

Running Head: Educating the Fighter

Educating the Fighter:
Buttonmashing, Seeing, Being

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Abstract

A growing number of educators are turning to games for a model of next-generation learning environments. To date, there has been a lack of critical inquiry into what kinds of learning occurs through game play, and how games get learned by their players. This paper is a critical study of *Viewtiful Joe*, a cult-classic sidescrolling 2D fighting game for the Nintendo Gamecube. Noted for its difficulty, *Viewtiful Joe* is an interesting case because as a fighting game, it embodies many of the principles fundamental to the medium, most of which are missed by educators illiterate with the medium. It shows the cognitive complexity that goes into a fighting game, as well as a cutting-edge example for how to manage that complexity. Far from button-mashing, success in *Viewtiful Joe* requires the player to learn to read the game symbol systems, understand *Viewtiful Joe*'s capacities, and see potential interchanges between them. The paper analyzes how *Viewtiful Joe* is structured to balance flow and novelty, encourage players to both develop new skills and master the ones they have. Finally, the paper examines how learning occurs through game play *as an activity system*, using player-generated FAQs to analyze how gamers represent their practice and suggest theories of expert game practice. Central to this paper is the argument that playing *Viewtiful Joe* is a *performative act*, where declarative knowledge, while clearly present for players, is secondary to players' ability to see and do in real-time.

Introduction

Imagine for a second that you are a teacher or instructional designer, charged with developing an advanced science course, covering a few hundred new terms, facts and concepts. How would you go about designing instruction that “covers” these concepts? What kinds of experiences would you want learners to have? How would you pace them and how would you know if they truly mastered what you needed them to learn? These questions, which may seem traditionally the domain of instructional technologists, are ones also faced by video game designers. As games get longer and more complex, designers have devised ways to “teach the player” to see and act in particular ways. Whereas educational technologists ask if education can happen at a distance, gamers shows you that it already does, as game designers and distributed game communities help them become better players. If you want to see the cutting edge of distance education, look no further than computer and video games.¹

And so, video and computer games are getting more and more attention from educators. Some groups, such as The Serious Games movement or The Education Arcade are starting to investigate to how to make games (or immersive digital environments, if you prefer) for learning. Inside and outside of academia, projects including Quest Atlantis, Riverworlds, Whyville, and MOOSE Crossing are trying to harness different elements from computer and video games and use them in educational software. Certainly, these endeavors are worthwhile, and a lot will be learned by further design-based research approaches (Barab & Squire, 2004). But a strategy I want to take here is to show that if there is something worth learning from in fighting games, presumably the most “mindless” of all genres, then educational technologists might benefit from looking at games more generally.

¹ Of course, computer and video games are not the only sites of computer mediated learning and collaboration at a distance. For an excellent look at English language learners learning through fan fiction sites, see Black (2004).

Along with Gee (2003) and I want to argue that there is also a lot to be learned about instructional design by studying contemporary computer games (c.f. Gee, 2004; Malone & Lepper, 1987). Commercial computer and video games have mostly been overlooked by educational technologists because: 1) they involve signs, patterns, and literacies that are foreign to non-gamers which often appear as just “flashy graphics” and “button mashing”, and 2) they privilege functional knowledge over declarative knowledge.² As such, a fighting game can be used to unpack several issues of interest to educators: what kinds of learning occur through game play, how interactive systems are designed to be learned, how complexity is managed, and upon critical reflection principles that might be derived from studying games in their own right.

Far from “button mashers,” expert fighting game players exhibit an expertise that is akin to a professional practice. Building on the work of Gee (2003) and the New London Group (1996) I argue that this expertise is a “design type knowledge” critically comprised of learning to “see” a problem space and coming to understand a game as a designed system. Given the importance of problem identification in game play, perhaps it is little wonder that this expertise largely goes undetected by non-gamers. A second, perhaps equally important problem is that fighting games are ultimately a performative game, whereby pattern recognition, detection, and quick action are valued over reflection (which typically occurs in between rounds or after losses). Contrary to earlier claims that games are flow inducing and therefore lack any critical reflection (e.g. Appelman and Goldsworthy, 1999) if we examine game playing activity, we see that many games are constructed specifically to create such reflection in action. When we look at game playing as an activity system which includes all of the fan writing, reading, analysis, and

² Situated theorists might rightly contend that mind is action (i.e. there are no static representations, only knowledge made on the fly and in situ). Therefore, any display of knowledge is in fact also a performative act, defined by both material conditions and social context, and that separating declarative from performative “knowledge” is not useful. While I also endorse this view, it is also worth drawing on this historical for the sake of argument here.

discussion it produces, it is clear that game playing usually becomes the subject of gamers' own critical and reflective analysis (Steinkuehler, in press). Although fighting games may not be the first genre of choice for instructional designers, they do have a unique capacity to help us understand how games work as a medium, what kinds of expertise they recruit from players, and how game playing communities organize around constructing and mastering game playing practice.

Methods

To make this case, I examine *Viewtiful Joe*, a side-scrolling fighting game that comes from a long line of 2D-side scrolling fighting games, and as such is part of an oft-maligned genre that most would consider “mindless button mashing.” Other analyses of other game genres (c.f. Gee, 2004a; Squire, 2004) are worthwhile and would likely provide useful insights, although these two particular properties seem to be inherent to the medium. This paper offers a critical analysis of *Viewtiful Joe*, a traditional two-dimensional single player sidescroller game. I logged roughly 40 hours of game play, and at the time of this writing, was working through the sixth level. Implicit to this paper is the assumption that until we develop more robust theories of gaming, it is absolutely essential that games researchers (and perhaps educational technologists) invest significant time in playing games. Just as one cannot imagine a literature scholar who “preferred not to read books” we can also imagine the limitations of games scholars writing about a medium without finishing a game.

Much of the paper is built on the second boss monster, Hulk Davidson. Building on a phenomenological process (c.f. Steinkuehler, Black, & Clinton, in press), I based much of this work on a close read of my own learning process while playing against Hulk Davidson. I took

several pages of notes, capturing my thoughts, feelings, and continuing awareness of the game challenges. I paid special attention to the kinds of knowledge I was developing, particularly what kinds of “declarative knowledge” statements I could make while playing.³ These notes are captured in tables 1-3.

I also examined both professional and amateur game FAQs and walk-throughs, documents which are important because they are the tools that gamers use to teach one another to play games. Game FAQs (collected at Gamefaqs.com) allow us access to gamers’ Discourse (Gee & Green, 1998), to see the values and language that gamers employ to inculcate others into their practice. Further, I observed and interviewed three players playing the game, in order to get a better sense for how others encountered the text. We might consider this approach phenomenological case study, one which is designed to generate theoretical insight into the nature of fighting games which then can be expanded and developed through further research. Given the paucity of in depth research on what constitutes gamer expertise and how gamers become expert, I believe it is essential that the field begin to use more of such studies as the bases for developing research agendas.

Understanding the Fighter

While fighting games have been important players in the gaming market for almost two decades, there has been relatively little academic analysis of their structure or properties as a semiotic system. In the late 1990s, a number of academics began deconstructing game characters, as a part of a broader move toward understanding games and popular culture, and fighting games

³ The critical reader may become concerned that this reflective metacognitive behavior is known to be a hallmark of good learning. Indeed, many games sites (i.e. Apolyton.net) recommend taking such notes as the first step to becoming a good gamer. Further amateur game sites, FAQs and walk throughs are full of other gamers creating such documents.

particularly *Mortal Kombat*, were often a target of this analysis (c.f. Cassell & Jenkins, 1998).

None of these studies investigated the properties of fighting games or their players, none deconstructed fighting games as systems, and none sought to understand how they are learned or played by players. In the absence of any pre-existing work on the fighting game, this section lays a foundation for understanding fighting games from a cognitive perspective.



Figure 1: Screenshot from *Viewtiful Joe*. Joe is on the left. Hulk Davidson is on the right.

One of the reasons that games are overlooked and misunderstood as an instructional media is that the majority of instructional designers and analysts are not literate with the medium and to the outsider, sophisticated game practices may look simply like “button mashing.” Expertise in fighting games arises through a rough progression of (yet also interaction among)

four phases: (1) learning to “read” the game as a semiotic system (2) learning, mastering, and understanding the effects of the range of possible moves, (3) understanding the higher order interactions among these rules and the emergent properties of the game system (4) and a continuous monitoring and reflecting on goals and sub-goals. To those used to studying knowledge in formal school settings, which privilege declarative knowledge, such embodied, situated gaming “knowledge” may seem foreign.⁴ Whereas schools privilege declarative knowledge, (particularly definitions or verbal representations of a “correct” answer), games privilege what it is that the player can actually do. No commercial game (save, perhaps, Full Spectrum Warrior) cares whether or not the player can articulate knowledge of the game world; instead knowledge becomes embodied in performance, although this knowledge *can* be later broken out into declarative statements.

Consider for example, *Viewtiful Joe*, a commercial game released in 2004 for the Gamecube. *Viewtiful Joe* is a side-scrolling 2 dimensional fighting game in the vein of “old school” fighters such as Street Fighter. The player progresses through levels populated with monsters, puzzles, and obstacles, using special moves to defeat enemies and solve puzzles. *Viewtiful Joe* draws heavily on this style of fighter that was popular in the early 1990s, but is known for its almost cruel level of difficulty and uncompromising dedication to the genre. Although *Viewtiful Joe* could be beat in under twenty hours, it takes most players at least three times as much to finish, if they can at all. Although perhaps not as difficult as *Ninja Gaiden* (Gee, 2004; Thompson, 2004), *Viewtiful Joe* is difficult enough that many players never finish it at all.

⁴ From a situated viewpoint, “knowledge” cannot be separated from the context of knowing, and exhibiting declarative knowledge is in a very real sense always a situated performance (i.e. writing an answer for a test within test genre constraints, delivering an answer in a class) whereby the constraints of the situation shape action.

Viewtiful Joe follows an established structure of relatively easy monsters / puzzle / mini-boss monster / easy monsters / boss monster. (See figure 3). The game is designed so that the player first confronts relatively easy monsters where she rehearses basic moves (and gains points that can be exchanged for new skills), next meets mini-bosses who require using special skills, with boss monsters who require tying together chains of special skills moves.⁵ Each of these segments is punctuated by puzzles where the player must interact with the environment to unlock passage to the next segment. *Viewtiful Joe* is unique in that many of the puzzles involve speeding up or slowing down time. For example, on one level the player must slow down time so that a droplet of water coming from a faucet grows extra large and triggers a button. In a move that is becoming increasingly common in game design, *Viewtiful Joe* also re-introduces all six major bosses in a final level, which functions as a final exam of sorts for gamers (See Figure 2 for a sample).

This rhythmic, repeating structure, which is also used in *Ninja Gaiden* (c.f. Gee, 2004) introduces difficulty, manages complexity, and enforces competency in gamers. First the player masters basic controls through fighting ordinary monsters while also quickly accumulating points for power-ups. This sequencing encourages and requires the player to develop the controls to become automatic for the player. Second, the relatively easy monsters give the player a feeling of accomplishment and the game pace a “faster” feeling as the player moves through screens relatively quickly. Third, the alternation of fast and slow sections of challenge and rehearsal establish a rhythm, much like a film maker might alternate shots or a musician would alternate verses and choruses. The easier sections are ones where the player consolidates skills and

⁵ I am indebted to Jim Gee for his enlightening conversation on the structure of *Ninja Gaiden* and its underlying rule structure, which closely parallels the structure of *Viewtiful Joe*.

receives rewards for actions; the harder boss sections are where the player experiences failure, and is forced to confront novel situations, and develops new skills.

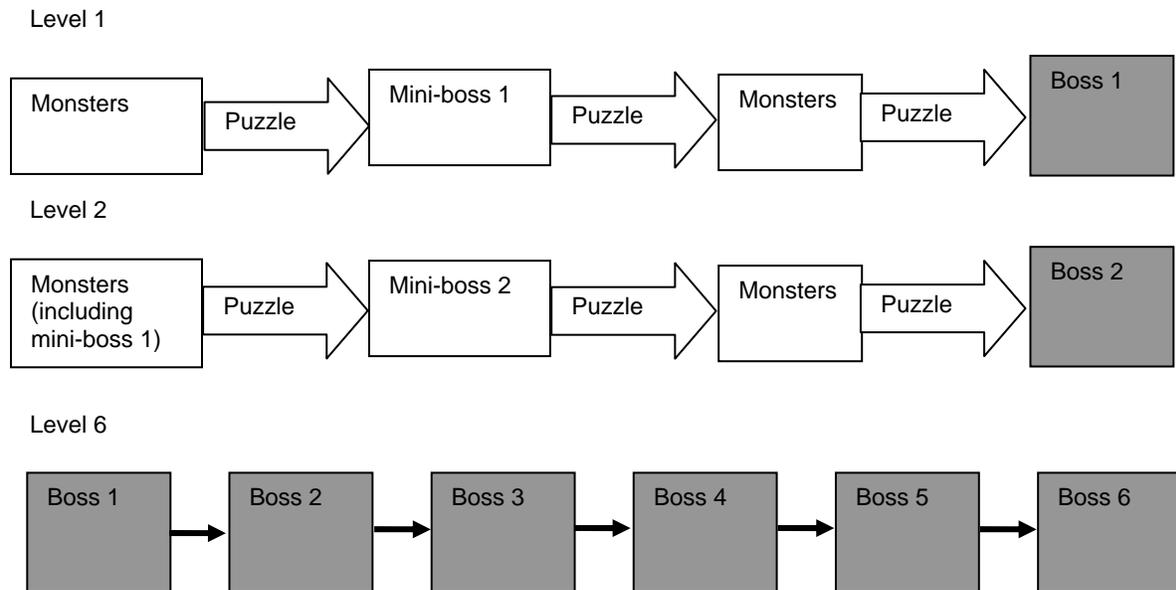


Figure 2: Basic level structure of Viewtiful Joe

Beating the Fighter

To illustrate the cognitive complexity behind a challenging fighting game and illustrate how gaming expertise gets developed, I will focus on *Hulk Davidson*, a boss monster that first appears at the end of the second level and reappears in level 6. Hulk Davidson is a “slow, arrogant rhino that hits hard, very hard, and is one of eight bosses in the game” (gamefaq.com) (See Figure 1). Defeating the Hulk Davidson takes only four or five minutes under optimal circumstances, but it is not uncommon for a player to spend a few hours learning Hulk’s patterns and developing effective strategies for beating him. An average gamer might spend from 30

minutes to two hours to beat Hulk Davidson, putting this task on par with the average class session.

It is beyond the scope of this paper to explain to non-gamers how to beat Hulk Davidson; most game FAQs (strategy guides created by fan communities posted on sites such as gamefaqs.com) use between 300-1000 words to describe this process to the already proficient player. Presenting that text here in full would be a semiotic nightmare of dangling signifiers such as “Ukemi,” words with situated meanings to players who have already spent 5-10 hours playing as Joe, but little to anyone else. These texts do however give us insight into gaming expertise, as they show how expert gamers represent their practice for other gamers and display their identities for which may give them better accolades. Here is an excerpt from an 80 page gamefaq.com:

If you stay close to him, then after 3 axe swings he will get ready to charge, lowering his head. He does not "rev up" for very long before he charges, so get out the way by mach running to the other side of the screen and jumping onto one of the platforms above. It can be a little hard to tell when he has hit the wall even if you are on one of the lower platforms, but you will get a feel for the timing of this move after you have seen it a few times, as well as the sounds he makes. If it hits you, you will get a very big feel for it - Ukemi can save you a little of that heartache. However, it is a pretty easy attack to avoid.

The process of “beating” Hulk Davidson is largely one of learning to read what is important in the game space. To do this, the player must understand Hulk’s moves, understand *Viewtiful Joe*’s potential actions, how they interact with the problem, and then realign his goals accordingly on the fly. Essentially, this is a dual space search problem, similar to hypothesis testing in science (Klahr & Dunbar, 2000).

The expert game player sees the game animations and sounds not just as “pretty graphics” but as signals to the game’s state which are used for action, such as Hulk’s “lowering

of the head” (See Table 1). The more that these states are understood, the deeper the emotional pleasure, and part of what makes games unique as a medium is the way they marry signs functioning as indexes to action – signs that carry strategic significance for the character – with emotional response.⁶ So, for example, when Hulk Davidson shouts lowers his head and shouts “Hee yum!” the skilled player might sense anticipation or excitement, knowing that Hulk is about to launch fire rockets – meaning that the player better get on his toes because the sky is about to rain fire -- while feeling visceral fear because of Hulk’s thundering chants which signal impending death.

State	Event	Consequences
Hulk launches rockets	Hulk shouts: “Hee uyum!”	Hulk will lay down his axe in .8 seconds will to create fire
	Turns and stamps his feet 2 times	He is preparing to launch rockets.
Hulk throws axe	Hulk shouts ...	Will throw axe
	Hulk shouts: “Alright enough is enough!”	The axe will return to Hulk in about 1.2 seconds.
	Hulk laughs “hahaha”	The axe has returned.
Hulk charges	Hulk Runs his paw over the ground	He is preparing to charge.
	Screams “Ahhh”	Is charging.
	Moans and twirls	Is stunned from hitting the wall.
Axe Block	Axe turns red	Axe is being destroyed.
	Says, “No, no, not in the face”	He is taking damage and not blocking your strikes with axe.
I run out of Viewtiful power	Joe says “uh-oh”	I am out of Viewtiful power. Slow-motion and mach speed are unavailable.

Table 1: Outline of basic actions, signs indexing them, and their consequences for the player.

For the player unfamiliar with the genre, these many signs and signifiers may be completely foreign. A novice might immediately hear Hulk’s roar without understanding its

⁶ This interaction between game symbols and game experience or emotion is a critical one that has led to many “red herring” arguments in game studies. Often called the ludology vs. narratology debate, this debate has focused on whether games should be understood as rule based systems, or whether the language and grammar of other, story based media (i.e. film) should be used. As this sample suggests, there is an interaction between the visual and audio iconography, the game system, and the player’s reactions that necessarily will draw on theoretical traditions from both camps.

meaning, or even that it indexes underlying actions. In other words, novices have problems not just deciphering what Hulk's roar means they should do, but even the fact that this code ought to be deciphered. In this interview, one gamer who grew up on Pong, Atari and Nintendo and still plays massively multiplayer games shares her frustration with *Viewtiful Joe*.

I didn't understand it. It was like walking into a set of internally referential codes. Unless you had played games before, I could not understand what they wanted or meant. It was like walking into a conversation on a topic that started years ago. It was spoken in a language where I didn't understand what the different symbols mean. I felt like I was being left out of an old boys' conversation. That game really irritated me. It was like everyone laughing at a joke and you don't get it. It relied way too much on prior knowledge and experience of games in the last 10 years.

What about the storyline, graphics, visual appeal?

Yes, I liked them all. That wasn't at all what bothered me. The storyline was classic comic-book hero superboy. The aesthetics were pseudo-retro, very cool. That's what made me want to play the game. What made me *not* want to play the game was actually *playing* the game. It was primarily the game play, but also its symbol system itself.

These passages reveal a problem with non-gamers analyzing games' semiotic systems and partially explains gamers' concerns with non-gamers' claims to understand games as a cognitive space. Whereas someone familiar with comic book conventions might understand *Viewtiful Joe* as a "comic book" game, understanding it as a 2D side-scrolling fighter demands knowledge of an entirely different semiotic system.

To understand how gamers communicate this expertise to one another, let us examine the text from the gamefaq to see how the author wants to coach the player through the game. First he directs the player to a basic heuristic strategy and subgoal: stay close to Hulk. This seemingly straightforward goal is actually somewhat counterintuitive when first playing the game. Hulk has a very large axe, and he likes to hit you with it or throw it at you. One would think that staying far away from Hulk and waiting for him to throw the axe, and *then* charging would be the

generally logical thing to do. So, an important first step in beating this boss is to adopt this counter-intuitive strategy of staying close to Hulk. A second step is to not swing at Hulk until he charges (attacking too early will destroy his shield, causing him to rain fire on the player). A substantial amount of game play is spent trying different strategies and picking out the appropriate sub-goal for the task. What the author has done here is analyzed the problem space and determined an optimal set of solutions, which result in a general strategy of remaining close to Hulk. An interesting secondary value is for strategies that allow the player to remain “in control” of the situation where Hulk is performs moves with relatively little randomization.

Skill	Conditions	Effect	Consequence
Axe Swing	Standard attack, used often when axe is present and Joe is close.	Creates 3 “skulls.”	If hit, you will lose 3 hearts (if you do not jump and need to use Slow motion to dodge, you lose 3 “Viewtiful” resources. Predictable attack.
Jump	When Joe is further than 3 paces	Upon landing, creates a red circle of damage	A simple attack to be avoided. Easy and predictable.
Axe Throw	If Joe is far away, or on a different platform / level.	Axe flies through air; can damage Joe.	Joe can dodge the axe, run to Hulk and get several hits in. However, the location and timing of the axe in air appear off-screen and are unpredictable, so this condition is best avoided.
Charges	After axe swings and jumps; Joe must be close.	Takes two damage.	Will do damage to Joe, but if avoided, results in Hulk hitting wall and being temporarily stunned.
Axe Block	When Joe attacks.	Negates Joe’s attack until destroyed.	Seems like an ideal condition for Joe, but because the destroyed axe allows Hulk to launch rockets, this move is to be avoided.
Launch white rockets	Regularly used.	Several rockets appear directed at Joe. When white, can be punched and redirected at Hulk. Two rockets will destroy his axe.	A risky move which can create a lot of damage, but also will destroy axe and bring about fire. Most often used if Hulk is near end of life or player is “behind” and needs to gamble.
Launch flaming rockets	When Axe is destroyed.	Fire rockets rain from the sky..	Joe catches on fire (and takes damage) or is confined to non-flaming parts of the floor, making very vulnerable to subsequent attacks. Can be dodged by standing in a place in middle of floor and fire can be extinguished by mach speed.

Table 2: Hulk Davidson’s actions, the conditions in which they occur, their effects, and their strategic consequences

Second, the passage tells the player what to attend to: Hulk’s 3 axe swings and the “lowering his head” animation. The 3 axe swings are important because when Hulk is in an axe swinging state the player is very vulnerable and attacking Hulk will only cause him to rain fire. Second, it points to the player that there are 3 and only 3 axe swings every time, which the player can learn to *predict* and avoid. Last, there are several other noises and animations happening simultaneously which the author does not point the reader to (See Table 1). All in all the problem space is quite complex (See Tables 1-4), but the author is economical with the text, which is action-oriented and lacking much declarative knowledge typical of school texts. The author does not say “Hulk Davidson has 3 swings that he uses each and every time. Using a jump move, avoid these attacks until Hulk charges. The charge will be marked by a lowering of the head...” Rather, the author assumes that the player will develop declarative knowledge through interaction with the problem and instead focus on specific, important details (3 axe swings), and leaves irrelevant ones out. Earlier moves or concepts (mach running, jumping onto platform, see Table 3) are “black boxed”. Consistent with the general argument of this paper, the FAQ focuses the player on what to attend to in the environment and how to couple this with effective action, skipping unnecessary declarative knowledge.

Normal Skills	Result	Strategic Significance
Jump	Changes vertical elevation within level	Avoid Hulk’s jumps and axe swings,
Double Jump	Changes vertical elevation to platforms	Avoid Hulk’s charges, fire, flying axe
Punch	Deals damage at closer range	Used most frequently for attacks because of speed.
Kick	Deals damage, better reach but slower to perform	Slowness means used less frequently if at all.
Dodge	Avoids attacks.	Used when axe is swung.
Voomerangs	Projectiles that can hit at a distance that cannot be blocked by Hulk’s axe. Does	Not useful for entire fight but can be used to shorten battle.

	relatively little damage	
Bombs	Can generate explosives; compounded damage with slow-motion	Will destroy axe; not used.
Ukemi	Special move to dodge attacks	Used infrequently, but if necessary
Red Hot Kick	Diving drop kick.	Needs to be above enemy and leaves Joe exposed to boss afterwards, so used infrequently.
Viewtiful Forever	Zoom while dodging to attack all enemies on screen	Does little damage and costs Viewtiful points to zoom. Not used.
Sliding kick	Slides across ground and kicks for extra damage.	Used for enemies at a distance but requires time to launch. Upsets rhythm so used infrequently.
Air Joe	flying punch-kick for damage.	Hulk is in the air in frequently so not used. Also upsets rhythm.
Special Skills	Effect	Strategic Significance
Slow motion	Slows time. Allows player to dodge “skulls”; increases damage while attacking. Consumes Viewtiful Resource.	Essential for dodging strikes, increasing damage, increasing explosion of rockets.
Speed time	Speeds time. Player gets more attacks in more quickly. Can turn Joe on fire. Consumes “Viewtiful Resource.	Useful for getting power-ups in background. Consumes Viewtiful Resource more quickly than slow motion, so used infrequently.
“Zoom”	Zooms camera closer to Joe. All damage is increased. Consumes Viewtiful Resource	Used to increase damage of all attacks.

Table 3: Viewtiful Joe’s actions, results, and strategic significance.

Third, the author identifies ambiguity in the task and the importance of repeated trials until the player himself can detect the pattern: “You will get a feel for the timing of this move after you have seen it a few times, as well as the sounds he makes.” Not unlike an expert surgeon or craftsmen, the author points out the importance of experimenting in the problem space and getting a feeling for both the timing of events and the patterns of interaction among variables. Experiencing some failure is to be expected and the hallmark of good learning. The author *does* give guidance to the novice, suggesting what features of the environment (the sound he makes) are worth attending to. However, from these ambiguities emerge a number of critical interactions, and this preceding discussion was just a part of one method to beating Hulk. The remainder of the text goes on in similar fashion to describe a method for beating Hulk. Other gamefaqs include some parts while leaving others, but most rely on similar patterns.

The problem of defeating Hulk Davidson can be solved multiple ways, so most game guides focus on *heuristics* rather than explicit procedural directions. Indeed, even sketching out the boundaries of this problem space and testing them is impractical, if not unintelligent. Table 5 is a mapping of all of the theoretically possible combinations of moves the player could make in any given problem space (keeping in mind that it is a simplification, as timing is critical variable not represented). Indeed, after a few minutes (or hours) of experimentation, players come to quickly map out the optimal states (drawing on knowledge from previous levels; it's important to note that this is the second boss, and the player has already spent a few hours with Joe).⁷ Good players develop intuitions of which combinations fit their playstyles, are optimal approaches, and are most likely to lead to reliably positive outcomes. Table 4 outlines some very typical heuristics culled from game faqs as well as my own experimentation on the level. Once the player gets the “feel” of the level – intuitively understanding the emergent patterns without having to think through it, she is approaching mastery. As a result, game playing expertise is more akin to “heuristic” knowledge than traditional “conceptual” or procedural knowledge.

Situation	Heuristic	Salient
Hulk is off-screen	Get closer to Hulk	You have few ways of doing damage and he can throw his axe which is hard to see. Hulk can also shoot white rockets which can be easily defeated, but also will initiate the red rockets which rain fire. When you are close, you can dodge attacks without breaking Hulk's shield.
When Hulks Attacks	Do Red Hot 100 exclusively	Causes 10 hits, which is good damage. Uses up VFX, but much time is spent dodging where VFX can be regenerated. Does not cause destroy axe and cause fire. As a result, use almost exclusively.
3 seconds without action or signs of Hulk Davidson	Enter slow-motion	Hulk rarely goes more than three seconds without performing a move, and the distance moves (i.e. axe throwing) usually take around 3-4 seconds to arrive. Entering slow motion has little cost and typically will allow the player to dodge Hulk.
When Hulk Charges	Jump to platform to dodge;	Hulk is stunned and takes damage; works reliably

⁷ For example, most players come to realize that the most effective attack combination for stronger monsters is the “SlowZ-RHOH” or Red Hot One Hundred, which is basically when the player simultaneously uses zoom and slow motion, punching the opponent ten times before VFX runs out.

	jump down, use Hot 100.	and is repeatable (leads back to Axe swing / jump sequence). Thus, the player wants to be in situations where Hulk is likely to charge.
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Table 4: Some Sample Heuristics of Battling Hulk Davidson

Becoming a Fighter

Fighting game expertise consists of reading the game interface (including character animations) as a semiotic system, knowing the strategic significance of possible moves, anticipating the emergent game system patterns and properties, and readjusting sub-goals on the fly. Often times, players will describe this experience as one of “flow,” where they are confronted with constant challenges, monitoring incoming data and performing at the top of their abilities (Csikszentmihalyi, 1990). At their essence, action games, but particularly fighters are *performative media*, where the primary pleasures are derived from active problem solving in situ, analogous to performance in sport, music, dance, or public speaking. This pleasure of flow feels almost rhythmic as the player becomes entrained with the game system, experiencing the avatar as an extension of the self. In single player games, this means coming to understand and appreciate the pleasures of the game system, whereby the avatar becomes an extension of the self.

Table 5: Chart depicting typical moves in Viewtiful Joe

In educational game studies, some have described a “flow paradox,” whereby a challenge is how to give players enriching experiences in game worlds, but also draw them out of the world for critical reflection (Goldsworthy and Appelman, 1999) In other words, if games are experiences of flow, where players are “in the moment” and confront series of challenges, how do we also encourage them to reflect-on-action, a practice that is central to developing expertise (Schon, 1991)? Games’ interactivity – the way that their constraints (such as the power of Hulk’s

axe) force themselves on the user demand that the player adjusts her actions “under the threat of extinction.” For game players to get past Hulk Davidson, they must learn to read Hulk and his signs, and use Joe’s skills effectively. By staggering monsters and mini-bosses with different skills and attributes, the game requires the player to master a broad range of moves to finish the game. In other words, *Viewtiful Joe* is designed to be learned by cyclically building on players’ expertise and providing new challenges, something Gee (2004) refers to as cycles of expertise. Indeed, as flow theory might predict, when games cease to be challenging or interesting to players, gamers decry them as repetitive or boring.

Examining game playing as activity systems, we see that an immense amount of reflection does indeed occur naturally during game play. In this case, we see players reading and writing FAQs, participating in message forums or talking with peers. As a player, it is impossible to conceive beating Hulk Davidson without some sort of reflection on game play in order to understand failure and monitor my progress. As interactive systems, games organize and manage failure for players allowing them to learn through interaction with the system (c.f. Squire, in press). If we look at the series of monsters, mini-bosses and bosses as a curriculum, we see that *Viewtiful Joe* is structured to ensure that the player knows how to fight closely, at a distance, and using an array of moves. *Viewtiful Joe* doesn’t allow the player to rely just on one or two effective actions; she must learn to manipulate *all* of Joe’s capacities and match them to conditions for action. Giving players a wide array of actions and requiring a deep knowledge of these various actions is partially what gamers mean when they describe a game as “deep”.

With the cognitive complexity that goes into beating the bosses in *Viewtiful Joe*, it would be easy to overlook the cognitive importance of the easier sections where the player fights weaker monsters. These sections serve cognitive functions, most importantly, allowing players to

become increasingly attuned to the moment-to-moment actions of the game system and sharpen their perception of the game “language”. As players enter the latter levels, consisting largely of monsters that were “mini-boss” monsters earlier in the game, they perfect their skills through rehearsing skills learned earlier. Indeed one of the most underappreciated parts of games – and most instructive parts for progressive educators is the way that essentially “repetitive practice” is built into the game to build mastery (Bransford, Brown, & Cocking, 2001).

But the “easier” levels also play an important function in terms of balancing the game. Players earn “Viewtiful” points for killing monsters, so if a player loses against a boss, she can go back and repeat battles to earn power-ups. These power-ups give more lives or add maximum speed, so that the game eventually (partially) becomes balanced for the player’s skill level. This ingenious little design means that if players do not yet have the skills to beat the boss, they are sent back for further “training.” Unlike most remedial instruction, which might feel pointless, the “remedial” levels of *Viewtiful Joe* are entirely functional. The player has a broader context for learning the “fundamental” skills, and is sent to practice just as she learns why she needs to practice them. If she completes the practice, she will also be rewarded with extra powers, which motivates the player go to back and retry something already completed. (In reality expert players may already have a similar amount of points, since they performed better on earlier levels and subsequently gained more bonus points).

Educating the Fighter

Even if the lessons educators can learn from fighting games are not immediately or intuitively apparent to all, hopefully I have presented a convincing argument that fighting games are much more than empty displays of gratuitous violence and fighting game players are more than mindless button mashers. Hopefully, this piece also suggests how if games are to be taken

seriously as an educational medium, how we can benefit by examining games much more closely than we have thusfar.

Gaming as performance; learning as seeing and doing. Resulting from this analysis are several arguments for what instructional designers and educational theorists can learn from games. Fighting games, at least are a performative act, which as a cognitive performance might be likened to reading sight music. As such, *seeing* is crucial. Novice players (including game critics) might look at games and see flash graphics, whereas gamers see a series of signs tied to action. This isn't to suggest that gamers ignore the aesthetic pleasures of graphics. Indeed, the interplay of the two is in part where emotional meaning resides for gamers within action in the genre. But what it does suggest is that much of the fighting game is learning what to look for in the game. Not surprisingly, most academics have develop little expertise in fighting games and therefore misunderstood playing fighting games as a cognitive activity.

“Knowing what to look for” when learning academic subjects happens in the same way. Students need to learn to “see” problems as experts, understanding what is important in a problem and what is noise (Chi, Feltovich, & Glaser, 1996). In our schools, where we largely sever students from the problems encountered in disciplines, (successful) students become adept at “reading” the signs of textbooks and story problems (c.f. Shoenfeld, 1983; Sternberg, 2003), but have little opportunity to interact with complex problems “from the world” in their naturalistic contexts. This “severing” students off from the contexts in which they happen is a core problem in our formal academic system, and something that mathematics, science, and literacy educators have lamented for years (c.f. Barab et al., 1999; Bransford, Brown and Cocking, 2001). In the traditional classroom, textbooks (and lectures) are the primary conduit of information (with discussion sections to discuss meaning). In the “game curriculum” games

produce novel and new experiences, and texts are used to help show players what to attend to, and to help synthesize action. Which model is better aligned with contemporary learning theory is for the reader to decide.

Examining the *Viewtiful Joe* gamefaqs, we get a good picture with how game-based literacies function. Declarative knowledge (i.e. how many axe swings does Hulk make while swinging a normal strike) are taken-as-given. Although the amount of “declarative knowledge” a player confronts in just one level could take several pieces of paper (see Tables 1-3), gamefaqs function as expert systems by directing the player to the proper framework for understanding the problem and the one or two facts that really matter. The gamefaq reframes the challenge as one of “staying close”, and making sure that Hulk’s shield remains intact. Even more so, they emphasize the importance of “seeing” the problem in a productive manner, pointing the player to the specific facts animations that matter. Facts are useful in the service of action and are used for interpreting strategic significance. Consistent with situated accounts of knowing and pragmatic epistemology.

Educators interested in designing games for learning need to understand that helping us “see” patterns is one of the most compelling qualities of the medium. Players quickly learn to decipher meanings in-action because it allows them to do work. Those who want to build environments based on principles derived from games might do no more than think of what cycles of perception / action are available to their students, and working to align them with desired outcomes, because if games remind us of nothing else, is that action is fundamentally situated in contexts (Young, 2004).

Those who ask “where is the learning” in games need look no further than to see the seeing and doing that players do. A popular query asked to games researchers is “where is the

content?” Hopefully, the tables full of moves, actions and consequences suggest that there is in fact content in popular games, and in fact most of it “comes for free” while playing a game. Hopefully, these sections also impressed upon the reader that gaming knowledge is a highly specialized language foreign to outsiders. Educators interested in game-based learning need to transcend their “content fetish” to see that what games do is immerse players in simulated worlds. Of course, educators from a situated perspective have long argued that most of what we do while learning is actually just these cycles of seeing and doing, perception and action, whereby we become attuned to the affordances of a situation and learn to act within it. Whether we are talking about learning to detect patterns in multiple choice tests or in 5 paragraph English papers, fundamental to learning are these reciprocal relations between seeing and doing.

Cycles of Expertise. Surely, much valuable learning comes directly out of pattern recognition, and learning-while-playing, but this is also to suggest that when taken as an activity system, game playing itself involves reflective practice. How gamers come to learn such complex activities can teach us a lot about learning and the design of learning environments. When taken as activity systems, learning through game play has implications both for psychologists studying play and for educators hoping to derive principles of instruction from games. By alternating “flow-like” sections and sections with challenges (See Figure 2), games like *Viewtiful Joe* create cycles of expertise (Gee, 2004), whereby learners both confront new challenges and consolidate new learning. Previous theoretical frameworks for games (c.f. Bowman, 1982) (wisely) drew heavily on Csikszentmihalyi Flow theory to describe how games can keep players in a state balanced between boredom and frustration. If we look at game playing over the breadth of a game, however, we see that to get good at a game requires both experiences of flow and experiences of explicit reflection. Learning occurs in both, but if we

attend to games' ability to put us in states of flow (which may be unparalleled among media) then we miss the way they are constructed to also encourage new learning. In most games, bosses serve this function of "jarring" the player from their existing mindsets to rethink whole new ways of acting.

When taken as an activity system, we see that game play involves a good deal of activity that any educator would identify as reflective. Clearly, players studying game manuals, FAQs, and cheats are engaging in literacy practices, as are those players who write them. But so are students who are *obsessed* with their games during school, sharing or downloading cheats, drawing on their patterns notebooks, or rehearsing moves in their minds. They are reflecting on their action. Of course as educators, we might prefer them pondering ideas consistent with our agendas. If we only look at game play itself, we miss half the story. Sleeping, web searching, reflecting is also part of the game play, and this is why game players can put a game down one night, and pick it up the next morning and "get it" (also similar to athletes and musicians working on difficult performances).

Educators can learn several important ideas from this. First, psychologists need to be careful to take a holistic view when conceptualizing game play. Merely attaching electrodes to a player's head will no more get the full story of the cognitive activity happening during fifteen minutes game play than will randomly hooking an academic to an electrode during an average faculty meeting or class session.⁸ Game play consists of rhythms, including periods of frustration, boredom, or rehearsal punctuated by periods of reflection. Second, we need to understand that the game itself is only one part of the activity system when designing educational software. This is not to suggest that we might not have learning environments that are entirely online, but it is to suggest that we ought to think carefully about how to leverage the naturally-

⁸ <http://www.newscientist.com/news/news.jsp?id=ns99992538>

occurring writing, reading, thinking, and socializing that goes on surrounding games to encourage deep learning. Part of what *Viewtiful Joe* does so well is balance these two needs carefully, rewarding the player when she must do “remedial” work on easier levels.

Aesthetics of being Viewtiful Joe. So far, this paper has concentrated on the cognitive dimensions of *Viewtiful Joe*, ignoring the aesthetic elements of the experiences. There are several visceral and cerebral pleasures to playing *Viewtiful Joe*, ranging from the pleasure of completing a hard boss, to the pastiche humor involved in fighting a large talking shark as a slacker-turned-superhero. But the aesthetics of *Viewtiful Joe* are absolutely critical if we want to understand how games function. Many, many times while suffering through repetitive levels or “way too difficult” bosses I found myself asking, “Why do I want to do this?” This is a question that educators frequently ask their students, and as educators there may be no more critical question we can ask of our game players who willing engage in thousands of hours of hard work every year on their games. Of course, this answer will be different for different people, but if we can begin to crack this nut, perhaps we can leverage the power of games.

In fighting games, perhaps more than any other genre, the controls system is to the player like a cane is to a blind man, a cognitive tool that functions as an extension of the self for achieving action (O). In short, even through the smallest of actions, we see big outcomes, we see our impact on the world. Compare this to most students’ experience of classrooms, where their impact on the day-to-day functioning is generally minimized. As previously mentioned, the levels are created in such a way that hard challenges are peppered with interesting puzzles and hard bosses. No gamer would suffer boring, repetitive levels every time, nor a relentless string of bosses. The game is *balanced* (and includes interesting self-balancing mechanisms, such as the power-ups) so that the game is tuned to players’ ability and tastes.

A game like *Viewtiful Joe* also creates a contract with the player, so that the game never presents a challenge where she doesn't have the skills to solve the problem. In the case of Hulk Davidson, the boss may ask the player to stretch his skills to new levels, but in all cases, she has been shown the basic moves that need to be learned. Gamers refer to this property as being "difficult" but fair. Of course, some games (especially bad ones) violate this contract. Game discussion boards are replete with criticisms of such games, and generally one can find these games stuck in bargain bins. In the good game the action is difficult, but the player always feels like she knows what she did wrong (sufficient feedback on action) and has enough data and tools to do better next time. And the player also always has a sense of progress toward that goal. *Viewtiful Joe* always gives me a sense that I'm progressing – whether it is gaining points to be traded for skills or logging time toward better understanding the boss. If even this is too much, I can always consult the answer guide (gamefaq).

While *Viewtiful Joe* is brutal in difficulty, it's also compassionate in its treatment of the player. When the player dies, the game pokes fun, using what Will Wright calls *amusing failure states* to lighten the tension of losing and remind the player that it is "just a game." After each death, an encouraging voice reminds you "Joe must go on". In part, this writing encourages the player to *become Viewtiful Joe*, the reassuring voices welcome the player to inhabit this character who will not quit despite whatever odds. One of the reasons that players will go on fighting as *Viewtiful Joe* but not finish those algebra sets is that the game plays on everyone's desire to be superhero, and every battle, every dialogue is constructed to reinforce this identity.

As educators, there is a tendency to question the need for story, characters, graphics or sound. Afterall – as educational technologists, these "fuzzy" elements are outside of our domain. Yet, it is precisely these compelling graphics, writing, sounds and character that implore Joe to

go on and are at least a part of the pleasurable experience for many players. This is not to suggest that every game must have bump map shading (indeed *Viewtiful Joe* does not). It does suggest that a Puritanical approach to learning that eschews anything pleasurable and fears that “entertaining” kids will spoil them may only further alienate our students and render schools even less relevant than they already are. An alternative might be to carefully consider the aesthetics of the school experience, something important to certain strands of thought in education (i.e. Maria Montessori) but notably left out of the Tyler model of education. As online learning continues to proliferate, perhaps there are opportunities for rethinking some of these basic assumptions about the student experience.

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