Virtual Space & HCI: Lessons from World of Warcraft

Abstract

Video games are the starting point for the general understanding of virtual space. (Grove & Williams 1998). Academics use videogames to describe virtual space (Murray 1996, Nitsche 2009). Others argue that there is no understanding of virtual space, only a loose collection of articles connected by the issue of realism in rendering or behavior (Manovich 2001). These statements point to a lack of understanding of virtual space on its own terms and sets the stage for this document. This is a design document, written by a designer of virtual spaces. It's purpose is to provocatively explore user experience and task completion as forces that influence the design of virtual space. This is not a conventional research paper.

The complex relationships of narrative, realism, motivation, usability and human computer interaction (HCI) are unpacked in the videogame *World of Warcraft* through an detailed examination of travel. It is proposed that the exploration of travel in a videogame can provide a toolkit of ideas for the application of narrative, realism, motivation, and usability in virtual space. Travel can inform designers on issues of user experience and task completion in virtual spaces

I. Overview and Backstory, the Wisdom of Warcraft

Overview and Terms

Virtual space in this document is defined as a computer generated, visually dimensional environment traversable by a user. Virtual space is capable of supporting both work and play. Work and play place different design objectives upon a virtual space. In this document, work takes on the functional imperative of efficient task completion. Play is loosely translated interactions outside the domain of work and is expressed as user experience. Videogames are seen as a subset of virtual space. The key difference in this document is that while virtual space allows for task failure, videogames actively prioritize user experience over efficient task completion. They expect and utilize task failure. This simple change of priorities, a promoting of user experience over task completion, turns even basic behaviors like falling down, into very complex interactions.

The virtual design forces discussed here, user experience and task completion, should be in harmony. Harmony however, is not a magical occurrence. It takes effort and understanding to balance these forces and meet the needs of the user. In this document, task completion is further understood through the computer science domain of human computer interaction (HCI) and its subset usability. Usability is narrowly defined as the software's ability help accomplish productive tasks effectively and efficiently (Hackos & Redish 1998). Example productive tasks are image manipulation in Adobe Photoshop and text editing in Microsoft Word. The idea of a productive task and task completion in virtual space, in this document, is held to that same practical standard.

User experience could be addressed through HCI studies, but given the need to understand user experience as separate and possibly in conflict with task completion, user experience is addressed through narrative and film studies. The use of storytelling and narrative in games is well known (Murray 1996). Linking narrative to representation, or realism is common in film studies (Bordwell 1985). Manovich's statement that virtual space is understood through realism in rendering or behavior, demonstrates the deep and often hidden role narrative plays in design as narrative is linked to realism.

The idea of conflict between user experience and task completion, as narrowly defined above, is straightforward in software like Microsoft Word. Users of Microsoft Word, don't wish to slay dragons to edit a line of text, find hidden treasure behind a magic keystroke, or lose themselves in a complex immersive interface. Connecting this definition of task completion to virtual space is awkward. This awkwardness may be due to the common conception of virtual space as a videogame, a place where you are in fact tasked to slay dragons and find treasure.

To smooth this awkwardness, the idea of an avatar as a network cursor (Heim 1998) may be helpful. Rather than view a user's avatar as a faux human mask for roleplaying (Laurel 1994), an avatar can be seen as a point from which a user accesses, manipulates and shares data (Guynup 1997). Like the cursor in Microsoft Word, avatars move and generate actions within a digital interface. This simple analogy does connect travel in virtual space to conventional usability two dimensional interface practices, and

should be kept in mind throughout this document. This analogy of avatar as a network cursor can highlight the exponential impact of narrative and motivation on virtual design. It also highlights the impact of going from two to three dimensions in terms of usability. The next section steps into the specifics of the design forces in videogame based virtual spaces and offers an example story of one particular cursor-avatar.

While Traveling on a Zeppelin…A Cursor Story

"It was early Sunday afternoon, and I was riding the zeppelin to the Undercity. A woman was standing uncomfortably close to the edge of the gondola. Before we reached the city's sky tower platform, she leapt from the zeppelin. Silently she fell. She died on impact. With the knowledge of her death, a word crossed my mind – Noob*."

This *World of Warcraft* player tried to cut a corner. She tried to make her travel task shorter by not waiting for the zeppelin's designated stop at the sky tower. Yet she misjudged the safeness of the height from which she jumped, and died. This player was now running back from the graveyard to retrieve her body. Luckily, videogame death is not permanent; it is merely a delay in task completion. *World of Warcraft* teleports you to the region's graveyard and forces the player/user, in a ghost form, to run back to their body. While dead, the player/user cannot speak with other players or interact with the world in any way. The player/user must reach their body in 6 minutes and accept resurrection, or additional game related penalties will be assessed.

Once alive, she would resume her original game related task of travel to the Undercity – a task delayed by a meaningless death. Having died in *World of Warcraft* in equally ignoble fashions, I pondered her loss. As a designer of virtual space, I pondered the role the designers of *Warcraft* had in shaping her fate. Was her death truly meaningless?

Falling as Travel Technique, Death as Task Failure

Death is the ultimate failure of a task. In the real world, designers go to great lengths to avoid any chance that a user may die. Games are different; death is part of the game (Rouse 2001). In the real, physical world, death is an extreme example of task failure, but a useful one here. In the revivable, replayable, and fictional world of video games, death is only a temporary setback. The point of a comparison of real, physical death and fictional game death, is to lay a foundation to break virtual space away from goals of realism, and more importantly, draw out the design factors of user experience and task completion.

In the world of video games, designers utilize death as the ultimate penalty and they balance it against constructs that imply success. In a well designed game, all task failures support the user's overall experience and are used to create a sense of value in the completion of game tasks. This leads to some interesting choices in terms of design. The HCI issues surrounding our simple fall from a zeppelin are very complex. It is the failure of a travel task, through an unusual, optional, yet completely reasonable travel mode in games called falling. A travel mode that stretches the core of the earlier idea of avatar as network cursor (Heim 1998).

Falling, travel, and death are a specific example set. To connect this and other videogame practices to conventional HCI principles, such as those that guide the use of a cursor, a range of larger issues must be addressed. It is well known that videogames utilize less than optimal methods for completing tasks. The initial key is how prioritizing user experience above task completion in videogames opens the door to a cascade of design options and issues to be understood. The interplay of narrative and interactivity takes on new and far reaching significance and the larger issue of narrative in virtual space begins to shape.

The simplified list of game design / HCI issues includes:

Failure – its use by videogames allows less than optimal HCI practices to be employed, if justified by narrative or motivational needs.

Narrative – which positions the user/player's concept of task success/failure.

Aesthetics – which bridge the gap between the purely usable / HCI driven space, and the immersive narrative/story in which the user/player plays.

Motivation – the need to keep the user/player playing.

Our best option for connecting the list of ideas above to standard HCI/usability practices is in the well-studied domain of virtual travel and speed. Videogames like *World of Warcraft* employ numerous travel techniques. The first issue in our list above is, in a sense, broken down into the three issues that follow it. It should be noted that it is wrong to declare that poor HCI practices (nonfunctional buttons, overly complex

displays, or hidden features) are appropriate in designing videogames. It is the ties to narrative and motivation that justify the possibility of failure and define success. This narrative justification of task success and failure is discussed in detail later in the paper, when HCI virtual travel taxonomies are directly tied to *World of Warcraft* practices.

Videogames are complex sets of rules and fiction (Juul 2005) geared to create play and the desire for play. This divide between rules and fiction (also known as ludic and narrative) is the basis for the use of terms narrative and motivation within this paper. Both terms, narrative and motivation, seem necessary to incorporate failure into a domain of rules and fiction. Games are also autotelic (Csikszentmihalyi 2001); all the activity in the videogame serves some purpose within the videogame. Every task and subtask has value and can be linked to issues of success and failure.

Even when a player/user is dead, motivational value can occur. In *World of Warcraft,* this comes from the fact that once you are dead – you cannot die. While running back from the graveyard area to their body, players may now fall from any height and survive. In an area called the Charred Veil, many dead players retrieve a small pleasure in their death by leaping over the edge of the high cliffs. This travel method offers both a shortcut to their body and the unique, previously unsurvivable, thrill of scenic downward travel.

Convention and Invention, Narrative Impact

Before addressing complexity of travel modes in *World of Warcraft* and connecting them to HCI taxonomies of virtual travel, it would be helpful to first provide one detailed example of the impact of narrative and narrative aesthetics on travel. Since falling as a travel mode has already been cited, it seems the most appropriate starting position. In a formal sense, the falling (or jumping) off a building often allows the player the quickest path to the ground. Therefore, falling could be seen as an efficient travel mode. It also requires little, if any, training (the basic concept of falling is well known to all human beings). This ease of understanding allows falling as an act of virtual travel and is utilized by players in many types of video games. From a usability perspective, falling allows for a more efficient method of movement when compared to common alternative presented in the virtual space – the walking down of a long, narrow, often winding, set of stairs or path. In a virtual space, falling to one's death can be completely removed. Unlike a videogame, is no need for that level of task failure or to tie falling to a narrative outcome like death.

The impact of falling as a travel mode on the design of a virtual space can still be uncovered by juxtaposing a videogame world, with the real, physical world. Consider the following thought experiment. If our ability to fall and survive occurred in reality – if human beings could literally survive falls of great heights, real world architects would invent different structures. These new buildings would exploit our ability to fall. These new buildings would become more usable. While it is unclear what these buildings would look like, any advantageous design modification in support of our new found ability to fall would certainly be utilized. Architects would invent a new element to add to their

buildings, one that incorporates the real world ability to be uninjured by great falls. The design of stairs, elevators, railings, balconies, and rooftops would evolve. Places for people to land would be created by architects seeking to maximize this new ability to complete travel tasks more effectively. Like architects, many HCI scholars champion the following of such real world forces over metaphors that simulate past designs in the creation of interfaces (Gentner & Nielson 1996).

Since videogames do support falling as a travel mode, it would seem plausible that their architecture, buildings, and landscapes would reflect and invent new elements to support falling. The causal observer is unlikely to notice these changes in architectural style that allow for failing as travel mode. Yet in videogames, like *World of Warcraft*, these elements and design styles do exist, but are not be readily visible. The answer to this invisibility of design lies in narrative and its impact on aesthetics. To understand the role of narrative and narrative aesthetics we must now leave both reality and the videogame world behind. Film studies offer a design space driven by narrative and narrative aesthetics. The survivability of a fall, in a Hollywood movie, requires narrative intervention. A well placed awning or swimming pool to break the fall, some superpower, or a timely act of god. Examples are commonly found in blockbuster movies such as Indiana Jones, Temple of Doom (awnings), James Bond, Thunderball (swimming pool) and Superman (superpowers). In videogames the changes in style are hidden by the narrative, or more appropriately, the changes in architectural style are made to feel acceptable to the user/player.

Hiding an architectural style that supports falling as a travel mode is only the beginning of the relationship between narrative and user tasks. In film, buildings have no direct connection to real world forces. In fact, many structures are complete fake. Flat storefronts make a town, small scale models or digital creations make whole cities. The rooftops of filmic buildings may not keep out the rain; filmic doors will not keep out trespassers. Some doors will not even open. The force that guides their entire presence and whole of their design is narrative. Is the building modern or ancient Greek? Is the building clean or is it dirty and run down? These factors are driven by narrative and are determined not by invention, but by narrative convention (Carroll 1992).

It could be said that invention deals with reality, while convention deals with realism. In virtual space, setting up a design dynamic of realism vs. reality is appealing, but in videogames, much like in film, realism is subordinate to narrative (Bazin 1953, Bordwell 1985). Proof can be found in the fact that films are often most immersive, most powerful when they break the rules of reality. From the slow motion spin effect highlighted in the Matrix movies, to the jump cuts used for two people in conversation on a television screen, unreal montage heightens the narrative power of the media.

A second takeaway from the preceding paragraph is that realism is not an end goal, but tool used to shape user, viewer or player behavior and understanding. Narrative is key to being able to apply realism effectively or to break from realism effectively with both videogames and virtual spaces. Film studies offers deep insight into realism and rearranging realism though montage to create more powerful, compelling outcomes. The

cutting and pasting of virtual space, like cutting pieces of film may allow for more efficient scenes to be produced. The new factor in manipulating realism is usability and in fact usability may override narrative in virtual spaces that lack overarching storylines. Regardless of future hierarchies, a starting point lies in understanding narrative, narrative convention, and user experience in videogames.

Film highlights the impact of narrative and narrative conventions. Film is a domain dedicated to generating powerful user experiences. The clarity between film conventions and real world invention is shattered in the domain of videogames. The videogame designer's desire for immersion in a storybook reality is balanced with the rules, the play, and the mechanics of task completion. Suspension of disbelief is balanced against the player/users desire for maximum efficiency in task completion (usability). Task efficiency within the boundaries of user acceptance (or the suspension of disbelief in games spaces), equals a sense of great power in the digital domain.

In *World of Warcraft*, travel modes not only use narrative conventions with ties to magic, myths, and science fiction, but they also extend and interweave with the design of buildings and landscapes themselves. Buildings and landscapes are not simply following realistic conventions in order to support the suspension of disbelief, they actively determine travel modes, user tasks, and end goals. Hidden behind the realistic conventions, the forces of invention, HCI, and usability are active. In the *World of Warcraft*, roofs and doors are designed in accordance both the game's narrative and its

usability needs. The lines between invention and convention blur. A videogame and possible virtual space design aesthetic emerges.

Convention and Invention, Addition and Subtraction

Returning to videogames, new travel modes, like falling great distances, should have an impact on design of environment in which the player/user inhabits. In *World of Warcraft*, buildings however do not reflect any new architectural developments that explicitly demand the leaping of users to the ground. Beyond a graphic novel, fantasy feeling, the buildings in *World of Warcraft* visually reflect traditional conventions of falling equals death. Note the term visual, for there are in fact great changes afoot, but they are often hidden or not seen as additions, but rather simple things that are missing or whose function is subtly transformed.

A primary reason that the architecture of *World of Warcraft* does not directly alter itself to exploit the fullest potential of virtual space, including the survivability of great falls, is narrative. *World of Warcraft* is a storybook world, a world dependent on the suspended disbelief of the player. To visually acknowledge and design for this digital survivability of great falls, would remind the user of their own digital fauxness. The entirety of the *World of Warcraft* paradigm is wrapped in a magical story. Magic powers and mythic beasts are used to justify the player/user tasks and abilities, as well as the design of the videogame world itself.

It would be easy to declare that all new design possibilities that enhance usability simply reach back to narrative domains and the addition of magic, mythos, or science fictions for justification. That justification is false, as upon deeper study a second hidden path for innovation design emerges. Since to invent new elements solely by utilizing the affordances of virtual space, and therefore ignore the game's narrative is not allowed, *World of Warcraft*, rather than add conspicuous architectural elements to support the survivability of great falls, *World of Warcraft* subtracts. Innovative design is not always the conceptually new, but can also come from the removal of the old and unneeded.

In the case of supporting jumps from places, railings are removed. In *World of Warcraft* cities like *Orgimma*r, caves in *Un'goro Crater*, and the Elven buildings in *Ghostwood*, structures support the leaping down of players/users and help speed them back into game play rather than require players/users to backtrack down paths they have little to gain from. In *Orgimmar*, falling allows travel across rooftops. The functionality of rooftops is no longer the reality based need to keep out rain, but is now tied to travel and allowing (or stopping) players/users from traversing them.

Other *World of Warcraft* omissions include rooms, especially in instances. Instances are special game play centered areas that focus on specific missions rather than support multiple general play tasks. Rather than utilize the square footage and construction costs to build compartments the way a real world architect would, instances tend to be a series of winding paths that connect with occasional larger spaces in which battles occur. This path-like approach to game architecture allows play to flow through

the virtual space. From rooms we move to doors. Doors, which open and close in *World of Warcraft* are largely removed. To enter most buildings, players/users travel through open archways and complete their tasks without the interruption of having to stop and open a door. When doors do appear in *World of Warcraft*, a sense of narrative need also appears. Doors segment game events, act as structural chapter or paragraph headings which serve notice that a new event will be coming. Doors, once an invention are now a videogame convention.

World of Warcraft, architecture does support the act of falling as a travel technique. Defining downward travel through the term falling, allows consideration of both intentional and unintentional acts, which is important as videogames support and utilize both task success and task failure. Falling can be a short-cut or it can bring death and so allow great heights to act as walls, boundaries that guide the player's actions and their knowledge of the world. The player/user can also fall into a pit of monsters, which, depending on the player/user's level, may be fatal or may be a short cut accessible by only higher level player/users. Falling is also unidirectional, so it affords a linear design element. Videogame level designers use space, through elements like falling to negotiate time (and therefore narrative) with the player/user. All of these past statements tie falling and its architectural impact not to the world of real world physical architecture, but the narrative aspects of videogame play.

Through this one example of falling as travel technique, it has been shown that narrative operates in a complex, flexible space, and is difficult to contain or cleanly

evaluate. Even videogames like *Tetris*, which were created without narrative caveats, can find themselves having narratives mapped on to them by the player/user (Juul 2005). In a sense, all videogames contain narratives, but "some narratives will be more discernable than others" (Juul 2005). Juul's work addresses the ludic and narrative divide (reshaped in videogames as sets of rules and fictions). This confirms the idea that narrative is always present, but is never is a complete explanation for the design of virtual space. A second related avenue previously described as motivation, warrants further HCI study. Motivation, like narrative, addresses user experience but not necessarily task completion.

Modes and Motivation, Becoming more Usable

"Players expect to fail" (Rouse 2001). This simple statement underpins the division between the domain of usability and that of video games. With failure not only an option, but a design necessity, interactive methods that usability scholars shun are suddenly given new life. The concept of modes is a major example. Despite their proven usability problems in interfaces and task completion (Sutcliffe, Ryan, Doubleday, Springet 2000), modes are commonly found in games. Modes including stealth, berserker, shadowform, and dozens of travel options and effects are found in *World of Warcraft*. The reason modes are acceptable in games is simple but multilayered. Videogame modes are tied to motivational (and narrative) forces.

During successful play, users gain new modes. The new modes empower the user to complete larger game tasks. In a sense, games become more usable over time. New modes are granted which increase the speed or killing power of the player/user, and allow

for the more prompt completion of fictional tasks. This gaining of power also leads to another note on modes. Modes intertwine with the motivational needs of game design. Gaining modes that are more powerful is a strong motivator for continued game play.

The use of modes and the failure of some game designers in addressing basic tasks like travel opens the door to a common ground with general usability principles. The preceding pages addressed a range of issues. The common use of falling as a kind of short-term travel mode in videogames underscored the complexity of the domain. The role of narrative in defining forms of user ability, such as adding magic or subtracting doors, and the use of practices that cause failure, such as modes, shift videogames away from standard HCI/usability principles used to design interfaces and non-game software.

To more deeply address the divide between game design and standard usability and see how usability is applied to generating user experiences within the videogame world common ground must be found. Speed and travel are issues found in both videogame and non-video game spaces. The latter portion of this paper goes into detail on the practices found in *World of Warcraft*. In that latter discussion, videogame practices of modes and narrative will play a key role, alongside current computer science and HCI scholarship on virtual navigation. Before merging narrative and motivation into past HCI scholarship on videogames and virtual travel, the limited nature of past scholarship and the differently purposed research of virtual travel, must be addressed. It is far too easy to assume that much of what has been written here has been addressed by others. A sense of past scholarship, blended with the preceding text past, lends a new

context for interpreting studies of virtual worlds, and allows the continued use travel / navigation example in making a larger case for usability in virtual space and the real lessons of game design.

II. Usability and Games

Historical Separation

Early HCI scholarship on the usability of video games viewed them in simplified terms. It placed video games under the comfortable rubrics of its own academic domain "All video games are interfaces between the child and an elaborate scoring system" (Pausch 1994). While the whole of a game could be seen in the light of an interface tied to a scoring system, this approach clearly overlooks the roles of narrative and ludic demands in game design. The use of the term "child" to describe the player/user carries its own implications as to how HCI scholars once viewed this design domain.

This narrow focus of HCI scholars on video games as interfaces allowed them to apply standard usability principles in regards to video games as a whole, yet it kept them from approaching a broad range of game design issues. Past papers such as Steve Cornett's "The Usability of Massively Multiplayer Online Roleplaying Games: Designing for New Users" does an excellent job of applying standard principles and practices to videogame interface evaluation. Measurements of success and failure were limited to a 2D interface. Acts of play – tasks within the 3D environment – were untouched. In the end, despite the common ground of humans, computers, and shared

interest in the user's needs and interaction, HCI and videogame design are most often kept separate.

> *"A generic feature of the two fields is the dedication to providing users what they want, but nevertheless there has been very little interaction between them"* (Jorgensen 2004)

> *"This relationship between theories of game design and traditional HCI evaluation methods has yet to be defined but definitely yields an exciting future"* (Pagulayan 2003)

Falling from a building may not be the best example to tie game activity and usability together. There is little usability / architectural scholarship on the design of buildings in virtual spaces. Much of the work consists of general statements, such as limiting user behavior and aligning structures for easier searches (Shneiderman 2003) or that realism may not always be the best approach (Poupyrev 2000). The most specific virtual research that has been done seems only indirectly applicable, largely because interest has been directed at novel input devices or travel/navigation techniques that overlook screen-based, mouse driven worlds (Bowman, Krufijff, LaViola & Poupyrev 2000) (Poupyrev 2000). While the act of falling is a valuable travel technique in videogames, HCI scholars of virtual space have not researched the value of falling. Comically, it appears to be a technique they wished to avoid.

The larger issue of travel however may hold enough overlap for our discussion. many HCI papers have been written concerning virtual navigation. The general focus of all of these papers relates to the improvement of travel and interaction in virtual space. Given the novel techniques, range of possible behaviors, and variety of goals, it becomes necessary to pare down the issue of travel further. Velocity – the issue of speed can be connected to travel in videogames, virtual spaces and two dimensional interfaces. In broad sense speed, the ability to optimally across a digital space, reconnects with the idea of avatar as cursor.

Avatar-Cursor Velocity (Full Speed Ahead)

Velocity is a design issue confronted by HCI scholars (Bowman 2000). Designers of virtual space control the speeds afforded to the user in traveling through the space. Choice of speed or range of speeds can be a difficult task. Too slow and users will be unnecessarily delayed. Too fast and users may find navigation difficult to control, especially for short precise tasks. A range of speed can be offered by modes or continuous control. Yet, the use of continuous control places an additional cognitive burden on the user that may influence other tasks undertaken while moving. A number of specific speed modes can be used, but in general, HCI scholars have discourage the use of modes as they can confuse and frustrate the user (Hackos & Redish 1998).

Videogames break from HCI efforts and may support either continuous control when play is of a racing nature and the added cognitive control issue is factored into the balancing of task failure and task success. In contrast, RPG videogames like *World of*

Warcraft use travel modes. As *Warcraft* is the example of this paper and it uses a variety of videogame travel modes, a HCI driven taxonomical review built upon the research of Bowman, Krufijff, LaViola and Poupyrev seems appropriate.

Starting in the domain of past HCI studies of virtual travel, the factors that influence optimal travel speed in any given virtual space are linked to the following:

User Experience – User skill in managing speeds includes benefits of practice and physical reaction time.

Demands of Task – Straight line, avoiding targets, gathering objects, gathering information, and/or interacting with fellow users.

Demands of the Space – An open field, a maze, rooms of a building, and/or a series of pits to leap across or vines to grasp.

Input/Output Devices – Joysticks, thumbsticks, mice, steering wheels, monitor, goggles, caves.

Technical Affordances – Processor speed, rendering speed, frame rate, internet connection (online game play only)

Software Affordances – Variable speed control, instant speed boosts, teleportation, guided navigation.

The factors above represent a methodology for describing the larger factors influencing how users manage velocity. Some are constant, such as Input/Output Devices and Technical Affordances. They do not change while the user is interacting. In contrast,

User Experience is generally seen as a linear progression allowing for greater speed and diversity of behaviors. The Demands of Task, Demands of the Space, and Software Affordances can vary greatly within the space. Fortunately it is also these latter three that designers of virtual space have the greatest influence over.

On the matter of velocity, the subtask taxonomies of Exploring, Searching, and Inspecting do not have a direct influence. Given the great diversity of application and cognitive processing, the subtasks of Exploring and Inspecting are not an optimal starting point for connecting videogames to HCI/usability practices. Travel to a known location factors out the cognitive load of users' issues of having to interpret their surroundings. Focus on travel will be limited to Searching – travel between known points.

Under Input/Output Devices, the question of Immersive, Semi-Immersive, and Non Immersive can be raised. Given that most games are screen-based, we can look to what is seen as, in an ACM context, as Non-Immersive work. Unfortunately, most of the computer science research has focused on Immersive and Semi-Immersive domains, which is due, in part, to a focus on phenomicologically driven realism (Manovich 2001).

The last major taxonomy involves the manner by which users control navigation and speed. Five categories of interaction techniques can describe the means by which travel is controlled (Bowman 2000). These techniques differ from the factors above in that they deal with the actual user input.

Physical Movement – Walking, treadmills, stationary bicycles.

Manual Viewpoint Manipulation – Grabbing and pulling, leaning one's body to control both direction and speed.

Steering – Continuous specification of direction. Motion itself is automatic and speed is typically constant.

Steering Automatic – User specifies direction, but does not require cognitive or physical effort maintaining direction. Motion itself is automatic and speed is typically constant.

Target-Based Travel – User specifies a destination, system handles details. With or without transitional travel (i.e. teleportation)

Route Planning – User specifies a path to follow. The user retains the ability to adjust travel / destination while in transit.

Each of the preceding lists of taxonomies highlights the complexity of virtual space and the seemingly simple act of travel. These taxonomies need to be understood and defined prior to a direct review of videogame interactions and their possible use in non-videogame spaces. For the purpose of usability evaluation, travel in *World of Warcraft* appears to be an ideal candidate for a number of reasons. *World of Warcraft* uses the standard interface input and output devices of mouse, keyboard and screen (not a game controller). Unlike a racing game, the task of travel in *Warcraft* is not a goal in and of itself. Speed varies, but is not under continuous control (racing game). It uses dozens of modes instigated in a number of ways. Travel tasks in this paper are further limited to being a subtask of Searching, as in traveling between known points. Searching is a

common task, one that also raises the importance of task completion in relation to user experience. In a sense player/users travel to places to begin missions, to play and generate user experiences. Searching therefore becomes more inherently connected to past standard HCI concerns of task completion than Exploring or Inspecting. Lastly, *World of Warcraft* also utilizes both Steering and Target-Based control techniques.

The next section enters into a more direct drawing of usability practices out of the *World of Warcraft* videogame. It is worth restating that videogames are not an interface connected to a complex scoring system. Videogames are complex environments centered on generating unique user experiences. Videogames incorporate task failure and become more usable over time. As shown in the detailed example of falling as travel technique, a range of design issues tied to narrative and motivation are present in videogames.

The larger benefit is not necessarily the application of usability principles to video game design, but rather how practices in video games are formed. From that, foundational principles applicable in non-video game related virtual spaces may emerge.

III. Usability and Travel in Warcraft

General Connections

The preceding section offered a detailed description of travel methods in virtual space. These travel methods show the complex web of options available to designers for an avatar-cursor. Missing from the previous section was the issue of player/user experience. Video games and virtual spaces hold narrative and motivational elements that

greatly impact player/user experience (Murray 1996). *World of Warcraft*, has already been shown to hide and/or alter the usability of its landscapes and architecture through narrative and/or motivational forces. Travel in *World of Warcraft* also overflows with hidden connections to user experience, narrative, and motivation. These connections, presented in full detail here, serve to underscore the role of narrative and motivation in game design and highlight the possible design differences between videogames and virtual non-game spaces.

World of Warcraft offers 70 experience-based levels. Players start at level 1. By completing missions and slaying monsters, they rise in level. At certain levels, players gain new travel modes. Without exception, these new travel capabilities always afford an increase in velocity. From a pure game play perspective, the link to increased velocity in the new travel modes is a motivational carrot for users. After the initial task of Exploration comes Search directed travel. *World of Warcraft* game tasks, or quests, typically require repeated Search directed travel to known and often distant destinations.

Greater speeds improve the task of Search directed travel. As the gaining of velocity is tied to player level, User Experience is addressed. The player/user gains new travel modes upon proven mastery of past abilities. The player/user gains new travel modes after experiential demands have taken them to ever more distant areas of the game. The stair stepping of modes is tied the growing travel demands of quests. *World of Warcraft* first manufactures a user need for increases in travel speed, and then fulfills that need. It is a simple, but very effective, methodology. Many different modes of travel and

sub-variations of travel modes are not only allowed, they are required. As these modes scale up, grow faster, fundamental constructs of usability, limiting of user choices / degrees of freedom become enrobed in narrative and sculpted by the needs of play.

The techniques for travel fall under the headings of Steering and Target Based control. Users start with access to both techniques. Steering begins with two speeds, run and walk. Running, default setting, is used while users engage in a range of interactive tasks. This range includes most travel during combat tasks, travel within instances, and travel to NPCs (Non Player characters, with whom conversations, purchases, repairs can be had). The latter, and often Search directed task of travel to NPCs, requires close proximity to the NPC target before the second task of NPC interaction is allowed by the game mechanics. Running is also used for travel inside of buildings.

A slower walk mode is available, but no lesson in the game teaches its use. It is seldom utilized, as most interaction in the game seems effective with run speed (The exception being players in Stealth Mode). In terms of initial travel modes, one Target-Based Travel mode is also immediately available to the new player/user. This Target-Based Travel is a teleportation mode triggered by a Hearth Stone. Clicking on this object, the user is teleported to their chosen home or Inn, which lies in a town where goods may be purchased and quests completed or initiated. An overall view of velocity and travel modes, in a loose order of availability to the player/user, is:

Steering Based:

*Running** – Default, and the most common, used for engaging in other interaction

Walking – Slower than running, available at level 1, seldom used

Buffs – These potions, magic items, or class traits allow for either small increases or short bursts of speed

Travel Forms – At level 20+ some character classes, Shamans, Druids & Hunters get a new ability, a travel mode that allows for 30 to 40% movement

Mounts – At level 30 users can purchase an animal to ride. Speed increase is 60%

Epic Mounts – At level 60 users can gain mounts that offer a 100% increase.

Flying Mounts – At level 70 users can purchase or earn fast mounts that can fly, these are only usable in the new Outland area***

Epic Flying Mounts – At level 70 users can purchase or earn very fast mounts that can fly, these are only usable in the new Outland area***

* moving requires the holding down a of key or use of the auto run - a toggle key that engages any pre-selected mode and causes the player/user to move. Auto run requires steering

** all speed increases are measured as percentages of run speed

*** flight raises new design issues that the original areas of *World of Warcraft* were unable to cope with, interesting one issue is an attack strategy where a flying player exits flight mode, falls to the ground, and attacks an enemy player by surprise

Target Based:

Hearth Stone – Teleportation to a single pre-chosen destination.

Flight Paths – Guided point to point travel on flying animals.

Portals – An ability gained by magic classes, they can summon other characters to their current location.

Ships and Zeppelins – The domain of *Warcraft*, the world of Azeroth, is currently divided into two "continents". These vehicles allow for travel across this digital distance. Both methods move away from their initial locations, and then teleportation action occurs bringing users in view of the other continent.*

Falling – Short term downward travel.

* list compiled before the release of Burning Crusade and Wrath of the Lich King More variations on the above themes may now available.

General details of *World of Warcraft* player/user control of views and perspective are worth noting, as the player/user can adjust their view during Steering based travel. The majority of travel is done in third person perspective. Users can zoom into their character and assume a first person viewpoint. Few seem to do so. Despite the greater sense of presence and immersion, users opt for the more efficient and usable third person view. Third person perspective allows for a higher and more complete view of the user's surroundings. Especially important is that it provides a view of what is behind the player/user. The viewpoint can be separate from the user's avatar, in terms of rotation. Right clicking and rotating allows the player to view his character, the axis of rotation, from any angle. In addition, the third person perspective has a default straightening effect. Forward travel brings the user view parallel to the direction of travel – unless the right mouse button is held. This approach allows for visual exploration without

commitment to a travel direction, and conversely easy shifting to a travel direction based on visual exploration.

Lastly, the viewpoint's distance from the player's avatar, while controllable by the thumbwheel, is also limited. Both in general distance, approximately 15 meters, and by any obstruction, the viewpoint may encounter. This includes the inside of roofs, branches and even high walls. Any obstruction pushes the viewpoint towards the viewer' avatar. This helps maintain the immersion, by not allowing users to see through a structure's geometry in an odd or overly unrealistic manner in addition to keeping the player/user's character visible and more controllable. The usability of third person perspective has driven it to become a part of the aesthetic of videogames. Third person perspective is acceptable not by the literal narrative within the *World of Warcraft*, but by the larger cultural narrative of videogames. It is an example of the blurry line between invention and convention. To address invention and convention from a more stable direction, a review of *World of Warcraft*'s use of narrative in interfacial direction may be helpful.

Narrative Ties, Visual Indication of State

From cursor changes to show state, menu item hotspots that glow on mouseover, to the color and image coding of webpages that add site locational cues and contextual support to the data on the page, interface designers use visual cues to reinforce changes in user position and state. In games is not a question singular indication for a player/users state or mode, but a rich blend of conventional visuals and audio with narrative based

visuals and audio. The *World of Warcraft*'s 2D interface positions indicators of state in the upper right menu. As the player/user enters various travel states, a small visual icon of the state is shown.

Beyond the standard menu indication, *World of Warcraft* draws inspiration directly from psychology rather than usability. While *Warcraft* draws on intuitive themes to indicate speed, the field of psychology opens the door to counter intuitive slowing of speed to indicate velocity as seen in the TV show Six Million Dollar Man. The Matrix shows some novel ideas on how to visually relate speed to users (Duvall 2001).

In *World of Warcraft*, the more common approaches found in Steering Based travel include, the kicking up of dust and debris, motion blur, glowing feet, wind streaking. These are all metaphors for active speed. Typically the latter three (all but the kicking up of dust) are also tied to a narrative of magical enhancement. Target based travel, the act of teleportation, includes a glow – typically from the hands of player/user which move in an preprogrammed act of faux spellcasting. All players/users can teleport to one Inn, designated by them. Further Target Based, point to point travel can be done by the warlock class using the Ritual of Summoning. A visual of a portal, an image of the destination embedded in a two meter circular spatial distortion, appears. The three players needed to support the ritual all auto-animate in a magical gesture at the portal and the distant player being teleported/summoned visually fades into their location. Since the *World of Warcraft* often places player's quests inside of instances and quests within instances typically require a group of players to complete the quest task, special Meeting

Stones are placed outside of them. Meeting Stones are part of an inworld interface and can be used to summon other players/users to that instance location. Some travel modes that are tied to magical narrative driven items, utilize cartoon or film-like special effects to steer the user's mind to an association with speed and the acknowledgement of state or mode (Duvall 2001).

Beyond cartoon speed effects and portals, *World of Warcraft* indicate changes in some travel modes by visually adding objects and elements. One addition is the shape shifting of specific character classes into faster travel forms. The player/user's character literally changes. Ghost wolf mode for shamans and cat mode for druids. With the new mode comes a narrative driven visual change highlighting the new mode. At level 30, *Warcraft* characters get mounts. At level 60 faster, and more decorated, "epic" mounts are available. Both mounts and epic mounts are character connected, narrative driven. Some examples include ogres riding wolves, the new mythos of taurens riding kodos (big cow people on the backs of big dinosaurs), humans riding horses, and of course undead humans having undead horses. Target based travel modes include use of ships, zeppelins, gryphons, hippogryphs, bats and wyverns. Each mode has a unique connection with the *Warcraft* storyline, either a classical mythos ogres riding wolves or a new mythos taurens riding kodos. All mythos are accepted by the larger videogame narrative and share a common HCI usability based travel function. Aesthetics merge the diversity of the narrative storylines with the needs of HCI activity.

Limiting Behavior at Greater Speeds, Connecting Dots

There is a common thread among computer scientists and HCI researchers regarding 3D interaction. It is that by removing unneeded user's choices or properly limiting user behavior, they can increase the usability of the interface (Shneiderman 2003). This can be restated as:

1. Minimize the number of navigation steps, needed to accomplish tasks. This includes treks between points and the subtasks of rotation and repositioning.

2. Avoid unnecessary visual clutter that distracts from or inhibits user tasks.

3. Simplify object movement; use predictable paths and less than 6DOF (Six Degrees of Freedom)

Removing and limiting choices that users would find difficult to manage at higher speeds (and would also adversely effect game play) is a standard practice in video games. *World of Warcraft*, like other games, places limits on the interactive behavior of users while in higher speed modes. To do this *Warcraft* applies narrative driven rationales for some limits and allows for in-game penalties for others. An example of narrative driven limitation is to allow only the running mode behavior inside of buildings and most instances (these special questing areas – are typically indoors, like a dungeon). This limitation is enforced by the software and automatically transforms a mounted player/user character into the unmounted run mode when building or instances are entered. Trying to mount inside a building and most instances will only bring a message of its unavailability across the center of the player/user's screen.

Players, even those who may not own horses, understand that horses and other mounts are not typically used inside of buildings. By limiting the speed of indoor behavior to essentially one speed and temporary magic driven increases (also called buffs), *Warcraft* designers can build structures optimal for that speed.

All higher-velocity, steering-based travel modes have limitations. The modes which involve shape shifting (ghost wolf for the Shaman character class, cat for the Druid character class) limit the user from casting magical spells, conversing with NPCs, creating magical items, and number of other, but not all, in-game interactions. In the special player vs. play areas, such as Warsong Gulch, characters in animal formed travel modes can still capture the flag and win the game. They can still attack other players, but in travel form, they typically do less damage.

The target based travel modes (Flight Paths, Ships / Zeppelins, and Portals) each follow three separate methodologies. All three are considerably faster than the steering travel modes. Flight paths are point to point travel, with transitional movement between locations specified by the game designers. Player/users mount a flying beast, a beast who in terms of narrative controls the path and speed while in flight. General interface tasks are allowed, but player/user movement is limited to rotation of viewpoint. Rotation provides an unique interactive-cinematic user experience as the player/user's path is, in part, plotted to be visually dramatic. The larger limitation of *World of Warcraft* Flight Paths is that they require the user to use Exploring based travel to discover where travel end points are. Players/users must find the Flight Master, the NPC character at an end

point, before being allowed to use a Flight Path in the future. The requirement of discovery, finding the Flight Master, effectively limits new player/users from having immediate access to the entire *World of Warcraft* continent. High level areas feature monsters that are especially attracted to low level characters (in a radial effect called aggro), and so player/users are limited by level in terms of where they can safely travel. The gaining of new Flight Paths becomes a motivation perk, one that makes the *World of Warcraft* more usable. Low level player/users can however unsafely travel to most locations. The opportunity for failure of travel tasks here is firmly integrated into game play and is a measured part of the user's experience.

In addition to travel, Flight Paths impact usability of the game space in a unique way They help teach users the spatial relationships and distances between points, then allows for quicker travel between them. Players actually fly along these paths seeing all the land below. This reinforces their spatial understanding of the world. Lastly on Flight Paths, this transitional travel, the seeing of the land below, does impact travel time. Despite greater speed, compared to Steering modes, some Flight Path journeys can still take several minutes.

The next highest velocity is found in Ships and Zeppelins. This method is limited to a few locations and is used to span the great ocean between the two digital continents of Azeroth. Unlike Flight Paths, no prior knowledge of the destination is required. Ships and Zeppelins limit the users under the same rules as being inside. Players can fight and create items while on these vessels. The time of travel is brief, once the Ship or Zeppelins

arrives and is boarded; only a minute passes before a teleportic transition occurs bringing them in sight of the coast of the other digital continent.

This example highlights a past design statement on subtraction – the bulk of the ocean is removed. The narrative of Ship or Zeppelin travel is placed before users and initiated but unnecessary waiting aboard them while they move over vast spaces is cut out. Users, whose quests lie on the other end of the journey, do not seem to mind this unreal, filmic, jump cut to the other side. The issues of subtraction, touched on here, also cast the third method of Target based travel, Portals and Hearthstones, in a somewhat different category.

Beyond Limits, Enabling Travel Task Failure

Some Steering and Target based travel modes are designed to enable travel task failure in certain, generally combat related, circumstances. An example of enabling travel task failure in a Steering mode can be seen in the Hunter character class. At level 20, it receives the Aspect of the Cheetah travel mode. *World of Warcraft* limits the Aspect of the Cheetah travel mode's usage by adding a negative behavior. If a player/user in that mode is struck (typically, but not always in combat), the player/user is disoriented. The users travel speed slows to a walk and their defensive ability is lowered. While the higher priority for the game designer may be balancing combat-directed game play, the subtext is that travel Aspect of the Cheetah mode is best suited to Search Based travel.

Hunters also get Aspect of the Pack mode that allows them to share their more speedy travel mode with members of their group. When any member of a group in Aspect of the Pack mode is struck, the entire group is disoriented. Clearly, the speed of Aspect of the Pack mode is not applicable to combat situations. Task failure, tied loosely to narrative titles is again utilized by the *World of Warcraft* designers.

With an eye towards task failure and subtraction, Portals and Hearthstones can now be addressed. Portals and Hearthstones allow for nearly instantaneous travel. In fact, no time is spent in travel, as it is a teleportation mode. In the narrative, it is a magic spell that is cast. The limitations this method has include simple issues such as of time of casting and time between castings. Several seconds pass while the character gestures, visually indicating a process is occurring, and then the travel event happens. In addition, variations on teleportation modes have in game limits such as a recharge time, magic items needed, or in the case of portals – two other characters in addition to the caster to assist the process.

From the usability perspective, teleportation could be instantaneous. All of these modes might be more efficient if made immediate. The time spent casting the Portal spell, could be tied to state change and viewed as narrative-driven transition statement. In a world that exploits failure however, the longer than perhaps needed casting time allows for interruption. Time is not needed for successful action, only for unsuccessful action. Players who are losing a battle or in a tough situation cannot instantly retreat. Other enemy users (or monsters) get an added shot at killing the teleporting user while the

casting time passes by. The software could easily move characters throughout the game world, but by allowing for failure by some, *World of Warcraft* increases the chance of task success for others.

Some portals, as now applied in the *Burning Crusade* expansion, also raise a new and interesting design change in the buildings within *World of Warcraft*. Whereas this paper began with falling and its impact on buildings and landscapes, the opposite mode of generally upward travel is found here. The architecture of the *Blood Elves* uses teleportation devices, *Translocation Orbs*. These orbs allow player/users to teleport up and across buildings to gain access to higher floors. Ramps and staircases (much like doors, railings, and rooms), are, occasionally, subtracted from the architecture and replaced by a magical device.

In a sense, *Translocation Orbs*, point to an evolution in the design of buildings within *Warcraft's* videogame aesthetic. Interestingly, while falling holds possible death as complete task failure and narrative outcome, determined by height, use of *Translocation Orbs*, carry no such weight. It is possible that the fictional nature and newness of the *Translocation Orbs* places the narrative depth of its interactive failings at a minimum. It cannot cause death, not because the game designers are unable to encode death, or just because death lacks value, but because the users are unable to immediately shape this travel modes failure into a narrative outcome. Unlike falling, users have only fictional experience with teleportation.

Walking, the Lost Mode

If the future involves a role for *Translocation Orbs* and an associated shift in the design of virtual buildings and landscapes - what of the past? What is the impact and role of the oldest and most common real world travel mode – walking? Walking is also available, but it rarely used. To push the lost point further, walking is in fact a penalty used to balance the tactical advantage of stealth. (*Rogue* and *Druid* class characters walk in stealth modes). Running is the default game setting in *World of Warcraft*. Interestingly, we could say that *Warcraft* is a world without walking. The most basic of all real world travel modes seems unneeded by the videogame. If videogame design is to influence the design of non-videogame virtual spaces, the concept of walking may need to find a new functionality outside of *Search* based travel.

VI. Conclusions

Understanding Virtual Space

This is not a conventional research paper; far too many concepts have been examined and woven loosely together on the preceding pages. Literary sources are sparse, but they are also well established, have historical value, and represent key issues from various academic domains. Presenting a clear picture of virtual space, one able to satisfy these diverse academic domains individually was never seen as plausible. The core audience for this document are designers of virtual spaces, those who can model and code. An audience that wishes to finally do more than build mirror worlds (Gelertner 1993).

This document is a starting point, one that both uses and breaks from goals of realism and game design. Travel, presented in great detail, offers insight into the nature of videogames, virtual space, and the subjects like narrative, realism, usability, motivation, and human computer interaction. The key dynamic within this document is the complex relationship, conflict and harmony between user experience and task completion.

There are a broad number of statements found in this paper. Many ideas, such as the relationship of games and failure, limiting user behavior to gain usability, and HCI discouragement of modes are well known. Interconnecting these ideas becomes the hallmark of this design document. A basic list of conclusions, based on both academic scholarship and the simple personal observations of a designer of virtual spaces is presented. This list is a mix of conjecture and research, it is assumed the reader can pull value from it and link it to their own experience in designing virtual spaces.

1. Virtual space is often seen as a videogame. This may be driven by the popularity of videogames in both public and academic circles.
2. Virtual space is often tied to realism in rendering or behavior. This includes social interactions and cultural studies of users. (Videogames, like Tetris may lack many of the visual elements of a real world, but even here some scholars like Janet Murray claim that Tetris has a narrative based on the fast pace of American culture.)

3. As a general observation, unplanned task failure in virtual space seems often associated with a lack of realism in rendering or behavior. The flawed solution often proposed is more realism in rendering or behavior. (Developers seem unaware of their cyclical situation that realism encourages more realism, and that other solutions may allow more successful task completion.)
4. Virtual space has no widely accepted understanding beyond videogames and realism. (Other applications of virtual space, such as data visualization exist, but no widely accepted understanding of virtual space in that context appears to be currently available)
5. Videogames prioritize user experience over task completion. In this document, task completion is evaluated by the speed by which a task can be completed. (Unlike users of Microsoft Word, videogame players often enjoy crashes, provided the crash is accompanied by a colorful explosion)
6. Prioritizing user experience greatly raises the importance of narrative and motivation.
7. Realism is subordinate to narrative and motivation.
8. Realism is a tool (not a goal) and can be used to shape user behavior and understanding within virtual space.
9. Realism and narrative can create a sense of immersion and presence. Immersion, like realism, is a tool.
10. A virtual equivalent to filmic montage driven by usability and narrative may exist. (A better description, discussion is beyond the scope of this paper.)

11. Narrative functions through conventions. Conventions are often arbitrary and require user acceptance and understanding to function.
12. Usability (as narrowly defined in this document) functions through inventions. Inventions do not require user acceptance or understanding to function. (Users do not need programming skill or a background in electronics to operate a computer)
13. Aesthetics link narrative and usability in virtual space. Done well, aesthetics can hide their usability role. (A house with a slanted roof is seen as normal; it fits our existing narrative of what a house should look like. The use of the slant, to channel rain off the roof is known, but in a virtual space, there is no real rain. In *World of Warcraft*, roofs become tied to travel paths, and a travel mode called Falling.)
14. Because videogames support task failure, interaction methods discouraged by HCI scholarship find new life, like multiple modes.
15. Gaining new modes becomes an integral part of long-term play in some types of videogames (i.e. *World of Warcraft*). They allow for new and greater challenges (as well as past failures) to be overcome.
16. Granting new modes becomes a motivation tool of videogame designers.
17. Videogames become more usable over time. New modes in videogames allow quicker and larger fictional tasks to be completed.
18. Some interactions, while more efficient if immediate are delayed to give opposing forces time to cause failure (Hearthstones - Teleportation). Some delays are also artificially added to mimic a real-world sense of creation or construction time (Casting of a portal or Summoning Spell - Teleportation).

19. Standard HCI practices of limiting user choices and behaviors become intertwined with modes and narrative concepts. (i.e. limiting optimal travel speed by forbidding mounted travel modes inside of buildings)
20. Addition of new elements – In videogame worlds abilities are linked to narrative titles and become conventions, often of magic (Hearthstones) or some in game technology (Zeppelins).
21. Subtraction of elements – Rather than add conspicuous new elements to support new behaviors or improve task completion rates, videogames may opt for a removal of unneeded real world elements (Railings, Rooms, Walls, Doors).
22. Maintaining the suspended disbelief of the user/player is an important factor in RPG videogames. This factor helps drive the concept of removing unneeded elements rather than adding new elements.
23. Non-storybased, productive, virtual spaces deal with suspended disbelief differently than RPGs or storybased worlds and may not be as affected by aforementioned narrative issues. They utilize narrative without being bound by narrative.
24. Non-storybased, productive, 3D virtual spaces are inherently real. They do not require belief to be suspended.

The larger lesson to be gained from studying videogames may not lie in efficient task completion and the inventions that promote task completion, but in experience management and exposing the role of narrative conventions. Videogames seek to manage the difficulty of tasks – rather than remove said difficulty. They incorporate motivational,

narrative and user experience into their design. Usability issues are present within the videogame world, but the preceding factors change the nature of their application.

Videogames, via their economic and social dominance, play a major role in the development of non-videogame virtual spaces. New users tend to interpret virtual space as a videogame environment. As users become more sophisticated, more accustomed to the broadening variations of interaction within videogame worlds, the ability of non-videogame spaces to utilized those abilities also grows. Players mature and become users and virtual space breaks the grip of game limitations. What may evolve is an outgrowing of many of the narrative, experiential, and/or motivational limits placed on virtual space by the demands of game design. Much like the modern desktop and its ongoing use of narrative labels applied to elements such as files and folders, the power and functionality underlying these digital constructs far outstrips their narrative labels and implied limitations.

For the moment, the speed of this act of growth is open ended and unknown. Current designers of non-videogame virtual spaces may still need to take into account narrative, experiential, and motivational elements in creating their spaces. Standard usability practices still apply, but in lines of conceptual grey, a blurring of the relationship of user experience and task completion is underway.

Further Study, Experience and Completion Conflict

“Improvement makes straight roads, but the crooked roads, without Improvement, are roads of Genius." - William Blake

One subject deserving more research is the resolving the conflict between task completion and user experience. In successful videogames like *World of Warcraft*, user experience and task completion are in harmony as priority is given to user experience. Failure is part of the videogame world. In successful software tools, like Adobe Photoshop or iTunes, user experience and task completion are in harmony, task completion is prioritized. Failure to manipulate an image or download a song is not encouraged by the software. Yet in designing innovative virtual spaces that are neither pure videogame nor pure software tool, this conflict between task completion and user experience emerges.

A non-travel example is as follows: In a virtual space, one resembling a home, it may be an innovative idea to encode textures that show wear and tear over time.** Faded wallpaper and stains on carpet could add to the user experience and sense of immersion in home. Yet if the home serves an innovative purpose, as an interface to images, music, and texts of the user, is the decay of the interface useful? Owners of Adobe Photoshop software are unlikely to support random stains and gradual fading of text and tool icons in the interface. Aside from the developers of Photoshop smirking over the potential sales of a software Sham-Wow to restore the interface’s original luster, it is difficult to envision a harmonic compromise.

An example closer to the issue of travel is the casting time for a teleportation spell. Casting time is described as needed to enhance user experience by allowing for the chance task failure. In any non-videogame interface, the addition of time to a user task would seem absurd. Often usability professionals use GOMs (Goals, Objects, & Methods) analyses and constructs like Fitts Law to reduce task completion times. Whenever possible, steps in a task are removed (Hackos & Redish 1998). In contrast, user experience often adds steps. It is a fundamental conflict, and every user action, every press of a key and move of a cursor has ties to both user experience and task completion.

Videogames, like *World of Warcraft* deftly use narrative to shape a user's expectations for experience and completion of tasks. This role of narrative in the shaping of user expectations and behaviors remains intact in non-game virtual spaces. How this role takes shape remains to be seen.

In non-game systems, the role of task completion in virtual space rises in importance and the usefulness of failure is dialed back. The question that arises is one of true goals and multiple goals inside a single screen. Is reaching the end the goal (task completion) or is the journey to that goal (user experience) of greater importance. The quote by William Blake at the start of this section sets the tone for just how deep this question truly runs. Standard usability like that of a cursor seeks the straight road, while those concerned with user experience in games run avatars along the crooked path. Designing a virtual space for a cursor-avatar that allows for both, an immediate

completion of the journey and a compelling experience on the way to that journey's completion is a hefty conceptual problem.

Despite the obvious nature of the conflict between user experience and task, completion the conflict has been hidden academic labels and presumptive application of 2D and 3D forms. The academic label of a virtual interface focuses on task completion. The academic label of virtual environments focuses on user experience. In academic texts, virtual interfaces and virtual environments are considered separate uses of virtual space. The are discussed as separate ideas in different chapters of the same book (Shneiderman 2004). The truth that virtual space is both interface and environment is lost.

The second factor hiding the conflict between user experience and task completion is the presumptive application of 2D and 3D forms. 3D forms are seen solely as an environment and 2D forms are seen solely as an interface. In videogames like *World of Warcraft*, the interface is seen as all the 2D elements, the window frame of buttons and pop up menus that surround a 3D environment centered on the screen. Rules of HCI and usability apply to the 2D interface elements while the rules of narrative/storytelling guide the design of the 3D environment. This 2D interface and 3D environment construct is convenient, but very harmful to innovative design. Declaring that 2D and 3D forms can only play certain functions is to say that form leads function. This is untrue, for all creative designers understand that form follow function. In broad terms then, the focus on realistic forms creates a design perspective that limits possibility

functionality. Only functions that fit the realistic forms are deemed acceptable, and worse a cycle of failure leads some individuals to assume that only ever more realistic forms and interactions are the solution. Meanwhile, the power of the digital space and the affordances of mouse, keyboard and screen are discarded in favor of faux realism and the user experience of roleplaying rather than task completion.

Lastly, if good interfaces are transparent to the task, what does that mean for 3D worlds that strive to be the opposite? The opposite of transparent is immersive, as in the all-surrounding, always present videogame space that guides the users actions as opposed to being the completely interface, wholly subordinate the users wishes. Such questions are difficult to address, but addressed they must be. Academia seems to have lost its leadership position in the design of virtual space. To move forward, hard questions must be answered and the conceptually cowardly hiding in concepts of realism (Manovich 2001), simulations, and games (Murray 1996, Nitsche 2009) must end. To design virtual space, functionality must be understood. Form must again follow function.

Notes

Additional support provided by Vizzini, Goonie and members of my *World of Warcraft* guild, Corrupted Destiny on Skywall Server. A short discussion of a early draft of this paper can be found at http://corrupted-destiny.guildportal.com/

* NOOB, NEWBIE: “Any player new to the game. Some players consider it an insulting term.” *World of Warcraft* Game Manual, Blizzard Entertainment (2006)
** A proposal from RIT Professor Jeff Sonstein, and my reply

Bibliography

Bazin, A. (1971). What is cinema? Vol I. (H. Gray Trans.). (Original Works Published 1940 – 1955), University Of California Press, Berkeley.

Bazin, A. (1971). What is cinema? Vol II. (H. Gray Trans.). (Original Works Published 1940 – 1955), University Of California Press, CA

Bordwell, D., (1985). Narration in the fiction film, University Of Wisconsin Press, WI.

Bordwell, D., Staiger, J., & Thompson, K. (1985). The classical hollywood cinema, Columbia University Press, NY.

Bowman, D., Kruijff, E., Laviola, J., & Poupyrev, I. (2000). An introduction to 3d user interface design, SIGGRAPH 2000.

Carroll, N. (1985). The Power of movies. Daedalus 114, 79–103.

Carlson, K. & Guynup, S. (2002) Avatar as content delivery platform. Future Generation Computer Systems. Vol 17 65-71.

Comolli, J. (1996). Machines of the visible. In Electronic Culture: Technology And Visual Representation. T. Druckrey Ed, 109-117, Aperture Books, NY.

Cornett, S. (2004). The usability of massively multiplayer online roleplaying games: Designing for new users. ACM SIG CHI 2004, Vienna, 6(1), 703-710, 24-29

Csikszentmihalyi, M. (2001). Flow: The psychology of optimal experience. Harpers & Row

Gelernter, D. (1993). Mirror worlds: or the day software puts the universe in a shoebox...how it will happen and what it will mean. Oxford University Press.

Gentner, D. & Nielson, J. (1996). The anti-mac interface. Communications of the ACM, 39(6), 70-82.

Grove, J. & Williams, H. (1998). Explorations in virtual history. IT for Learning

Enhancement. Monteith Ed. Lisse, Swets & Zeitlinger

Heim, M. (1998). Virtual realism. Oxford University Press.

Heim, M. (2001) The avatar and the power grid. Mots Pluriels. Vol 19

Jorgenson, A. (2004). Marrying HCI/usability and computer games: A preliminary look. NordiCHI 2004.

Juul, J. (2005). Half real. MIT Press.

Manovich, L. (2001). The language of new media. MIT Press.

Murray, J. (1997). Hamlet on the holodeck: The future of narrative in cyberspace. MIT Press.

Nitsche, M. (2009). Video game spaces: Image, play, and structure in 3d worlds MIT Press

Laurel, B. (1994) Placeholder: Landscape and narrative in virtual environments. ACM Computer Graphics Quarterly, Vol 28

Pagulayan, R. J., Keeker, K., Wixon, D., Romero, R., & Fuller, T. (2003). User-centered design in games. In Handbook For Human-Computer Interaction In Interactive Systems. J. Jacko & A. Sears Eds, Erlbaum, 883-906.

Pausch, R. (1994). What HCI designers can learn from video game designers, In SIGCHI ’94.

Poupyrev, I. (2000). 3D manipulation techniques, In Course Notes of SIGGRAPH 2000, Los Angeles.

Shneiderman, B. (2003). Why not make interfaces better than 3D reality?, Computer Graphics and Applications, IEEE, 23(6), 12-15.

Shneiderman, B., & Plaisant, C. (2004). Designing the user interface: strategies for effective human-computer interaction. Addison Wesley.

Rouse, R. (2001). Game design – theory and practice. Wordware.

Sutcliffe, A., Ryan, M., Doubleday, A., & Springet, M. (2000). Model mismatch analysis:
towards a deeper explanation of users' usability problems. Behavior & Information Technology 19(1), 43-55.

Tan, D., Robertson, G., & Czerwinski, M. (2001). Exploring 3D navigation: Combining speed-coupled flying with orbiting. SIGCHI'01, 3(1), 418-425.