VIDEO GAMES, MIND, AND LEARNING*

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In this essay, I will stress the contribution Game Studies can make to our thinking about learning, knowledge, and the human mind. Video games are a relatively new technology replete with important, and not yet fully understood, implications (Gee 2003).

Scholars have often viewed the human mind through the lens of a technology they thought worked like the mind. Locke and Hume, for example, argued that the mind was like a blank slate on which experience wrote ideas, taking the technology of literacy as their guide. Much later, modern cognitive scientists argued that the mind worked like a digital computer, calculating generalizations and deductions via a logic-like rule system (Newell & Simon 1972). More recently, some cognitive scientists, inspired by distributed parallel-processing computers and complex adaptive networks, have argued that the mind works by storing records of actual experiences and constructing intricate patterns of connections among them (Clark 1989; Gee 1992). So we get different pictures of the mind: mind as a slate waiting to be written on, mind as software, mind as a network of connections.

Human societies get better through history at building technologies that more closely capture some of what the human mind can do and getting these technologies to do mental work publicly. Writing, digital computers, and networks each allow us to externalize some functions of the mind.

Though they are not commonly thought of in these terms, video games are a new technology in this same line. 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—games like *Half-Life 2*, *Rise of Nations*, *Full Spectrum Warrior*, *Morrowinds: The Elder Scrolls*, and *World of WarCraft*—are what I would call "action-and-goal-directed preparations for, and simulations of, embodied experience". A mouthful, indeed, but an important one.

To make clear what I mean by the claim that games act like the human mind and are a good place to study and produce human thinking and learning, let me first briefly summarize some recent research in cognitive science, the science that studies how the mind works (Bransford, Brown, & Cocking 2000). Consider, for instance, the remarks below [in the quotes below, the word "comprehension" means "understanding words, actions, events, or things"]:

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

What these remarks mean is this: human understanding is not primarily a matter of storing general concepts in the head or applying abstract rules to experience. Rather, humans think and understand best when they can imagine (simulate) an experience in such a way that the simulation prepares them for actions they need and want to take in order to accomplish their goals (Barsalou 1999b; Clark 1997; Glenberg & Robertson 1999).

Let's take weddings as an example, though we could just as well have taken war, love, inertia, democracy, or anything. You don't understand the word or the idea of weddings by meditating on some general definition of weddings. Rather, you have had experiences of weddings, in real life and through texts and media. On the basis of these experiences, you can simulate different wedding scenarios in your mind. You construct these simulations differently for different occasions, based on what actions you need to take to accomplish specific goals in specific situations. You can move around as a

character in the mental simulation as yourself, imaging your role in the wedding, or you can "play" other characters at the wedding (e.g., the minister), imaging what it is like to be that person.

You build your simulations to understand and make sense of things, but also to help you prepare for action in the world. You can act in the simulation and test out what consequences follow, before you act in the real world. You can role-play another person in the model and try to see what motivates their actions or might follow from them before you respond in the real world. So I am arguing that the mind is a simulator, but one that builds simulations to purposely prepare for specific actions and to achieve specific goals (i.e., they are built around win states).

Video games turn out to be the perfect metaphor for what this view of the mind amounts to, just as slates and computers were good metaphors for earlier views of the mind. To see this, let me now turn to a characterization of video games and then I will put my remarks about the mind and games together.

Video games usually involve a visual and auditory world in which the player manipulates a virtual character (or characters). They 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 and 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 players can manipulate their virtual characters to skate the park in a fun and challenging way.

Even when players are not modifying games, they play them with goals in mind, the achievement of which counts as their "win state" (and it's the existence of such win states that, in part, distinguishes games from simulations) These goals are set by the player, but, of course, in collaboration with the world the game designers have created (and, at least in more open-ended games, players don't just accept developer's goals, they make real choices of their own). Players must carefully consider the design of the world and consider how it will or will not facilitate specific actions they want to take to accomplish their goals.

One technical way that psychologists have talked about this sort of situation is through the notion of "affordances" (Gibson 1979). An "affordance" is a feature of the world (real or virtual) that will allow for a certain action to be taken, but only if it is matched by an ability in an actor who has the wherewithal to carry out such an action. For example, in the massive multiplayer game *World of WarCraft* stags can be killed and skinned (for making leather), but only by characters that have learned the Skinning skill. So a stag is an affordance for skinning for such a player, but not for one who has no such skill. The large spiders in the game are not an affordance for skinning for any players, since they cannot be skinned at all. Affordances are relationships between the world and actors.

Playing *World of WarCraft*, or any other video game, is all about such affordances. The player must learn to **see** the game world—designed by the developers, but set in motion in particular directions by the players, and, thus, co-designed by them—

in terms of such affordances (Gee 2005). Broadly speaking, players must think in terms of "What are the features of this world that can enable the actions I am capable of carrying out and that I want to carry out in order to achieve my goals?"

So now, after our brief bit about the mind and about games, let's put the two together. The view of the mind I have sketched, in fact, argues, as far as I am concerned, that the mind works rather like a video game. For humans, effective thinking is more like running a simulation than it is about forming abstract generalizations cut off from experiential realities. Effective thinking is about perceiving the world such that the human actor sees how the world, at a specific time and place (as it is given, but also modifiable), can afford the opportunity for actions that will lead to a successful accomplishment of the actor's goals. Generalizations are formed, when they are, bottom up from experience and imagination of experience. Video games externalize the search for affordances, for a match between character (actor) and world, but this is just the heart and soul of effective human thinking and learning in any situation.

As a game player you learn to see the world of each different game you play in a quite different way. But in each case you see the world in terms of how it will afford the sorts of embodied actions you (and your virtual character, your surrogate body in the game) need to take to accomplish your goals (to win in the short and long run). For example, you see the world in *Full Spectrum Warrior* as routes (for your squad) between cover (e.g., corner to corner, house to house) because this prepares you for the actions you need to take, namely attacking without being vulnerable to attack yourself. You see the world of *Thief* in terms of light and dark, illumination and shadows, because this

prepares you for the different actions you need to take in this world, namely hiding, disappearing into the shadows, sneaking, and otherwise moving unseen to your goal.

When we sense such a match, in a virtual world or the real world, between our way of seeing the world, at a particular time and place, and our action goals—and we have the skills to carry these actions out—then we feel great power and satisfaction. Things click, the world looks as if it were made for us. While commercial games often stress a match between worlds and characters like soldiers or thieves, there is no reason why other games could not let players experience such a match between the world and the way a particular type of scientist, for instance, sees and acts on the world (Gee 2004). Such games would involve facing the sorts of problems and challenges that type of scientist does and living and playing by the rules that type of scientist uses. Wining would mean just what it does to a scientist: feeling a sense of accomplishment through the production of knowledge to solve deep problems.

I have argued for the importance of video games as "action-and-goal-directed preparations for, and simulations of, embodied experience." They are the new technological arena—just as were literacy and computers earlier—around which we can study the mind and externalize some of its most important features to improve human thinking and learning. But games have two other features that suit them to be good models for human thinking and learning externalized out in the world. These two additional features are: a) they distribute intelligence via the creation of smart tools, and b) they allow for the creation of "cross functional affiliation," a particularly important form of collaboration in the modern world.

Consider first how good games distribute intelligence (Brown, Collins, & Dugid 1989). In *Full Spectrum Warrior*, the player uses the buttons on the controller to give orders to two squads of soldiers. The instruction manual that comes with the game makes it clear from the outset that players, in order to play the game successfully, must take on the values, identities, and ways of thinking of a professional soldier: "Everything about your squad," the manual explains, "is the result of careful planning and years of experience on the battlefield. Respect that experience, soldier, since it's what will keep your soldiers alive" (p. 2). In the game, that experience—the skills and knowledge of professional military expertise—is distributed between the virtual soldiers and the real-world player. The soldiers in the player's squads have been trained in movement formations; the role of the player is to select the best position for them on the field. The virtual characters (the soldiers) know part of the task (various movement formations) and the player must come to know another part (when and where to engage in such formations). This kind of distribution holds for every aspect of military knowledge in the game.

By distributing knowledge and skills this way—between the virtual characters (smart tools) and the real-world player—the player is guided and supported by the knowledge built into the virtual soldiers. This offloads some of the cognitive burden from the learner, placing it in smart tools that can do more than the learner is currently capable of doing by him or herself. It allows the player to begin to act, with some degree of effectiveness, before being really competent—"performance before competence." The player thereby eventually comes to gain competence through trial, error, and feedback, not by wading through a lot of text before being able to engage in activity. Such

distribution also allows players to internalize not only the knowledge and skills of a professional (a professional soldier in this case), but also the concomitant values ("doctrine" as the military says) that shape and explain how and why that knowledge is developed and applied in the world. There is no reason why other professions—scientists, doctors, government officials, urban planners (Shaffer 2004)—could not be modeled and distributed in this fashion as a deep form of value-laden learning (and, in turn, learners could compare and contrast different value systems as they play different games).

Finally, let me turn to the creation of "cross-functional affiliation." Consider a small group partying (hunting and questing) together in a massive multiplayer game like *World of WarCraft*. The group might well be composed of a Hunter, Warrior, Druid, and Priest. Each of these types of characters has quite different skills and plays the game in a different way. Each group member (player) must learn to be good at his or her special skills and also learn to integrate these skills as a team member within the group as a whole. Each team member must also share some common knowledge about the game and game play with all the other members of the group—including some understanding of the specialist skills of other player types—in order to achieve a successful integration. So each member of the group must have specialist knowledge (intensive knowledge) and general common knowledge (extensive knowledge), including knowledge of the other member's functions.

Players—who are interacting with each other, in the game and via a chat system—orient to each other not in terms of their real-world race, class, culture, or gender (these may very well be unknown or if communicated made up as fictions). They

must orient to each other, first and foremost, through their identities as game players and players of *World of WarCraft* in particular. They can, in turn, use their real-world race, class, culture, and gender as strategic resources if and when they please, and the group can draw on the differential real-world resources of each player, but in ways that do not force anyone into pre-set racial, gender, cultural, or class categories.

This form of affiliation—what I will call cross-functional affiliation—has been argued to be crucial for the workplace teams in modern "new capitalist" workplaces, as well as in modern forms of social activism (Beck 1999; Gee 2004; Gee, Hull, & Lankshear 1996). People specialize, but integrate and share, organized around a primary affiliation to their common goals and using their cultural and social differences as strategic resources, not as barriers.

So video games, though a part of popular culture, are, like literacy and computers, sites where we can study and exercise the human mind in ways that may give us deeper insights into human thinking and learning, as well as new ways to engage learners in deep and engaged learning. While in other work (Gee 2003, 2004) I have discussed the ways in which good games recruit deep learning, here I have wanted to suggest that Games Studies could have an important contribution to make beyond the study of games as part of research on media. Indeed, the field of Games Studies could serve as an interaction point for a variety of different interests and disciplines, bringing together entertainment, art, media, cognitive science, society, technology, education, and learning. But, at the least, I have hoped to suggest that good video games are not a trivial phenomena.

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