VIDEO GAMES AND EMBODIMENT

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Introduction

In this paper I want to talk about one way in which modern video games can illuminate the nature of human thinking and problem solving as situated and embodied. There are a number of different ways in which cognition can be said to be situated and embodied and I will discuss only one in this paper. My approach does not imply that other approaches are not equally fruitful.

Traditional work in cognitive psychology took thinking and problem solving to be primarily mental phenomenon, all about things going on inside the mind (Clancey 1997). Though the mind was "in" the head, the body had little, beyond that, to do with the matter. Today, it is popular to think of thinking and problem solving as "embodied" (involving the body, Clark 1997), affective (involving the emotions, Damasio 1999, 2003), technological (involving tools and technologies, Hutchins 1995; Latour 1999), interactive (involving participation with others, Greeno 1998; Lave & Wenger 1991), and sociocultural (involving the workings of social and cultural identities and groups, Gee 1992; Strauss & Quinn 1997).

Some of this more contemporary work tends to ignore—sometimes even deny—the role of mental processing. In my view that is simply to err on the other side. In fact, it is important to have a theory of processing. And important, in fact, to have one that is compatible with the embodied, affective, technological, interactive, and sociocultural nature of thinking and problem solving. Many people believe that a "connectionist" view of mental processing (in the broad sense of a family of viewpoints that focus on associations among stored experiences from the world) is a view of processing that is

particularly well fitted for the embodied, affective, technological, interactive, and sociocultural mind (Gee 1992, 2004)..

In this paper I want to focus only on embodiment (for other aspects, see Gee 2004) and what we can learn about embodiment from modern video games. Over the last several years, many people have become interested in video games as a site to study human thinking, problem solving, and learning (e.g., Barab, Thomas, Dodge, Carteaux, & Tuzun 2005; Barab, Zuiker, Warren, Hickey, Ingram-Goble, Kwon, Kouper, & Herring to appear;. Gee 2003, 2005; Jenkins & Squire 2004; Shaffer 2007; Steinkuehler 2004, 2006; Squire 2005; 2007), so let me first sketch out one reason why this is so. Then I will turn to one way to talk about embodiment in games—and, then, from games to "real life". This way is but one, there are others, ones that I will not deal with her (but which I do not mean to slight).

The Mind as an "Action-and-Goal Directed Simulator of Embodied Experience"

Scholars have always studied the human mind through analogies to technologies they feel work something like the mind. Thus, Locke and Hume argued that the mind was like a blank slate on which experience wrote images and ideas, taking the technology of literacy as a guide for how to view the human mind. Much later, modern cognitive scientists argued that the mind worked like a digital computer calculating generalizations and deductions via a logic-like rule system (Clancey 1997; Newell 1990).

The reasons these sorts of analogies work is that the mind is, indeed, some sort of "machine". The reason they don't work with full success is the mind is a very special sort of machine. But humans do get better through history at building technologies that

more closely capture some of what the human mind can do and do it publicly. Thus, both writing and computers (digital and analogue) both allow us to externalize some of the functions of the mind.

Though the are not commonly though of in these terms, video games are a new technology in this same line (Gee 2005a). They are a new tool with which to think about the mind and through which we can externalize some of its functions. Video games of the sort I am concerned with here (games like *Half-Life 2*, *Rise of Nations*, *SWAT4*, *Morrowinds: Oblivion*, and *World of Warcraft*) are what I would call "action-and-goal directed simulations of embodied experience". A mouthful, but an important one, I believe.

It used to be, and still is in some quarters, a standard view in psychology that meaning of a word is some general concept in the head that can be spelled out in something like a definition. For example, the word "bachelor" might be represented by a complex concept in the head that the following definition would capture: "a male who is not married".

However, today there are accounts of language and thinking that are quite different. Consider, for instance, these quotes from some recent work in cognitive psychology:

> … comprehension is grounded in perceptual simulations that prepare agents for situated action (Barsalou 1999a: p. 77)

… to a particular person, the meaning of an object, event, or sentence is what that person can do with the object, event, or sentence (Glenberg 1997: p. 3)

… higher intelligence is not a different kind of process from perceptual intelligence. (Hawkins 2005, p. 96)

These quotes are from work that is part of a "family" of related viewpoints. For want of a better name, we might call the family "situated cognition studies", which means that these viewpoints all believe that thinking is connected to and changes across actual situations and is not usually a process of applying abstract generalizations, definitions, or rules (e.g., Barsalou 1999a, b; Brown, Collins, & Dugid 1989; Clark 1997, 2003; Engestrom, Miettinen, raij Punamaki, 1999; Fleck 1979; Gee, 1992; Glenberg 1997; Glenberg & & Robertson 1999; Hutchins, 1995; Latour 1999, 2005; Lave 1996; Lave & Wenger, 1991; Wertsch 1998; Wenger 1998) While there are differences among the different members of the family, they share the viewpoint that language is tied to *people's (goal directed) experiences in the material and social world.* Furthermore, these experiences are stored in the mind/brain not in terms language, but in something like dynamic images tied to perception both of the world and of our own bodies, internal states, and feelings:

> Increasing evidence suggests that perceptual simulation is indeed central to comprehension (Barsalou 1999a, p. 74).

Let me use a metaphor to make clear what this viewpoint means. Not surprisingly, at this point, I will use video games as the source of my metaphor. Video games like *Deus Ex*, *Half-Life*, *Age of Mythology*, *Rise of Nations*, or *Neverwinter Nights* involve a visual and auditory world in which the player manipulates a virtual character. Such games often come with editors or other sorts of software with which the player can make changes to the game world or even build a new game world. The player can make a new landscape, a new set of buildings, or new characters. The player can set up the world so that certain sorts of actions are allowed or disallowed. The player is building a new world, but is doing so by using, but modifying, the original visual images (really the code for them) that came with the game. One simple example of this is the way in which players can build new skateboard parks in a game like *Tony Hawk Pro Skater*. The player must place ramps, trees, grass, poles, and other things in space in such a way that he or she or other players can manipulate their virtual characters to skateboard the park in a fun and challenging way.

So imagine the mind works in a similar way. We have experiences in the world, including things we have experienced only in the media. Let us use as experiences of weddings as an example. These are our raw materials, like the game with which the gamer starts. Based on these experiences, we can build a simulated model of a wedding. We can move around as a character in the model as ourselves, imaging our role in the

wedding, or we can "play" other characters at the wedding (e.g., the minister), imaging what it is like to be that person. The model we build is not "neutral". Rather, the model is meant to take a perspective on weddings. It foregrounds certain aspects of weddings that we take as important or salient. It backgrounds other elements that we think are less important or less salient. It leaves some things out all together.

However, we do not build just one wedding model simulation and store it away once-and-for-all in our minds. No, what we do, rather, is build different simulations on the spot for different specific contexts we are in and purposes we have. In a given situation or conversation involving weddings, we build a model simulation that fits that context and helps us to make sense of it. Out models are special-built to help us make sense of the specific situations we are in, conversations we are having, or texts we are reading. In one case, we might build a model that foregrounds weddings as fun, blissful, and full of potential for a long and happy future. In another case, we might build a model that foregrounds weddings as complex, stressful, and full of potential for problematic futures.

We also build our model simulations to help us prepare for action in the world. We can act in the model and test out what consequences follow, before we act in the real world. We can role-play another person in the model and try to see what motivates their actions or might follow from them before we respond to them in the real world. In fact, humans tend to want to understand objects and words in terms of their "affordances" for actions. Take something as simple as a glass:

> The meaning of the glass to you, at [a] particular moment, is in terms of the actions available. The meaning of the glass changes when different constraints on action are combined. For example, in a noisy room, the glass may become a mechanism for capturing attention (by tapping it with a spoon), rather than a mechanism for quenching thirst (Glenberg 1997, p. 41).

Faced with the word "glass" in a text or a glass in a specific situation, the word or object takes on a specific meaning or significance based not just on the model simulation we build, but also on the actions with the glass that we see as salient in the model. In one case, we build a model simulation in which the glass is "for drinking", in another it is "for ringing like a bell to get attention", in another it is a precious heirloom in a museum that is "not for touching". Our models stress affordances for action so that they can prepare us to act or not act in given ways in the real world.

We think and prepare for action with and through or model simulations. They are what we use to give meaning to our experiences in the world and to prepare us for action in the world. They are what we use to give meaning to words and sentences. But they are not language. Furthermore, since they are representations of experience (including feelings, attitudes, embodied positions, and various sorts of foregroundings and backgroundings of attention), they are not just "information" or "facts". Rather, they are value-laden, perspective-taking "games in the mind". So I am arguing that thinking for humans is often like modding a game, it is a form of "modding" our experiences, experiences we have had in body in the world.

Of course, talking about simulations in the mind is a metaphor that, like all metaphors, is incorrect if pushed too far (see Barsalou 1999b for how a similar metaphor can be cashed out and corrected by a consideration of a more neurally realistic framework for "perception in the mind"). What I want to stress about our model simulations are two things: a) they are special-built, we make them on the spot to help us make sense of and act in specific contexts or with specific texts; b) they are not "neutral", but capture a given perspective or viewpoint, foregrounding some things and backgrounding others, though our perspective or viewpoint changes in different contexts. We can, of course, run simulations that reflect perspectives and values we ourselves don't believe in or even value by running a simulation from the perspective of someone else. This is how to understand people and texts we don't like.

So meaning is not about general definitions in the head. It is about building specific game-like models (wherein we can act or role-play other people's actions) for specific contexts. Even words that seems so clearly to have clear definitions, like the word "bachelor" that we used as an example at the beginning of this section, do not. For example, what model simulation(s) would you bring to a situation where someone said of a woman, "She's the bachelor of the group"? You might build a simulation in which the woman was attractive, at or a little over marriageable age, perhaps a bit drawn to the single life and afraid of marriage, but open to the possibilities. You would see yourself as acting in various ways towards the woman and see her responding in various ways. The fact that the woman is not an "unmarried man" does not stop you from giving meaning to this utterance. I, having had different experiences than you, might form a different sort of simulation. Perhaps the differences between my simulation and yours are big, perhaps

they are small. They are small if you and I have had similar experiences in life and larger if we have not. And clearly your simulation—like mine—is value laden and culture-bound in some ways, indeed, even one source for the creation and maintenance of cultural stereotypes (Strauss & Quinn 1997)..

Of course, if we were in a situation in which we didn't just hear about the woman, but saw her, we would build our simulation to reflect what we see and know. Nonetheless, there is much room left for "gaming", for running the simulation in various directions to make sense of what is going on, to try to predict what may happen, to make decisions about what we should say or do, or to make decisions about what the meaning is of what others have said and done.

Children play games early in life to prepare themselves for real life. It turns out we all play games in our heads to prepare us for action and decision in the real world, games we make out images, actions, feelings, and dialogue that come from our experiences in the world. Our experiences in life allow us to build "wedding games" in order to think, talk, and act in regard to weddings and things related to weddings. When we use these models to act in the real world, we can, then, change the wedding game, that is, the real-world experiences we or others have of weddings. Our models and the real world are always interacting on each other. The world offers us raw materials for our simulations and our simulations cause us to act in the real world in ways that change it to better resemble or model simulations.

Video Games: The Projective Stance

Now I want to discuss one way to think about embodiment and embodied thinking in video games. I will argue that this sort of embodied thinking is characteristic of many (not all) video games, but that it is also a form of embodied thinking that is, more subtly, pervasive in everyday life and social interaction as well (Gee 2007).

In many video games, players **inhabit** the **goals** of a virtual character in a virtual world. At the same time, that virtual world is designed to be **attuned** to those goals. In these video games, the real-world player gains a **surrogate**, i.e., the virtual character the player is playing., e.g., Garrett in *Thief: Deadly Shadows*. By "inhabit" I mean that you, the player, act in the game as if the goals of your surrogate are your goals.

Virtual characters have virtual minds and virtual bodies. They become the player's surrogate mind and body[1]. You may wonder what I mean by the "mind" of a virtual character. What I mean is this: as a player, you must—on the basis of what you learn about the game's story and the game's virtual world—attribute certain mental states (beliefs, values, goals, feelings, attitudes, and so forth) to the virtual character. You must take these to be the character's mental states; you must take them as a basis for explaining the character's actions in the world.

By "attuned" I mean that the virtual character, that character's goals, and the virtual world of the game are designed to **mesh** or fit together in certain ways. The virtual character (in terms of the character's skills and attributes) and the virtual world are built to go together such that the character's goals are easier to reach in certain ways than they are in others**.** Consider an example: In the game *Thief: Deadly Shadows* the player plays the master thief Garrett. In inhabiting Garrett's body (whether playing the game in

first person or third person mode), the player inherits specific powers and limitations. In inhabiting Garrett's body, with its powers and limitations, the player also inhabits Garret's specific goals, goals having to do with stealing, infiltrating, and stealthily removing or sneaking past guards to accomplish specific story-related ends in the game. Given Garrett's powers and limitations, these goals are easier to reach in some ways than others within the specific virtual world of this game.

The virtual world in *Thief*—the world through which you as Garrett move—a world of many shadows and hiding places—is a world designed to interact with Garret's powers and limitations in terms of specific affordances and disaffordances (Gibson 1977, 1979). These affordances and disaffordances do not reside in the world alone, but in the combination of the specific mind/body Garrett brings to the that world and the way in which that world encourages or discourages that specific mind/body in terms of possible actions. Garrett is good at hiding and sneaking and the virtual world (environment) of the game is good at being hidden and snuck in, so to speak.

It is a world of shadows and hiding places, a world well fit for Garrett's superb (mental and physical) skills at hiding, waiting, watching, and sneaking. It affords hiding and sneaking of all sorts. It is not a world well made for outright confrontations and frontal fights: in this world, Garrett can find no guns or weapons much beyond a small dagger and the spaces that would allow outright fights with multiple guards are pretty cramped, allowing guards easily to surround Garrett. The way the world is made, the way that Garrett's mind/body is made, and how they mesh, has major consequences for the sorts of effective plans and goals (you as) Garrett can make and carry out.

So, we see, that a video game creates a three-way interaction among the virtual character's mind/body, the character's goals, and the design features of the virtual world in terms of affordances for effective action: virtual character ←→ goals ←→ virtual world. There is a tight fit here (thanks to the game's design).

In a game, the virtual character's powers and limitations mesh with the way in which the game's virtual world is designed in quite specific ways so that the virtual character's goals can be accomplished better in some ways than others. Finding this mesh or fit—"sweet spots" for effective action—is, of course, one of the key skills required in playing a video game. You CAN play *Thief* as an out and out fighting game, eschewing stealth, but you will be fighting the mesh (that discourages such actions) between Garrett's mind/body (your surrogate mind/body) and the virtual world of the game all the way.

So I have argued so far that players **inhabit** the goals of a virtual character in a virtual world and the virtual world is designed to be **attuned** to those goals. But in video games the virtual character—e.g., Garrett—also **instantiates** the goals of a real-world player. The virtual world of the game is designed to **invite** the real-world player to form certain sorts of his or her own.

According to the first claim, in a game like *Thief: Deadly Shadows*, you, the player, see the world from Garrett's perspective and need to find ways to use the mesh ("fit") in the world among Garrett's mind/body, his goals, and the design of the virtual world to carry out **his** goals effectively. But things work the other way round, as well. Garrett becomes a reservoir that can be filled with **your own** desires, intentions, and goals. By placing your goals within Garrett—by seeing them as Garrett's goals—you can

enact your desires in Garrett's virtual world. But note that this is a process that works well only if you carefully consider that mesh ("fit") that exists in the game among Garrett's mind/body, his goals, and the design of the virtual world. This is the only way in which your own goals will be effectively added to Garrett's and accomplished, since the game will resist goals that fall outside this mesh. In this sense, your own personal goals must become Garrett-like goals, goals that flow from his (virtual) mind and body as they are placed in this specific game world.

Let me give an example. At one point in *Thief*, Garrett needs to break into a museum to get an important object. This is Garrett's goal and you need to inhabit him and see the game world from the perspective of his affordances in this particular virtual world if you are to play this part of the game successfully.

But let's say that you as a player decide that you want to get through the museum by sneaking up on and knocking out every guard or, alternatively, by sneaking by them all and leaving them all unharmed, never knowing you were there. This is not a goal that Garrett has in the game. There is no in-game way to decide what his goal would be in this respect. To realize this goal, you have to make it Garrett's in-game goal, treat it just the way you would his own goals, the goals that you are inhabiting. You must do this, because the world in which Garrett moves allows this goal to be reached in some ways and not others, and it allows it to be reached more easily and effectively (even more elegantly) in some ways than others.

So, we can revise our three-way interaction a bit: we can say now that a video game creates a three-way interaction among the virtual character's mind/body (the player's surrogate), the character's goals **and** the player's goals, and the design features

of the virtual world in terms of affordances for effective action: virtual character (player's surrogate) ←→ character's goals + player's goals ←→ virtual world.

So, in playing a game, we players are both imposed upon by the character we play (i.e., we must take on the character's goals) and impose ourselves on that character (i.e., we make the character take on our goals). It is interesting to note that this is a theme Bakhtin (1981, 1986) focuses on for language. He uses the term "centripetal force" for my term "being imposed upon" and the term "centrifugal force" for my tem "impose upon". I think there is good reason for this—this symmetry between games and language—but this is a topic that needs to be taken up in a different paper (Gee 2003, 2004).

Garrett is a **project** I inherit from the game's designers, and, thus, in that sense an imposition. But Garrett is also a being into whom I **project** my own desires, intentions, and goals, but with careful thought about Garrett as a project. To both carry out the Garrett project and to project my desires, intentions, and goals into Garrett, I have to **think like a game designer**. I have to reflect on and "psych out" the design of the game. This dual nature of game characters—that they are projects the player has been handed and beings into which the players project their desires, intentions, and goals—is why I refer to them as **projective beings**, a phrase meant to capture their double-sided nature (Gee 2003).

In the real world we humans receive our deepest pleasure—our most profound feelings of mastery and control—when we can successfully take what a **projective stance** to and in the real world. This is when things really "work" for us. This is, indeed,

one of the deep sources of pleasure in gaming, namely, that in gaming we regularly enact a stance that is harder and rarer, but just as powerful, in our real lives.

I will describe what I mean by the projective stance in a series of steps. But the first two steps can be taken in either order or carried out simultaneously. So, here is what I mean by "taking a projective stance" to and in the real world: First, we look at the real world, at a given time and place, and see it (i.e., other people and objects in the world) in terms of features or properties that would allow and enhance certain patterns of actions in word or deed. Second, we see that these actions would, in turn, realize the desires, intentions, and goals of a human actor who took on a certain sort of identity or played a certain sort of role (and not others).

These two steps amount to seeing, imagining, or construing a fit or mesh among the world (construed in a certain way), a particular type of actor, and specific goals that actor wants to carry our. Third, we then try to become that actor—become that sort of person, but also attempt, within that framework, simultaneously to realize goals and values that are part of the core self (our own personal history) we bring to any social identity we enact.. We act in word or deed in terms of that identity.

Of course, we humans often form goals first and then turn to the world to realize them, though there are times when the world suggests goals to us that we have not preformulated. If we take step 1 first, we are letting the world suggest vectors of effective action to us. If we take step 2 first, we come to the world with goals and an identity we want to render effective in the world and seek to find the mesh in the world that will make things work out right. In reality, we very often iterate the process—bringing goals to the world, looking for an effective mesh, reconstruing our goals,

reconstruing the world, and eventually acting and, if not effective, repairing and acting again. This sort of iterative process is not untypical of video game play, either.

Let me be yet more blunt. What I am suggesting is that when we humans act in the world (in word or deed) we are "virtual characters" (i.e., taking on specific identities such as "tough cop", "sensitive male", "hip young adult", "caring teacher", "savvy consumer", "needy friend", "nationalist African-American", and so on and so forth through an indefinite list) acting in a "virtual world" (i.e., construing the world in certain ways, and not others). Of course, the consequences are usually more dear in the real world than in a game world, but in both cases we seek to see how the situation is "designed" or can be viewed as "designed" to enhance a fit or mesh among ourselves, our goals, and the world (Gee 1996).

The argument, then, is that video games build on and play with a stance that is the norm for effective physical and social human action in the world. They externalize in images much of what remains "mental" (usually unconsciously imaginative) in the real world when we are operating powerfully and effectively. In video games we play with life as if life were a toy.

Footnote:

1. Having an avatar is one of several ways in which players of video games gain physical embodiment through "micro-control". Micro control has well known cognitive effects (Clark 1997; Gee 2005b). Humans feel their bodies extend only so far as the space over which they have small-scale control, which for most of us is a space quite close to the body. Blind people have the feeling that their body extends out to the end of their cane, since the cane extends their space of small-scale control. When people use a web-cam to water plants in a far away place via the Internet, they feel that their bodies have extended into space, a novel feeling for humans, since it is one unavailable for most of human history. Video games also offer humans a new experience in history, namely micro-control over objects in a virtual space. This gives us the feeling that our bodies and minds have extended into this virtual space and that the space of the real and virtual are joined. Sometimes the player micro-controls a single avatar (as in *Half-Life*), sometimes a group (as in *Full Spectrum Warrior)*, sometimes many people, buildings, and armies (as in *Rise of Nations*), sometimes shapes and movement (as in *Tetris*).

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