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The Social Construction Model of Interactive Gaming for Disabled Users:

Benefits and Developmental Evaluation

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Abstract

Though some pragmatic thought has been put into making computer and video games as accessible to the disabled as such media as film and music, there has been a paucity of research and discourse on the *social construction model* as it applies to interactive games. With this model, such media impacts the self-identity, social spheres, and coping mechanisms of users with mobility, orientation, and/or neurological challenges. I explain how this model emerges out of the generative experiences and inherent feedback components of the interactive game medium, and attempt to frame the importance of game accessibility from a development perspective.

Though the game industry has been fast to change and adapt to new technologies and successful innovations in product content, there is much discussion amongst developers, academia, and gamers of its "accessibility". This term has come to mean a variety of things. To the commercial and marketing side of the industry, it is meant to describe the need to appeal to as many demographics as possible, particularly what has been labeled the "non-gamer". On the creative end, developers have started to realize the need to simplify their designs, from user input to the complexity of the content's mechanics, both as a response to the abovementioned business demands and the ever multiplying demands on consumers' attention. What seems like a far more important, but thus far relatively neglected initiative within the industry is to evolve both the creative output and the devices needed to use games to better accommodate audiences marginalized within societies, particularly users with disabilities.

Much of what discourse on this matter does exist currently centers around the idea that, as interactive games have become a dominant medium within our culture, they must be as accessible to the disabled as books, movies, and music are. While this is imperative, there has been a paucity of research and discourse on the *social construction model* as it applies to interactive games. Such a model stems from a linguistic constructivism viewpoint, is widely used in topics from disability studies to general learning theory, and is based on the idea that the "sign" always precedes the body in a hierarchy of signification (Siebers, 2006, p. 174). From this perspective, media (in this case, specifically that of an interactive nature) impacts the self-identity, social spheres, and coping mechanisms of users with mobility, orientation, and/or neurological challenges. I will explain how this model emerges out of the generative

experiences and inherent feedback components of the interactive game medium, and attempt to frame the importance of game accessibility from a development perspective.

Why has such a movement yet to catch on in any substantive way, and has only begun to gain a formal dialogue very recently? The answer transcends the medium itself: people with disabilities in our society are greatly marginalized, and have yet to escape the label – in any large-scale sense – of the "other" in a world built upon norms and impulsive expectations. Computer and video games are emblematic of a problem with a scale beyond the scope of this analysis, with cultural, social, and economic implications that impact our moralistic, governmental, and occupational foundations. If such is the case, why even bother considering the interactive game medium amidst larger and perhaps more important matters that have yet to be meaningfully resolved? Again, the answer has little to do with the concept of the "game" itself as a form of entertainment, but more as a culturally insurgent and immensely important part of our world that has taken hold of the mainstream far more deeply than anything before it. Games have the potential to empower disabled users in a more substantive way than the media forms preceding them, such as film and music. The aim of enabling marginalized communities to take part in this adoption of the games medium, furthermore, is a needed step in furthering it as a valuable pursuit for individual users and society at large.

The concept of broadening the reach of games into traditionally "serious" areas – those without leisurely purposes, such as military training and political action – is far from a new one. Over the past four or five years, there has been an upsurge in the development and application of so-called "serious games", used for purposes relevant to the above fields and those like it. Initiatives such as the Serious Games Initiative, Games for Health, and HopeLab have been

widening the purposes and reach of games, using the medium as a way to improve the

wellbeing of players, including those who live with certain psychical and mental challenges

(Bierre et al., 2005; Howell, 2005). The desire on the part of the development community to

accommodate these "new audiences" – not just the disabled, but anyone who may benefit

from the usage of interactive worlds in a didactic sense – clearly does exist. It furthermore

recognizes the medium's ability to compel physical, psychological, and social change. Such ideas

have existed within the gamer community perhaps for much longer. Disabled gamers in

particular have long been concerned about game accessibility issues, and several grassroots

efforts highlight the power of such audiences in broadening their access to the medium. A

prime example is the *Doom3[CC]* project, which succeeded in adding closed-captioned dialogue

and gameplay cues to the popular first-person shooter *Doom 3* despite initially being met with

opposition by the larger user base. In reaction to the proposed idea, a user of a site dedicated

to the game posted: "I don't know why we [don't] just shoot [hearing impaired] people," "[first-person

shooter] games are not made for hearing impaired people," and "I don't think game designers should go

out of their way to make a game with subtitles so that deaf people can play them" (Sefton, 2004).

Despite the apparent insensitivity of a few gamers, the *Doom3[CC]* project's efforts underline

the compulsion on the part of both the industry and its consumers to diversify both the users

and purpose of interactive games.

This diversification, however, has perhaps been best exemplified not by the mainstream

game industry, but by institutions ranging from hospitals to schools. The medical industry is

looking at 3D game and virtual environments as an effective means of helping patients regain

motor control or balance, while educators have started to use games to target certain learning

disabilities. Schools have begun to realize that today's children have grown up with and are more accepting, reliant, and responsive to interactive material than years ago. Recognizing this, the exponential increase in Attention Deficit Disorder (A.D.D.) in children over the past decade may point to issues regarding a lack of individuation in classroom-based learning (Simpson, 2005, p. 17). Games can serve as a tool in combating A.D.D. and related neurological disorders by giving players control over their learning environment. They also provide a way to see failure as a learning experience and not an end result. This trial and error methodology is innately geared towards learning. Users may make mistakes, but because of frequent task iteration, they are quickly learned from; users are also more likely to demonstrate something that may have otherwise been overlooked. For instance, game failure states such as reaching a time limit – forcing repetition – can be beneficial to a young player who must critically develop new strategies and manage a variety of concurrent demands. In addition, for people who acquire a disability later in life, these "serious" environments may better demonstrate the differential between expected results in terms of both cognition and bodily-based tasks and their actual likely outcomes. These types of players benefit greatly from mental "priming", or experiencing a wide spectrum of both possibilities and concerns, and circumstances arising from such in conjunction with a disability, before dealing with these situations in real-world settings. Similarly, those with congenital forms of disability can use games as a way to feel empowered, fitting into a well-defined role and seeking an individuated path, which may contrast with the limitations faced in a society still trying to accommodate people with physical or mental challenges.

These innovations have also been seen with the usage of games and virtual worlds in medical rehabilitation environments. This type of media allows patients to re-acquire certain abilities faster and more systematically, since – as interactive worlds amplify their input in ways not directly apparent in day-to-day activities – they can establish a positive identity as newly disabled subjects. The Brooke Army Medical Center in Fort Sam Houston, Texas, for example, is beginning to use computer-assisted environments to increase a patient's motivation in continuing rehabilitation and enhancing physical therapy. Similar to devices that have been sold to the consumer market for decades that have tapped into haptics and bodily movement of players with varying success, myokinetic interface-virtual reality systems developed by such institutions as Rutgers University can be worn by amputees, allowing subjects to manipulate virtual objects (Segedy, 2006, p. 2). Such a simulation of reality may help users maintain some residual motor capabilities, but may also channel into a user's pathology, helping him or her to better understand a new condition and gain confidence despite the limitations imposed by limb loss. Similarly, new research at Washington University uses simple in-game learning exercises to open up the possibility for control of prosthesis through neural activity (whereby electrocorticographic data maps motor signals to such devices) or simply discover the realistic implications of prosthesis (Fitzpatrick, 2004). This "medical model" gives users a tangibility and cause-effect experience that is often lost in protracted therapy sessions, but also has *significant* social implications for its users, and is therefore something that should be studied closely by the larger game development community. Such an influence clearly factors into the argument for accessibility in all game software, since the same benefits are familiar to those not in medical environments.

For gamers with such disabilities as tourette syndrome and cerebral palsy, the potential

of video and computer games are not just in mobility aspects such as spatial cognition and

acceleration, but also access to social and linguistic experiences. Games allow such users to

connect with others, find their place in and navigate a space, grasp a concept, or simply

accomplish something outside of their everyday norm. Such activities can often be complex and

overly taxing to engage in on a normative basis for much of the disabled populace. Primarily,

this freedom should obviously give the player a feeling of having fun, but can also translate into

concrete positive change for a disabled gamer. For instance, through the use of a modified

game input device – such as Jouse (a mouth control that uses "sip and puff" and directional

movement) or adaptive "one switch" controllers, reducing a complex gamepad into a one that

can be triggered with a variety of body movements ("One Switch") – a person may regain a

sense of control over their body in many other situations, having had such abilities within the

software. Likewise, games can also enhance self-concept and efficacy (though this may be true

for most users, disabled or otherwise), allowing the player to feel a sense of accomplishment

and autonomy, and may even help the disabled to better openly communicate, particularly

when it comes to self-report (Howell, 2005, p. 104). It stands to reason, then, that such

experiences may improve a person's resiliency in dealing with daily challenges, instilling

confidence in usage of assistive devices, identifying obstacles, and critically adapting to typical

circumstances.

Unfortunately, the availability and publicity of such adaptive game input devices has yet

to reach a mainstream level of reception (like what we see with mobility devices such as

wheelchairs) despite the fact that such devices may have as positive an impact for the social

modalities of a disabled gamer as medical advances do. I posit, though there are a few

"alternative" gamepads like the Novint Falcon and left/right-handed controllers ("One Switch"),

that these appliances will not reach such a critical mass until the interactive game medium itself

has. While certain accessible devices are manufactured on moderately large scales, the needs

of many of the disabled are so specific and shifting that they require tailor-made solutions, such

as for someone with a form of progressive spinal muscular atrophy ("Video games -- access for

all"), which can change as muscular and motor abilities diminish over time. It is all the more

important, in these cases, that game developers adopt standards that allow the interoperability

and customization of input regardless of gameplay type or platform. It is not, however,

currently viable to expect large publishers or developers to take on the resource-consuming

process of producing content specifically for the disabled community; from a business

perspective, it is too costly and risky. One cogent option may be to create middleware, running

in an OS' background, that takes the mapping of any user-installed USB device and emulates

the target gamepad (e.g. Nintendo Wii remote or Sony DualShock 3), thus lessening the

demand on developers and opening up usage to any standards-compliant equipment. "Casual

games" – which are essentially those aimed at broad audiences with popular genres being

puzzle, educational, and adventure – are already produced by many large publishers and readily

lend themselves to such solutions, giving the disabled community a potentially large selection

of pre-existing content to adopt.

The options to better the accessibility of the medium do not apply only to the physically

disabled, but of course those with mental and intellectual limitations. Routes to doing so are

outlined above and include engaging those with A.D.D. and simplifying storyline and mechanics

as a way to better accommodate users with mental challenges. A more recent and culturally

emergent development within gaming, however, may provide an even wider array of benefits

for the disabled: social and competitive communities. Such groups are obviously far from a new

concept in the world of interactive gaming, with the earliest forming around multi-user

dungeons (MUDs) as early as the 1970s (Curtis, 2002) and a decade or more ago in massively

multiplayer online games (MMOs), but more recently has there been a surfacing of more

persistent communities. Some, called "guilds", band around an MMO and play together at

regular intervals, forming close relationships and relaying their members' personalities through

voice and text. For those with real-world communication barriers, this can provide a needed

outlet for socializing, teamwork, and – as has been discussed – a morale-lifting outgoing

experience. More frequently, friends may also get together in real space locations and play on

their computers and consoles in homes and conference halls alike, while games such as *Guitar

Hero*, *Dance Dance Revolution*, and *Madden* have spawned social activity between gamers, who

may not otherwise connect, also in the real-world for competitions and showcases. Again,

these venues, even with the disabled still a minority, can hold a certain camaraderie, reception,

and positive homogeneity for those who may not engage larger social spheres on a usual basis,

and hold lessons for game creators who want to instill such accessibility without being limited

to a specific audience.

Games lag far behind other media in terms of adapting to the needs of the disabled;

nearly all movies have the option of subtitles or assisted hearing devices, many books are

available in audio or Braille form, and even internet developers have adopted standards that

allow for better screen reader usage and a multitude of readability options. The still pervasive

lack of familiarity with and understanding of the disabled from the majority of society cannot

be used as a crutch for this deficit. Given the above reasons for and options to include such an

audience in the medium's purview, it would seem in fact that interactive games are in a prime

position to make meaningful positive impacts to this global community. This is not limited to

being an ideal entertainment venue, but also affecting individuals' cognitive facilities, social

realms, and mental capacities for learning and adaptation. Games are furthermore equipped to

placate problems that arise in late development and injury-related disabilities, where

simulations and virtual worlds may help patients to accept their new limitations, and more

importantly realize a sense of autonomy. Even with little all-encompassing investment from

developers themselves, the medium holds the ability to better interface with the disabled

community in ways impossible through "static" media. I am not proposing that game

developers and publishers create whole new methodologies and production pipelines to

accommodate disabled gamers – far from it. As a medium that is far more adaptable and fluid

than anything before it, they may however be missing out on financial benefits and market

growth potential of sufficiently reworking content to suit unmarked audiences. With some

growing pains and changes to the way both consumers and creators think about this audience,

games can be validated well beyond its superior artistic and technical merits.

References

Bierre, K., Chetwynd, J., Ellis, B., Hinn, M., Ludi, S., & Westin, T. (2005, March). Game Not Over:
Accessibility Issues in Video Games. In *Human Computer Interaction International Conference*.
San Francisco: International Game Developers Association. Retrieved April 26, 2008, from
International Game Developers Association Games Accessibility Special Interest Group Web site:
http://www.igda.org/accessibility/HCII2005_GAC.pdf

A conference preceding examining game accessiblity by reviewing the need for accessibility,
the current state of the industry, and possible solutions. Used in examining possible
disabilities with need and use for games.

Curtis, P. (2002). Mudding: social phenomena in text-based virtal realities. In R. Packer & K. Jordan
(Eds.), Multimedia: from Wagner to virtual reality (pp. 352-369). New York: W.W. Norton &
Company. (Original work published 2001)

This chapter explains the origins, popularization, and cultural meaning behind multi-user
dungeons (MUDs), which are an example of early computer game-based communities.

Fitzpatrick, T. (2004, June 9). Human subjects play mind games. In *News & Information*. Retrieved March
28, 2008, from Washington University in St. Louis Web site: http://news-info.wustl.edu/tips/
page/normal/911.html

This article, written by the Washington University news services, details how researchers
there discovered a way to map motor signals from epileptic subjects' brains using
electrocorticographic data whereby they could then control a simple computer game using
their thoughts. Not only does this open up the possibility for a disabled person to adapt such
a methodology to daily game playing, but the researchers claim it could someday be applied
to the usage and control of prosthesis for disabled patients.

Howell, K., B.A, M.B.A. (2005). Games for Health Conference 2004: Issues, Trends, and. *CyberPsychology
& Behavior, 8*(5), 103-109. Retrieved April 21, 2008, from MEDLINE database.

The Games for Health Conference 2004 (one that is now ongoing annually) identified issues,
trends, and needs unique to games for healthcare. Used for explanation of how doctors and
medical researchers are using interactive games in therapy for newly disabled patients.

McCann, S. E. (Director). (2007). Video games -- access for all [Television series episode]. In J. Oh, S.
Sadiq, J. Rosen, & J. Johnson (Producer), *Quest*. San Francisco: KQED. Retrieved August 26, 2007,
from http://www.kqed.org/quest/television/view/276

This PBS affiliate-produced TV program interviewed a father and son that had adapted a
traditional computer keyboard/mouse interface to work for the son, who has spinal muscular
atrophy, so that they could play a computer game together and with an online community.
The report also focused on the Game Accessibility movement within the game development
industry, and particularly at the 2007 Game Developers Conference where several sessions
on the topic were held. Closed-captioning in games and devices that work with current game
consoles for people who with diverse challenges are also investigated.

Segedy, A. (2006, June 1). Virtual environments enable real recovery; the possibility of relearning motor control without risk of further injury may bring new hope to neurologic patients. *Biomechanics*, 49-54. Retrieved April 16, 2008, from LexisNexis database.

> This article highlights new procedures in hospital rehabilitation for soldiers and others that have incurred recent injuries that use virtual environments and video games to improve coordination and usage of prosthesis. Used in highlighting ways that the interactive games can have serious benefits outside of its traditional role as an entertainment medium.

Sefton, M. (2004, September). About the Project. In *Doom3[CC]*. Retrieved April 18, 2008, from http://doom3cc.planetdoom.gamespy.com/about.htm

> This web page includes information about the Doom3[CC] Project, a modification of the popular Doom 3 computer game that includes closed captioning of all cinematic and gameplay sequences. Is an example of user-driven content the help the disabled access games.

Siebers, T. (2006). Disability in theory: from social constructionism to the new realism of the body. In L. J. Davis (Ed.), *The disability studies reader* (2nd ed., pp. 173-183). New York: Routeledge.

> This article is a detailed explanation and critique of how social constructionism differs from the medical model and purely realistic depiction of the disabled form in terms of why and how our society construes and identifies disability. Topics covered include pain, individuality, and bodily, social, and political experience.

Simpson, E. S. (2005, September/October). Evolution in the classroom: What teachers need to know about the video game generation. *TechTrends, 49*(5), 17-22. Retrieved March 25, 2008, from Academic Search Premiere database.

> This article details how children who have grown up with video games and three-dimensional worlds think and learn differently than previous generations, and explains how teachers are not catering to these natural, but radical learning needs. Though it does not directly tackle disability, it purports how this discrepancy may explain the vast increase in learning disability diagnosis over the last decade and rationalizes the need for the adaptation of interactive games technology for serious purposes.

Various Accessible Gaming Gear. (n.d.). *One Switch*. Retrieved April 27, 2008, from http://www.oneswitch.org.uk/1/AGS/AGS-various.htm

> One Switch is a website that has information on a variety of adaptable electronic devices for a variety of media, including gaming. It has information on a plethora of devices that disabled gamers may use to more successfully have input options for the medium.