and Desser 1994).

The extension of space familiar to these scrolls occurs in a number of early platform games where escalators allow the player to jump vertically and access far left or far right

ends of the scrolling screen. Space scrolls through the frame with the character moving and responding to the space. The scroll based on a scenario rather than a subject shows a progression of elements that the player hops over, jumps above or circumnavigates. Wolf highlights how in *Stampede* the player can neither stop nor change direction or revisit the same space in one play session. Space moves on in a seamless horizontal flow regardless of game activity. Wolf also highlights other examples of scrolling models in *Super Mario Bros* (1985). *Super Mario Bros* uses the scrolling space of a large stage set with space made up of layers of overlapping and independently moving planes. The front layer contains the player-character (and often the scenery the character stands on) while the back layer contains background graphics and scrolls at a slower rate than the foreground creating an illusion of depth (Wolf 2001). As well as the traditional hand scroll such uses of space are similar also to the laterally elongated stage area of Japanese Kabuki and Noh theatres.

The ambulatory and centralized position of the viewer in the Asian scrolls is echoed in a physical manner in the Western panoramic tradition. The navigable panorama began in the early19th century as a large scale circular or semi-circular image often extending to thousands of feet housed in purpose built rotundas and theatres (Stafford and Terpak 2001). The pan +horama or 'all-view' showed contemporary events and exotic overseas places such as the great sweep of Robert Barker's panorama *Grand Fleet at Spithead* of 1791. For Stafford 'the all-view … embraced an already pictorialized topography and displayed it as a volume of space'(Stafford and Terpak 2001: 95). Key to its reception was the movement of the viewer through an architectural space. The image was revealed

as a non-narrative totality emphasised by natural light inside the canvas, trompe d'oeil effects and experienced through the act of navigation around a platform. In certain instances decks or platforms were fitted out to resemble the deck of a ship with mechanical aids to simulate movements accentuated by live music and performers. Critical here is that the panorama was to be seen while travelling – concealed and revealed through the movements of the body. In this way the body as well as the image was experienced as the active producer of sensation.

Only later with the moving panoramas and the miniature strip or ribbon versions did the 'eye' become the dominant mode of navigation. The rolling panoramas moving past the immobile viewer marked a separation between the body and the eye. Critical here is a shift in emphasis to the eye away from the physical movement or performative actions of the viewer. Another related and important development of the panorama was in Muybridge's 1878 full circuit panoramas of San Francisco. Using his mammoth plate camera turned vertically his overlapped photographs shot from Nob Hill created a full circular panorama of San Francisco. Showing uninterrupted views including the Golden Gate and Alcatraz the final panorama extended to seventeen feet long. As Solnit notes, only the very wealthy had a space where it could be laid out flat and like the Chinese scroll it could not be seen in all its detail at once or in a single glance (Solnit 2001).

It is this tradition of wraparound panoramic photorealism that is taken up in *Myst 11: Exile*. As in Muybridge's work strange anomalies of vision arise as part of optical distortion as the frame is asymmetrically stretched so that the first and last panels of the

image can overlap. Based on a 2D rendering of QTVR (QuickTime Virtual Reality) technology *Exile* elicits certain kinds of movement based on the geometry of the photorealistic panorama as a navigable space. Structured on the principle of the cylinder the player navigates within the centre of a series 360 degree cylinders. Nodal points offer exit and entry points to the next circular panorama.

Rather than the one-point perspective derived from Renaissance painting the player moves around left and right in a circular panorama that takes in the landscape as a visual sweep and returns back to the starting view. There is no central focus to the gaze or ideal viewing position instead the horizontal scrolling aspect is emphasised offering a continuum of perception rather than fragmentation. Extending the horizontal axis into a circle distracts the player from forward centric propulsion and reveals an excess of landscape detail. In the Western panoramic tradition of the grand vista, space is full. Such a panorama comes as a rich tapestry of visual intensity that leaves out all reference to a space outside the viewing area.

The player in the centre of the scene is the central axis around which the world rotates. Having a central axis point of view there is a constant vying for attention at the edges of the image as things are continuously revealed. In one sense there are no edges to the image as the player is always surrounded by a circular field of view. There is a simulation of body movement replicating the mobile body moving past a static panorama. This is a perceptual trick similar to the experience of being on a static train that appears to move because the opposite train is leaving the station. For the player, the circular panoramas

moving in the horizontal axis produce an ambulatory sensation as through the spaces are being physically traversed. The effect is spectacular producing a sense of immersion and a dizzying sense of dislocation as though being in a landscape but apart from it.

Isometric Space

The isometric view is another common strategy used in computer games. We are familiar with the isometric view of *The Sims* (Will Wright 2000) and other similar 'God games' such as *Age of Empires* (Bruce Shelley 1997) and *Civilization* (Sid Meier 1993). In a pragmatic sense the isometric view shows a top down perspective where parallel lines remain parallel and objects retain their size and geometry within the frame making it easier for the player to see spatial relationships between buildings and objects within a wide landscape or environment.

As Krikke points out (Krikke 1996) isometry emerged from a mixture of axonometry or classic Chinese perspective (*dengjiao toushi* in Chinese) and European geometry. Axonometry was a method used in traditional Chinese and Japanese painting such as in Chinese vertical scrolls and Japanese woodblocks of the Edo period. Differing from Western perspective, in the axonometric view lines reaching deep into the picture plane do not converge, but remain parallel. It counters the Euclidian perspective rules of diminution where figures and objects in the background are smaller than those in the foreground, and where shading or chiaroscuro techniques of light and dark are used to delineate shape and form. Axonometry has no vanishing point and does not assume a fixed position of the viewer or a fixed spatial relationship between subject and object. Krikke traces how these techniques were introduced

to Europe in the 17th century via Jesuits returning from China and later taken up in technical drafting, architecture and engineering. From there its greatest influence came through graphic design and the modernist architects at the Bauhaus to become the basis of CAD systems and other modelling systems used in simulations and computer games.

As a number of commentators have suggested notions of space as empty or immobile are central to a Western ontology of spatial creation and representation (Soja 1989; Shinkle 2003). Unlike the Western notion of space as negative and objects as positive, space in the Japanese and Chinese systems of representation are considered an active principle. As can be seen from early Japanese and Chinese paintings, theatre and film, blank space is used as a key compositional element where emptiness is alive, a creative entity inhabited by nothingness - *wu* in Taoist and Chan philosophy (Ehrlich 1994). The spaces between the objects define the space just as much as the objects themselves and establish a powerful dynamic between the background and foreground elements or the space and non-space. In this sense we can see a distinct difference between the Western idea of full space and the Japanese sensibility that allows for space to be empty or not entirely covered.

This spatial model codified within the isometric view implies a large plane of space perhaps even a portion of limitless space or endless extension. In many isometric computer games unexplored areas are blacked out and revealed only through navigating into the blank space at the edge of the visible image. Isometric perspective draws attention to the edges of room spaces, spatial structure and empty space. In *The Sims* the

player looks down upon and manipulates the avatars to put out the garbage, call neighbours on the phone, and move from toilet, to bedroom to kitchen. Neither the players' position nor line of sight is fixed providing a mobile point of view accessed through camera views or shifts in the viewing angle. The player can view a wide perspective to see all rooms of the house simultaneously or zoom into the action to navigate the avatars to perform specific detailed domestic duties and engage in a certain kind of suburban sociality.

In his discussion of perceptual address in Japanese composition William argues that the isometric view offers an involvement with the elements within the frame rather than an alienated viewpoint (D. William 1994). Often the top down isometric view has been discussed as a distancing technique. Countering such arguments Williams suggests that in isometry there is a constant encouragement of perceptual involvement. The ability to see and manipulate our *Sim* from a top down view of the home space turns them into an electronic type of pet which does provoke a voyeuristic fascination perhaps even a sense of immediacy. The player's ability to manipulate avatar behaviour across space through repetitive navigation of the *Sim* from bathroom, to kitchen, to bedroom becomes central to the *Sims* social success within the community and 'winning' the game. Agreeing with William's argument the isometric viewpoint in *The Sims* does seem to encourage our involvement with the *Sim* avatars and their domestic spatial apparatus.

3D Space

For many years, 3D geometry and level of polygon count has been the Holy Grail of 'realism' within computer games. The 3D spatial construction common to shooters and

strategy games adopts a code of seeing based on the Renaissance projection of three-dimensional space onto two-dimensional picture planes. This geometry of visuality known in the early Renaissance as *costruzione legittima* formalized the idea of the vanishing point where the lines of projection met at an imaginary point on the horizon. Initially a theory of spatial perception, such codes became inscribed in ways of seeing during the early Renaissance as the eye was trained to read the spatial mathematics and therefore be able to appreciate the harmonic proportions employed by Quattrocento architects. The assumption underlying Renaissance space is that static objects are surrounded by empty space. It provides the 'to be looked-at-ness' of space rather than its active or dynamic principles. In addition it demanded a specific static viewing subject and a contained body. In this way 3D games inherit an age old idea about 'realism' based on Renaissance aesthetics and beauty associated with the Golden Mean.

In employing the Euclidian attributes of empty isotopic geometric space, within 3D game engines, delineation is made between space and non-space or objects and emptiness. In the spaces of *Doom* (1993) and *Quake* (1996) geometry is flattened out and confined to the surface of objects in the X/Y/Z (horizontal, vertical and depth) axes with the space between objects represented as homogenous and empty. Such a rigid geometry expresses a certain disjuncture between foreground and background elements of the composition and creates an oddly elongated Z axis. The exaggerated lines of the Z axis exact a penetration into the frame demanding a certain force on movement that Fuller and Jenkins have associated with narratives of conquest and a 'conspicuous consumption of space' (Fuller and Jenkins 1995). *Doom* and *Quake* use a restricted horizontal and vertical viewpoint to drive the player into the

Z spatial axis. The visual schema of such 3D games offers an unbroken exploration of space allowing players to tilt, pan, track and rush headlong through space. The mathematics of the space is such that players can easily crash against geometry such as solid walls and become spatially disorientated. Navigation is not always logical and requires game specific spatial knowledge. Poole describes the player's point of view in such games as 'remote controlling a robot with tunnel vision rather than being there yourself' (Poole 2000).

In the third person stealth shooter *Splinter Cell-Chaos theory* (2005) the position of the player within space and their manipulation of space and its attributes form a core dynamic of the gameplay. Like earlier shooters such as *Doom* (1993) and *Quake* (1996) navigation of 3D geometry is multi-level and requires fast reaction and unconscious motor skills. The player crouches, jumps, and manoeuvres to complete their secret assignment for the US national security agency. The player manipulates their play character Sam Fisher, through confined and dangerous spaces gathering intelligence, capturing and eliminating terrorist operatives. Building up knowledge of architectural space, selecting non-obvious routes and remaining invisible is essential to success in playing the game.

Framed by the visual logic behind linear perspective of a receding interior and a defining horizon line the player enters space as a penetration into the frame. Exaggerated depth perspective emphasises the interior as a type of frontier. The structuring of 3D presupposes a fixed point of view from an immobile onlooker. In *Splinter Cell* this is oddly reversed with the player operating as a highly mobile physically articulate body.

Based on the player's challenge as Tom Fisher to remain invisible via stealth and mobility, a detailed knowledge of the enclosures and passageways of the ludic architectural space is demanded. Perceptual experiences, spatial mapping and an engagement with proprioceptive opportunities demand a highly sophisticated approach to the game's spatial dimension.

Conclusion

The types of representational spaces in computer games draw from particular histories of visuality and elicit certain responses – not just certain ways of looking - but certain modes of behaviour. The intent of the paper is not to privilege visual representation over other forms of spatial engagement but to focus on the specificity of visual models that are not confined to conventional Western models of linear perspective. The focus on different models of space from the panorama to isometric space to 3D suggests that representation in computer games is a rich, complex and diverse field of culture. The discourses of visual representation in game studies are perhaps overly simplistic in that they suggest Western models of visuality dominate game design. Much game design emerges from Japan, and as this paper has outlined, draws on philosophies of space inherited from distinctly non-Western traditions. My attempt in this paper has been to open up the discussion to introduce some of these models and to point towards the importance of visual perception and affect as key elements in player engagement. A broader notion of screen spatiality extends arguments that games are simply representational aspects of popular visual media and suggests that an understanding of

player experience as spatial praxis can tell us much about gameplay as a vital aspect of experiential contemporary culture.

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