Author: Erik Champion, Massey University

Title: Experientially Pollinating Virtuality and the Living Transcripts of Escape Space

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Abstract

The media of virtual worlds is diverging due to the cognitively competing demands of reading text or exploring 3D space. Conventional media historians may attempt to reconcile this hydrae paradox with terms like "narrative space", but unless they themselves design, they are probably unaware of the profound design differences between real and virtual place-making. One has interstitial 'breathing' zones, thresholds, indirect user-derived erosion and personalization, somaesthetic triggers and evocations of territoriality; the other has a polygon count. Yet virtual places are developing in complexity in terms of user-driven design modifications, especially in terms of biofeedback, but not as direct input, rather as indirect atmospheric modifier.

I will illustrate this development with projects but my long-term aim is to encourage the reader to ponder the related ongoing design issues. If environments can change according to players' biofeedback, how will we (as designers) tackle the issue of counterfactual creativity versus the traditional virtues of authenticity and authorial narrativity?

Could biofeedback pollute the aesthetic uniqueness and hermeneutic isolation of virtual worlds, contaminating them? Such use of biofeedback leads us to the question of whether virtual worlds are or can only be parasitical. And a question for media studies academics, given such a confusing future, is they trained to handle these changes? If there is a change in virtual worlds from the sterile and predestined to intermedial fusion of audience and player, will there be a call for new skills and boundary definitions in media history?

1 Introduction

How is civilization and culture affected by new media? I am reminded of Oswald Spengler's separation of the two terms; civilization comprises the laws that allow people to live close together, in a city, civitas. Culture is what is cultivated or allows one to cultivate a setting, a local domain. Yet with modernization's separation of people from agricultural production, civilization and culture are increasingly seen as conduct and taste. Due to the impoverished social interaction and social history of many virtual worlds, civitas has become a measure of high-tech ownership and purchasing power. While culture seems to be edging closer in meaning to taste, or consistency of appropriation of high-status aspiration items.

Spengler wrote "This machine technics will end with the Faustian civilization and one day will lie in fragments, forgotten -- our railways and steamships as dead as the Roman roads

and the Chinese wall, our giant cities and skyscrapers in ruins like old Memphis and Babylon." Spengler was prescient but not accurate. In this carbon-guilty and oil-averse generation, game-playing and virtual world inhabitation is fast approaching the numbers and profits of the tourist and moviemaking industries.

One could well wonder if the virtual will supplant the real. Architecture schools teach studio design using game engines, gamers play at home rather than in arcades, and you can now enjoy the fancy visual form of Capri from the comfort of your desktop. So perhaps "machine technics" is already transforming into virtual techné, while the Faustian Westerner is metamorphosing into a RPG level-designing Mephistopheles. And now with the increasing sophisticated march of graphics, a virtual world is as much place as it is text, so are media historians equipped to handle locale and region?

2 Place and Culture

Edward Casey[1] [2]and Ed Relph[3] have both written extensively on the definition of place. Casey focused on the experiential sensation of place as an extension of the body. On the other hand, Relph viewed place as that which surrounds the viewer existentially, in terms of attitude and intention. Relph defined many different types of place, and he described how each offered a mix of experiences.

Sardar and others have suggested that virtual worlds will start the museumization of cultures,[4] and especially, the homogenization of all non-Western cultures. If cyberspace is so orientated to obliterate non-Western subtleties, nuances and differences, what sort of affordances could we develop that would avoid this cultural homogenization? Perhaps the answer lies in our approach to virtual places. If they are seen as a collection of unique experiences that could grow and mutate independently, they are in less danger of homogenization. So place can also be defined as unique experience. For example, in her doctoral thesis abstract, Ciolfi wrote the following notion of place:

"Place is a notion of space inextricably linked with the wealth of human experience and use occurring within it, and invested by values, attitudes and cultural influences. In other words, place is experienced space."[5]

Place experiences are also subjectively associated with experiences of other places. In the real world, our understanding of the current locality is often coloured by the places that we have just travelled to, or that we recognise as having some relation to our current place. In much Presence research, there is talk of being transported to a virtual environment, yet participants are in fact often teleported.

So virtual environments are often experienced instantly; they typically do not offer a ritual of passage or 'arrival' that allows a suitable atmosphere or expectations to build up. Perhaps that is why many virtual environments marketed as 'worlds' have limited capacity for personalisation or for customisation. They also often lack clear and precise navigation and general environmental affordances.

Writers have suggested adopting game engines and game-style interaction for the development of virtual worlds yet activity may create a sense of panic and reduce the level of attention paid to the enjoyment and learning of the virtual environment. Tasks

and social agents need to be part of virtual environments, as they provide purpose, meaning, and social feedback. The danger may be that talking to people will be more interesting than the place, or the place is so intimidating or imposing that social interaction is severely curtailed.

Extrapolating from anthropological stages of 'going native', Relph suggested three dimensions of relating to feeling inside or outside place. These dimensions are behavioural (observing behaviour modified by place cues), emphatic (participating in an understanding of place), and existential (feeling an integral part of a place). So culture and place are intertwined.

Cultural or physical constraints may be needed to control or free the participant in naturalistic or novel ways. As environmental psychology is a difficult and complex field for concrete results, our knowledge of which significant elements control or help human behaviour in virtual environments is likewise curtailed and limited. Yet this knowledge is vital. A greater understanding of behavioural and perceptual cues helps a designer to design just enough that affords 'placeness'. We need to decide which real-world cues and constraints are desirable, while acknowledging that realism may sometimes hinder engagement.[6] Inspired by both the Memex and the Memory Palaces of Simonides, Steven Johnson once argued that the most engaging three-dimensional environment would be socially associative, interactive, and task-oriented with a 'recall' or a 'trail' of the users.[7]

3 Biofeedback Projects

3.1 Crepuscular Gameplay for the Individual Player

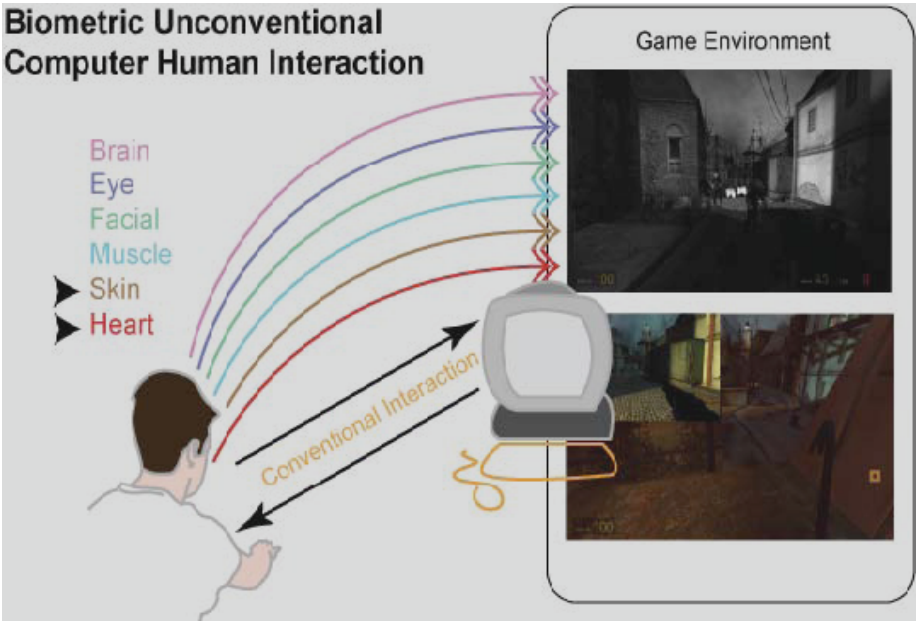

Figure 1: Biofeedback options

Andrew Dekker's thesis examined how biofeedback could enhance gameplay (Figure 1). So far biofeedback has been used in virtual environments for exercise and for meditation, but it can also be used for visceral entertainment.[8] In our quest to horrify large sections of

the audience in as personal a way as possible, Andrew created sockets to connect a meditation game's biosensors to the Source game engine.[9] This was to allow the player's biofeedback to dynamically change a popular mod of Half-Life 2, the zombie level Ravenholm. With the biofeedback input, as the player becomes more excited, the music changes, the cinematic shaders change, and even the AI of the zombies is affected.

Using a cheap commercial biosensor interface, and with access to the software development kit, Andrew incorporated the player's biofeedback (heartrate variability, skin response and heartbeat) at regular intervals back into the game level. As shown in Figure 2, the shaders of the game would change to white or red (or whatever the designer thought cinematically related to increased or decreased stress levels), and the higher the readings, the higher the rate of spawning of the monsters.

Figure 2: Biofed gameplay, changing the shaders and NPCs

For the biofeedback project, I was very keen to test out the psychological gameplay possibilities of multiplayer biofeedback. Could players see their opponents' biofeedback? Could they attempt to work out other players' phobic triggers, be they ants, rats, great heights, or open spaces? Wouldn't people be so intrigued they would try to discover and set phobic triggers that caused their opponents to stress and decrease their game performance?

The changing effects if used appropriately could amplify the player's fear and horror. This is however only the first step, biofeedback can be also fine-tuned in order to seek out and capitalize on particular phobic triggers, to dynamically adjust as people become less scared, or even to help create a very anti-social social game. Ethically problematic, and therefore intriguing, a multiplayer game using biofeedback could enable players to seek out their opponents' phobic weaknesses, and continually bombard them with the elements that most terrify them.

Now two years later, after our project and DiGRA paper, I see that Valve are planning to use biofeedback in their games,[10] and there are several products that will soon be

available for purchase.[11] For example, one product promised to be on sale this year includes the capability to move or burn objects just by concentrating.[12]

Of course some of this is for testing rather than for gameplay, but it is gratifying to see how game designers are enthusiastic about biofeedback's potential. For example, Valve's Gabe Newell has been quoted as saying "There are new technologies where we can wire players up with EEGs and actually have direct exposure to their physical reactions to the games…We can know for sure of something is actually frightening the player - their heart rate is going up, their respiration stats are peaking, appropriate parts of their brains are being activated. Direct measurement of players' arousal states and responses to the things we're doing is super exciting. It just will allow us to be much more analytical about the decisions that we're making and the roller coaster ride we're trying to create for the player."

3.2 Player to Player Biofeedback

Would it be possible to affect current players of games and virtual worlds using the biofeedback of past players? Of course it would! An undergraduate student group signed up to one of my project ideas, testing out biofeedback on gameplay. I suggested recreating the Minotaur myth of Knossos using a game engine.

Using a head mounted display, plastic sword (its position would be tracked), and 3D joystick, the player has to navigate through a labyrinth and kill the Minotaur. Spatially located recordings of previous player heartbeats could be used and amplified to increase the tension and drama. In other words, as the player passes by locations in the labyrinth where previous players' biofeedback was recorded, they would hear the heartbeat of the player at that point. The aim is thus to see if their biofeedback is directly affected by this "echo".

We were allowed access to plans and panoramas of the real Knossos, but the area under the palace was too small for the experience so the students created a larger labyrinth for the game level. They also spoke to academic psychologists on what was required, and then built their own device. They looked at various game editors and settled on Unreal Tournament. The game featured a head mounted display, because the device we bought had quite a delay, which I thought would be excellent for increasing the suspense for the player, when they heard sounds behind them.

Unfortunately, the students were not able to finish the project, but I intend to resurrect it at a later date. I should also mention that to heighten the feeling of being in an underground labyrinth, as the player virtually approached the end of a corridor, electric fans would rotate and blow from the direction of the new corridor in the labyrinth.

3.3 *Audience and Player Biofeedback*

If games were actually rendered as the foreground of live and dynamic content, ambient audience interaction could also be utilized. For example, I supervised a group of students (Bonnii Weeks and Jonathan Barrett), who built an ambient form of audience interaction,

initially inspired by an interpretation of *MechWarrior*. The main aims were to more fully spatially immerse the player, while involving and not distancing the audience.[13]

In their game installation the player sits on a hydraulic chair with gameplay-driven force feedback, surrounded by the game environment projected via a curved mirror onto the inside of a dome or tent).[14] The player actually feels the terrain through a converted massage seat that feeds off the height-data of the terrain. In the next phase of the project we had also planned to have the red lights (shown in Figure 3) hooked up to the player's biofeedback or their "game-health". This would allow the audience to see how well the player was doing before deforming the terrain in real-time. This would mean just as the player began to calm down successfully after steep hills or pitted ground, the audience could redesign the landscape obstacles.

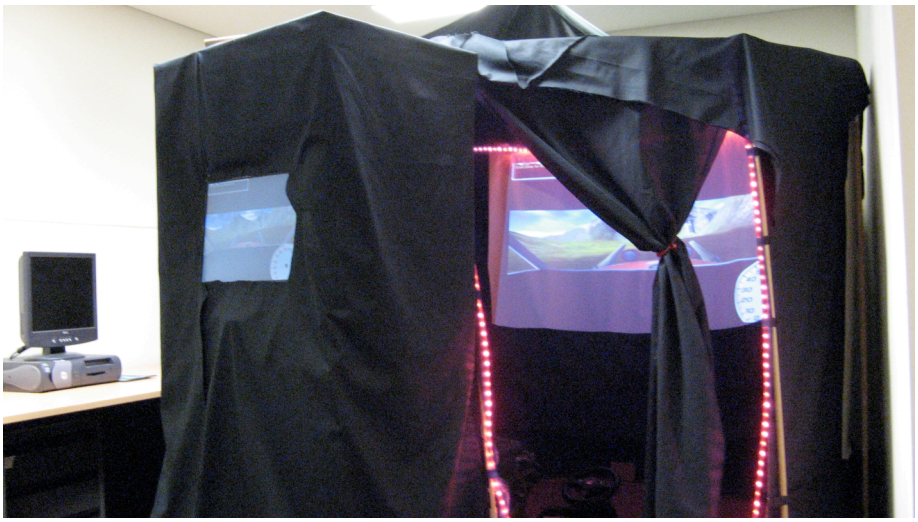

Figure 3: Car racing in a tent

We had also talked about a potential Greek god role for the audience: at certain key times they could move their hand over a sandpit. The camera tracking would then tell the game logic to redefine the sand, soil or sea, causing havoc for the (hero) player. We could easily further complicate this scenario. The audience and the player could share some amount of interaction, directly, or indirectly, but they may not exactly know what is pre-rendered, and what is interactive, or who is consciously, accidentally, or subconsciously controlling the interaction.

These research projects are only initial investigations, but aspects of them could also be incorporated into a layered combination of social happening and game-play. Biofeedback and improvements in facial tracking could see real-time facial and bodily expression in games; which could also open up new dramatic possibilities in games and digital media in general. For example, the audience may only sometimes see player behavior or player events as they happen, perhaps sometimes they see past player actions (*phantomas*). We had already employed ghosts (badly video-taped actors inserted into a temple-scene), although they had no physics or collision, they could cause different parts of the game events to change dramatically.

4 Experiential Realism

In a Gamasutra article John Hopson has also mentioned how the computer game is a behavioral skinner box, a reward system consisting of reinforcers, contingencies, and responses.[15] Because machinima often uses or evokes images and associations with playing a game, and because these resources are such powerful triggering mechanisms, the game-player as spectator is caught between viewing the machinima as film, and reaching for a keyboard mouse or joystick to shoot the bad guys, strafe to avoid danger, rotate the camera view, or run towards a portal.

Computer games have their own acquired language of perceived affordances, and reacting to these perceived affordances becomes second nature to the experienced gamer. However, biofeedback can lay a second layer of feedback, one is responding to the game's feedback and one's own feedback to the game.

In another Gamasutra article, Brett Johnson has explained how game level designers deliberately develop a "player vocabulary" so that the game player instinctively acts, "As designers, we can carefully build a vocabulary of game mechanics and shape what the player knows about the environment, and when they know it."[16]

In real-life we have internal feedback, being aware of the awareness inside our own bodies, and perhaps virtual worlds will feel richer when they too afford this sense of one's own bodily sensations. And when returning to scenes of previous player interactions, the player may gain an idea of how and why they were acting in the past. The repetitive nature of game-behaviors will be personalized and nuanced by specific player data, their own, or other players. This opens up the possibility of reflective design.

Like both Brett Johnson and Steven Johnson,[17] I believe that the way in which games are designed to trigger and overload certain cognitive processes is deliberate, intricate, and difficult. To trigger behavioral responses while at the same time causing the player/observer to reflect upon them and still stay engaged requires sophistication and skill. Incorporating biofeedback into attempts at more reflective game design also brings us closer to the field of hermeneutics, to interpretation.

5 BIOFED FUTURE GAMES AND VIRTUAL WORLDS

In *Prime Evil* (1982), Douglas Winter declared, "Horror is not a genre, like the mystery or science fiction or the western. It is not a kind of fiction, meant to be confined to the ghetto of a special shelf in libraries or bookstores. Horror is an emotion."[18] If horror is a genre, a series of conventions, it raises a problem for ludology. If we take a computer game and it slavishly recreates horror as a genre, how does it avoid repetition destroying the sense of dread?

Can it only be played (and fully enjoyed) the first time? I suggest that while there are several ways in which horror games of the future can continually evoke a sense of fear and anticipation, the creepy, and the crepuscular are particularly pertinent. The creepy, gradual choreographed sound and movement, light and dark, is however only the first step. The crepuscular, objects, shadows and movements that seem to flicker on the edge

of dawn and dusk, or, here, on the edge of our otherwise immersed state, could occur not just in terms of audible thresholds, perceived notions of alterity, but also in terms of peripheral vision.

But terror doesn't stop there. The, crepuscular can be more than merely the peripheral. Imagine gameplay affected by a dynamic force that evades definition and identification, but seems triggered or otherwise responsive to something deep inside you that you are not sure you can keep hidden from the outside world. Perhaps you are not even sure exactly what it is that terrifies you but something about this alien force seems to know what unsettles you even more than you do. It is uncanny. And it responds in such a personally affective and emotive way to you that it seems privy to your innermost fears and phobias.

Figure 4: Screenshot of Star Wars: Jedi academy

So there can be slowly creeping horror games, and adrenaline- based games or worlds (the more activity you do, the higher you virtual physical capabilities). On the other hand, biofeedback could be used to afford more interactivity the calmer the participant becomes. For sports, a slow down in physiological states could make the ball seem bigger and slower, or allows the diver to dive deeper, and stay in the water longer. For meditation in virtual worlds, calmer states could trigger background environmental changes, or give the participant magical powers (which is the principle of the Wild Divine game), the ability to levitate, move objects (Figure 4), or read minds. Players could be thematically told the physiological states of the other players via changes or behaviors in avatars or the background environment, or even other avatars' artifacts. After all, the avatar that represents me could look different in my camera-world to the one seen by another player looking at my avatar.

Biofeedback in shared virtual environments could create aura around objects such as furniture, and rooms could change in color or glow (or for games, protection value), depending on the biofeedback of participants who visit or inhabit. Or perhaps popular objects erode more quickly or conversely, or stay preserved while less popular ones erode; in magical environments some objects could even develop special powers and affordances.

Non-playing characters' moods or abilities could be affected (perhaps infected is a better word), by biofeedback of the players they can encounter. Science fiction writers have already predicted this for at least four decades, for example, P. K .Dick has written of scenarios where people start developing traits of each other in reality or in virtual reality.[19] And many religions from Mayan to Christian are based on some related notion of aura.

Of course there can be related abilities, like being able to walk through worlds, or the world slows down or speeds up according to calm or hyperactive states. And we could be using a range of data, from postural change and eye movement, to skin response or heartbeat. The implications are yet to be fully explored but they are intriguing.

Perhaps in-world visualization or auralization of the feedback when shown to the player would change the player's actual feedback. Could we also accumulate and share biofeedback across social groups? Would it destroy any bonding effect or create a sense of community? So there are still ethical issues to be explored, especially if one wanted to see if designers could *cultivate* biofeedback in order to control behavior (*civitas*).

6 CONCLUSION: EXPERIENTIAL POLLINATION

In this paper I asked three main questions on place, media and culture. Between the writing of this paper and its presentation I may change my mind, but as of this moment I believe I can provide some tentative answers.

Will the virtual place supplant the real one? I do not know for sure, but I do believe the former will definitely confuse the latter. Certainly the popular press seems to making a division between pre-digital game media and games, in a form of proto-culture (or pop culture) versus civilization, however this division may well fade once critics of games and new media start perceiving the subtle distinction between entertainment and engagement.

What new skills will be needed in the near future? I have argued that architectural historians and philosophers aren't qualified to tackle this writhing new field unless they are also experienced in the areas of interactive entertainment, user experience design, and constructivist cognition theory. And media archaeology may increasingly become a catchphrase, but not as a fertile outgrowth of archaeology, for we have moved past the digital age to the realm of virtual artifacts and procedural subversion.

I believe game design skills will start to merge with usability and interaction design skills, for the current platforms for games are technically evolving, but the ways we can use them is creatively mutating at an even faster rate. Right now we are on the cusp of moving past virtual artifacts and point-click-shoot interaction. The ill-fate MIT Media Lab Europe

did early pioneering research in the area of biofeedback and virtual environments, but it is only a little leap to an era where audience-environment-players past present and future, all share not just data and rendered polygons, but also participate in embodied experience.

As noted by the mission of the MiT 6 Transitions conference, in "The Bias of Communication" Harold Innis distinguished between time-based and space-based media.[20] I have added the potential idea of biofed-media, which runs *through* time and space. How it will be extracted from individuals, fed back into the system, displayed as user feedback, stored, expressed, and delineated (as individual, social or even environmental media) will not be a trivial exercise. And it will certainly not be durable in the sense of time-based media such as stone and clay. However it could be more flexible and enriching than space-based media such as paper or papyrus. For it can continually influence and be influenced both by itself and those it 'contaminates', and by the process of contamination itself. In other words, BioPop(ularist Data) will eat itself.

So the next revolution, I predict, is in bio-fed virtual worlds where the passive, subconscious and otherwise unpredictable embodied responses of the audience affect both the virtual world (the extern), and future players. I suggest the zenith of this development will be when we have genuine living scripts in virtual worlds: the new media recording of player-experience will augment or even infect the [virtual] world history. The concept of media transmission and storage changes to media pollination.

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Endnotes

[1] Casey, Edward S. *Getting Back into Place: Toward a Renewed Understanding of the Place-World*. Bloomington: Indiana University Press, 1993.
[2] Casey, Edward S. *The Fate of Place: A Philosophical History*. Berkeley: University of California Press, 1997.
[3] Relph, E. C. *Place and Placelessness*. London: Pion, 1976.
[4] Sardar, Z. "Alt.Civilizations.Faq: Cyberspace as the Darker Side of the West," in *Cyberfutures: Culture and Politics on the Information Superhighway* edited by Z. Sardar and J. Ravetz, pp. 14-41. London: Pluto Press, 1996, p.19.
[5] Ciolfi, L, P Deshpande, and L. J Bannon. "Understanding Place as Experience: Augmenting Human Activities in Context." Paper presented at *the Space Place and Experience, HCI Workshop*, Rome, Italy, 13 September 2005.
[6] Mosaker, Lidunn. "Visualizing Historical Knowledge Using VR Technology." *Digital Creativity S&Z* 12, no. 1 (2000): 15-25.
[7]Johnson, Steven. *Interface Culture: How New Technology Transforms the Way We Create and Communicate / Steven Johnson.* 1st ed. ed. [San Francisco]: HarperEdge, 1997, pp. 120-122.
[8] Gilleade, Kiel, Alan Dix, and J Allanson. " Affective Videogames and Modes of Affective Gaming: Assist Me, Challenge Me, Emote Me " Paper presented at the *DiGRA 2005 Conference*, Vancouver, Canada 2005.
[9] Dekker, Andrew, and Erik Champion. "Please Biofeed the Zombies: Enhancing the Gameplay and Display of a Horror Game Using Biofeedback," 2007.
[10] Houghton, Stuart. "Valve Wants to Look at Your Brains." *Kotaku* (2008), http://kotaku.com/5096254/valve-wants-to-look-at-your-brains.
[11] Fruhlinger, Joshua. "Brains-on with Neurosky and Square Enix's Judecca Mind-Control Game." (2008), http://www.engadget.com/2008/10/09/brains-on-with-neurosky-and-squareenixs-judecca-mind-control-ga/
Flatley, Joseph. "Neurosky and Square Enix Set to Demo Mind-Controlled Gaming." *engadget*, October (2008), http://www.engadget.com/2008/10/07/neurosky-and-square-enix-set-to-demo-mind-controlled-gaming/.
Beschizza, Rob. "Hands-on (or Brains-on) with Neurosky Thought Control System" *gadget lab* (2007), http://www.wired.com/print/techbiz/startups/news/2007/12/mind_games By.
[12] Cheung, Humphrey. "Video: Neurosky Mindset Proves TG Daily Editors Are Jedis." *Games and Entertainment* (2008), http://www.tgdaily.com/content/view/36180/118/.
[13] Champion, Erik, and Jeffrey Jacobson. "Sharing the Magic Circle with Spatially Inclusive Games." Paper presented at the *SIGGRAPH Asia Conference, Singapore*, 10-12 December 2008.
[14] Bourke, Paul. "Using a spherical mirror for projection into immersive environments" (*Proceedings of the 3rd international conference on Computer graphics and interactive techniques in Australasia and South East Asia.* Graphite (ACM SIGGRAPH), Dunedin Nov/Dec 2005), 281-284.
[15] Hopson, John. "Behavioral Game Design." *Gamasutra* (2001), http://www.gamasutra.com/features/20010427/hopson_01.htm.
[16] Johnson, Brett "Great Expectations: Building a Player Vocabulary." *Gamasutra: Features* (2001), http://www.gamasutra.com/view/feature/3052/great_expectations_building_a_.php
[17] Johnson, Steven. *Everything Bad Is Good for You: How Popular Culture Is Making Us Smarter*. London: Allen Lane, 2005.
[18] Winter, Douglas E. *Dark Thought, The Pathos of Genre*. (1998). (Based on a speech delivered to the Horror Writers Association Bram Stoker Awards Banquet: June 6, 1998). http://www.darkecho.com/darkecho/darkthot/pathos.html
[19] Dick, Philip K. *The Three Stigmata of Palmer Eldritch*. 2007 ed. Kent: Orion Publishing Group, 1964.
[20] Innis, Harold A. *The Bias of Communication.* Toronto: University of Toronto Press, 1991 c1951.