

What Kids Learn That's POSITIVE from Playing Video Games

 by: Marc Prensky "Our family engages in "mindless" video games from time to time ... but it's treated like "junk food";... It really has no "nutritional" value for our minds." – Ben Armstrong 1 Like the observer above, many parents and critics express the opinion that computer and video games are "mindless," i.e. that kids don't learn anything beyond hand-eye coordination from the thousands of hours they spend playing video games. Other critics express the opinion that video games impart only negative messages and, in the words of one, "teach our kids to kill." 2 Still others assert that while players may learn "about the game" they learn nothing "useful" about "real life." I think all of these positions are wrong. For whenever one plays a game, and whatever game one plays, learning happens constantly, whether the players want it to, and are aware of it, or not. And the players are learning "about life," which is one of the great positive consequences of all game playing. This learning takes place, continuously, and simultaneously in every game, every time one plays. One need not even pay much attention. But we do need to pay some attention in order to analyze how and what players learn. The first thing we need to pay attention to is the difference between a games' "surface" messages, as presented in its graphics, audio and text (what is commonly called its "content") and a game's underlying messages and required skills. 3 I am not an apologist for all the content in computer games, but that "surface" content is all most critics ever see of a much richer experience. The fact is that in every game, a great deal of useful learning goes on in addition to, or even despite the game's surface content, whatever that may be. This huge amount of powerful, positive learning is almost universally ignored by critics, parents and educators alike. My key point is this: While it is possible to adjust the content of video and computer games to be more in synch with social or teaching objectives – and in some instances this is already happening – a lot of positive learning goes on even with the current content. In fact, as a learning tool, computer and video games may be the most powerful mechanism ever known. 4 So, particular content aside, let us examine what "useful" things kids actually learn about "real life" from playing the video and computer games with which they spend so much of their time. I will first talk generally, and then follow up with specific examples of several best-selling games. Five "Levels of Learning" in Video Games Let me suggest five "levels" in which learning happens in video and computer games. I'll call these the "How," "What," "Why," "Where," and "When / Whether" levels of game learning. There are surely sophisticated names for them, but I dislike jargon. Because I think these five levels apply to a greater or lesser extent to all game players, at any age, I am generally not going to distinguish here between "older" kids and "younger" kids. However I think this distinction is sometimes useful, and can be broken down even further. Learning Level 1: Learning How The most explicit level of learning that takes place as one plays a video or computer game is that one is learning how to do something. As one plays one learns, gradually or quickly, the moves of the game – how the various characters, pieces, or anything else operate and what you can make them do. One learns how to drag tiles to build up a virtual city or theme park. One learns how to virtually fight and protect oneself. One learns how to train a creature and make it evolve. And of course one learns the physical manipulations of the controllers involved in doing all this. An additional, unconscious message that one learns playing a game is that one controls what happens on the screen, unlike when watching movies or TV. Even infants quickly learn this and sit fascinated, moving the mouse and watching the screen with glee for long periods. This is "real world" learning. What else do players learn about the "real world" at the How level? Pattern recognition, for one thing. Learning how to flip Tetris pieces has been shown to enhance "mental spatial processing" abilities, which can help kids on a "real world" non-verbal test. In fact, UCLA psychology Professor Patricia Marks Greenfield cites video game playing as a major cause of the rise in "non-verbal IQ" in the United States. 5 And the more a game's content "simulates" anything in the real world, the more one learns about how to do things in that world. Designers of "simulation" computer and video games pride themselves on the games' becoming ever more realistic and "lifelike." One may not be able to learn to do everything in a computer game – there are kinesthetic cues for which you need a movable platform or a real body – but what you can learn how to do is huge, and still vastly under-explored. Can you learn to find your way around a real-life oil platform, trade financial instruments, manage a theme park, or aim a gun and be stealthy? You bet you can. And gamers often choose their games because they are interested in learning these things. Whether one learns "physically" to do these things depends mainly on the game's "controller" – the device(s) for giving the game input. With the mouse and keyboard, or the typical console controller (two hands, several buttons), a player is not going to be doing "real life" physical moves – the learning is mostly mental (– Good!) But game controllers, too, can be made, and in arcades often are, extremely lifelike. The exact controls of a vehicle, the playing surfaces of a musical instrument, the remote surgery tools of a doctor, can all be used to control electronic games. On a recent visit to a Tokyo game arcade, I played video games controlled by fire hoses, dog leashes, drums, guns, bicycles, hammers, typewriter keyboards, punching bags, cars, tambourines, telephones, train controls, kayak paddles, bus controls, maracas, a pool cue and even a sushi chef's knife. In many of these games any border between game and real-life learning disappears entirely. What is more, players of computer and video games not only learn how to do things in terms of knowing the procedures, but they also practice the skills until the learning is internalized and becomes second nature. Critic Dave Grossman 6 attributes the aiming accuracy of one young mass killer to such practice, which may or may not be the case. But just because one learns how to do something, it doesn't mean one has learned when or whether one should do it. I will get to this later. The How level also extends to more transferable learning by enhancing non-game-specific skills. For example, frequent game players learn how to parallel process and multi-task, because they have to in order to succeed. They learn how to take in many sources of information at once, such as the zoomed view, the overall view, the rear view mirror in a driving or flying game, and they get better at integrating these perspectives into a single world view. They learn how to incorporate peripheral information, a skill that Professor Greenfield has shown to be enhanced by computer game-playing as well. 7 What – at the How level – do kids learn about "real life" from playing, say, Pokémon? They are actually learning – unconsciously, and without thinking of it at all in those terms – how to use and manage a large database of information! This is quite useful "real-world" learning that could easily be applied to other large bodies of information such as plants, animals or geographic data – if the context were equally compelling. How do we know the learning at the How level actually takes

place? Because we can observe it. People who practice something over and over typically learn and get better. So a player of video or computer games learns quite a bit just at this first level. But we have barely even scratched the surface. Let's dig deeper.

Learning Level 2: Learning What At the second level players learn about what to do in any particular game (and, equally important, what not to do). In other words they learn the rules. The rules of any game teach you what is possible and/or doable in that environment, and video and computer games are no exception. One finds out by playing, for example, whether the rules of a shooting game allow you to attack a player on your own team, or whether a simulation game allows you to do destructive (or self-destructive) acts. Prior to the advent of electronic games, players typically learned a game's rules before they started playing. But this isn't true for computer and video games. Their "rules" are built in to the programming, and you learn them by trial and error as you play. In fact, the very process of game-playing can be viewed as learning to understand the "rules code," according to Professor Sherry Turkle of MIT. ⁸ This aspect of games may well enhance the skill of inductive discovery, the thought process behind scientific thinking. Another important feature of electronic games is that players can typically change the built-in rules. They do this by using the easily findable codes – known, to the dismay and misunderstanding of adults, as "cheat codes" – which are passed around from player to player via magazines, the Web, and word of mouth. What these codes really do is alter the games' rules by giving players extra weapons, lives, power, etc. So game players learn that rules aren't necessarily fixed, but can be altered. Is this a "real-life" lesson? How often do we hear business books exhorting managers to "change the rules of the game." And there's much more that video games' rules teach kids about "real life." Game players are constantly comparing the rules of whatever game they are playing to what they have learned elsewhere, asking themselves "Are the rules of this game fair, accurate, etc. in terms of what I know about the world?" We know this comparison happens because games with wildly unfair or inaccurate rules get quickly identified as "bogus" and don't get played much. If the rules of Sim City, for example, allowed a player to build a modern metropolis without electricity, no one would play it. Game designers spend a lot of time "tweaking" the rules of their games to make them seem reasonable and believable. And players of all ages often argue heatedly about whether game rules reflect the "real world" in terms of physics ("What is the true trajectory of a missile in space?"), biology ("Could a person really sustain that hit and live?"), and human behavior ("Would an opponent actually do or say that?") So the rules of video and computer games force a player, no matter what his or her age, to reflect – at least subconsciously – and compare the game to what they already know about life. This is important, "real-life" learning.

Kids learn about yet another aspect of rules at the What level: "What if we break them?" Players can be heard shouting "That's not fair!" or "You can't do that!" at a very early game-playing age, and this is precisely what they are learning about. So even at these first two levels there is quite a bit of learning in video and computer games – regardless of content – a great deal of which applies readily to the "real world." But we aren't even close to seeing all the learning that goes on in these activities. "Level up," as gamers say.

Learning Level 3: Learning Why The third level is learning why. Players learn the strategy of a game as they play it. (Strategy, of course, depends on, and flows from, the rules.) Successful game players learn that sometimes you need to attack openly, and other times stealthily. In some situations you need to horde and be selfish, in others you need to cooperate. Complex moves are more effective than simple ones. Weak pieces gain power when used as a group. Keep your guard up, be prepared, and don't attack until you have the forces required. And be sure to reserve some of your resources for defense. Game strategy (and tactics) are chock full of such lessons about "real life." Like the rules, a game's strategy needs to be "life-like" for a game to make sense, even if the characters are purely imaginary. Again, players are always making their unconscious comparisons. They know from life, for example, that a hierarchy of strength among species typically depends on size. If a smaller character can defeat a bigger one, they know he'd better have something – strength, endurance, weapons, spells – that makes him more powerful. And now that single player games are fast being replaced by games that are multiplayer and networked, learning a computer or video game's "strategy" increasingly comprises "learning to deal with other people." That's about as "real-world" as you can get. Military officers have known for millennia that games can teach strategy, and the US military is far ahead of the curve in using video and computer games for its learning. The US Army, Air Force, Navy and Marines all use video and computer games for learning skills ranging from squad-based teamwork, to flying, to safety, to shooting, to submarining, and even to commanding units and multi-branch forces, at all ranks from recruit to senior officer. Although some of these games are custom-designed, many are used right off the shelf. The military now takes it for granted, for example, that its pilot candidates have mastered every military flight simulator game there is. What they expect is that these people have learned not so much "how" to fly a plane, but why – what are the strategies for fighting with one. And the same goes for submarines, tanks, and special forces. And the fact that that computer games teach strategy in sports and business is not only indisputable – it's now commonplace. Just as in the other levels, there are also deeper Why lessons that are learned from playing computer and video games. Among these important and valuable "real-life" lessons are:

- Cause and effect
- Long term winning versus short term gains
- Order from seeming chaos
- Second-order consequences
- Complex system behaviors
- Counter-intuitive results
- Using obstacles as motivation
- The value of persistence.

All this, and still two more learning levels to come! Let's move it!

Learning Level 4: Learning Where The Where level is the "context" level, as in learning about "where you are." It encompasses the huge amount of cultural and environmental learning that goes on in video and computer games. At this level players learn about the world of the game and the values it represents. They acquire cultural metaphors and images to use in describing the "real world." It's on this level that kids learn, both consciously and non-consciously, their games' "ideas." Psychologists tell us that games are an important means through which children learn to understand their world. ⁹ Video and computer games certainly reflect all the "big ideas" – or myths – of our culture. "[A player learns] to handle myth, lore, ... danger, betrayal, the fact that there's always someone bigger and more powerful than you are, and the existential inevitability that – even if you kill the bad guys and save the girl – eventually you will die," says one observer in the New York Times. ¹⁰ Players learn through their games to handle cultural relativity, and to deal with different people and roles. They learn that on one planet, in one society, in one world you can't do X, even though it may be perfectly normal in their own world. They learn their culture's ideas about achievement, and leadership. They learn, for example, that although

enemies may be hard to beat, if you persevere and learn enough, you can defeat them and win the game. Our games also reflect our society. Like most of American society, most of our computer and video games are not violent, and reflect, rather, our wide range of interests. Those critics who deplore our small percentage of violent games might reflect on the statistics showing that part of American society is violent and not particularly law abiding – the U.S. has 6 out of every 1000 of its people incarcerated, a higher percentage than anywhere on earth 11 – which has to do with a great many non-game-related factors. This, of course is not new learning to kids who watch 20,000 hours of television 12 by the time they finish college. And finally, like all other forms of expression, video and computer games reflect and interpret the particular sub-culture(s) in which they are created. Although rarely given the credit and respect they deserve, the designers and builders of computer and video games are among the most intelligent and creative people in the world, according to the highly respected scientist Danny Hillis. 13 The games they create reflect their own thoughts, fantasies, heroes and villains. Game players learn to identify with the game characters and with the cultures they inhabit. How do we know this learning happens? Again, by observation. I've watched young kids fight over who gets to be "Link," the hero of the Nintendo "Zelda" games. Link is their hero, the "person" they want to be. The qualities he possesses – courage, the desire to search, explore, overcome all enemies and get to the end to save the princess – are the ones they want to possess. Of course other players may choose Duke Nukem as their hero. For better or for worse, kids use video and computer games as a filter through which to understand their lives, just as in the past they used stories (e.g. "You be Lancelot – I'll be Mordred.") But one big difference between games and stories is that kids learn they can control their hero's life, and not just in their fantasies. One of the most effective game techniques for transmitting contextual "where" information is immersion. The more one feels one is actually "in" a culture, the more one learns from it – especially non-consciously. Recent improvements in graphics, sound, smells and "force-feedback" controllers have made video and computer games incredibly immersive, involving almost all of a player's senses. (I predict that soon there'll be special food to eat or gum to chew while playing.) Language teachers are especially aware of how much learning goes on in immersive situations. So it is not surprising that the many immersive games are causing kids to learn a lot. Learning in immersive worlds is controlled in large part by the designers' choosing to amplify certain elements, and to reduce others. 14 For example, if designers amplify the difficulty of defeating enemies (to increase the challenge or prolong the game) the player will learn that "enemies are hard to defeat." Kids take in whatever messages are in the game, including that "transgression," in a game context, is often fun. 15 And this is the importance of the fifth, and most important, learning level of all. Learning Level 5: Learning When / Whether The When / Whether level is the final and ultimate level of learning in computer and video games. This is the level where game players learn to make value-based and moral decisions – decisions about whether doing something is right or wrong. This level also includes the non-conscious emotional messages that influence these decisions. It is therefore the most controversial of the learning levels. And it is the level where players can "really" win or lose their games, in terms of learning. Learning at the When / Whether level is created not only from amplification and reduction, but also from the use of allegory and symbols. It comes from images, situations, sounds, music and other emotion-producing effects being manipulated into powerful combinations, just as in a novel or movie. Learning at this level also comes from the rewards, punishments and consequences in the game. Certainly the combination of amplification, emotional cues and rewards in certain "fighting" games leads players to learn that the answer to "Is it OK to kill this character in the game context?" is "Yes." But the important question is: Are kids also learning this about "real-life?" Do they leave these games with the message "This behavior is fun in a game," or with the message "I've got to run out and do this"? Do they generalize all their games' When / Whether messages to the actual world they live in, or do they accept and retain some messages (e.g. "fighting is tough") and reject others (e.g. "everybody is an enemy")? I would argue that – unless already severely disturbed – kids don't leave violent games with the message "I've got to run out and do this," at least not in our society. "We fantasize about a lot of things we'd never want to do in real life," points out MIT Professor of Comparative Media Henry Jenkins. 16 Just as with the rules, game players are constantly cross-checking messages in the game, automatically and non-consciously – and occasionally consciously as well – with whatever else they know or have heard for consistency. Messages that are consistent get accepted, messages that are in conflict get further examination. "We typically test media representations against our direct experience," says Jenkins, "and dismiss them when they don't ring true." 17 Perhaps in some warped culture where killing were encouraged the messages in a violent game could indeed encourage a player to kill in real life. But in a culture like ours, where the message "do not kill" is profoundly a part of our cultural context, people – even kids – think more than twice about whether to do it in real life, unless they are already severely disturbed. We must, of course, watch out for our very youngest children, who have the most trouble sorting and discriminating. Still, as my game designer friend Noah Falstein reminds us, "We have to be careful about buying the rhetoric of people who blame the game Doom for Columbine and ignore the fact that those guys were building pipe bombs in their garage and their parents never noticed." 18 There will always be kids who do not get society's message from their parents or elsewhere. But they are the exception. The comparison of the When / Whether learning in the game with the When / Whether learning in the rest of life is the reason that shooting games can teach kids how to aim without their learning to kill. To learn the latter, a player would have to have to overcome an awful lot of disconnects with the messages he or she hears in the rest of life. It is certainly in our public interest to keep such counter-messages as frequent and strong as possible. But although some critics argue that there should always be "bad" consequences for "bad" acts in games, most players would tell you that if games turned purely into moral lessons they would no longer be fun. Much of the appeal of many games, as well as other forms of entertainment, is "transgression in safety." Yet even this contains learning. "In recent years, [games] have tried to offer more morally complex and emotionally demanding representation of aggression, loss and suffering," says Jenkins. 19 Those are important "real-life" emotions that all kids need to learn more about. Three Examples It is now time – having up till now described the learning in computer and video games for the most part theoretically – that we turn to some actual best-selling games to see what our kids are learning from playing them. I will look at three examples: One with content that might in some sense be considered "educational," one that is clearly "just a game" (although not a particularly violent

one) and one that many find objectionable. Two are computer games. The third started as a video game, and is now available on the PC.¹

1. Roller Coaster Tycoon Our first example is Roller Coaster Tycoon, a best-selling computer game for several years, with over 4 million copies sold. Although you can play this game in many ways, your basic goal is create a successful theme park, beginning with a fixed amount of money. Depending on the rides you build, how you maintain them, and the admission prices and amenities you choose, virtual people either show up or they don't, and you either make or lose money. You can even see what your individual guests are thinking. Here are some of the things kids learn from this game:

- How – At the “surface content” How level,** players learn how to build and run an enterprise – how to acquire land, build rides, deploy workers etc.
- At another How level,** players learn how to use an economic simulation with a graphic interface.
- What – At the What level,** players learn about the constraints on what you can and can't do in business. You can't, for example, build on land you don't own (or control). You can't expect people to go on broken rides. You need to allow your customers to periodically eat and go to the bathroom.
- Why – At the Why, or strategy level,** players learn about the tradeoffs that need to be made in order to run a business successfully. For example, they learn that a clean park in working order attracts guests, but maintenance costs money. They learn that if prices go up, fewer people will come. At this Why level, Roller Coaster Tycoon basically teaches the “real-life” skills of resource management and tradeoff analysis.
- Where – At the Where level,** players learn about a business environment – what customers think, how they behave, how to make them happy or mad.
- When / Whether – And at the When/Whether level,** a player quickly learns that customer behavior depends on the owner's choices. If, as the owner, you raise prices, cut corners, build few bathrooms and don't repair your rides, your short-term profits may spike, but your customers will be unhappy and your profits will soon vanish. These lessons are among those that some of our “real-life” executives might wish they had learned earlier!

Roller Coaster Tycoon, along several other off-the-shelf games, has recently been employed as a teaching tool in school classrooms in England. x They discovered, among other things, that one of the most important things children learn from the games is how to work together in groups. Roller Coaster Tycoon does not claim to be a learning tool – it's a commercial game. But the amount of learning in it is huge. And although clearly not all games are as “educational” and “real-life” as Roller Coaster Tycoon, it is possible to make games that are even more so, sometimes without even explicitly trying.

2. The Sims As an example, let's take The Sims, perhaps the most popular computer game ever made, with total sales of over 17 million units. The Sims is a “living dollhouse” game, in which a player sets up a house, and populates it with people who talk, grow, work, buy, date, mate, have children, and even go to the bathroom, all according to the player's instructions (and a great deal of built in artificial intelligence programming). The Sims is, in the words of Will Wright, the game's designer, a huge “possibility space” in which a player can construct an unlimited variety of possible scenarios, from happy nuclear families, to alternative life styles, to misfits who burn down the neighborhood. So what do players learn from playing the game?

- How – At the content How level** they learn how to behave in a consumer society. 20 They learn an awful lot about “stuff,” including how to create it, choose it, and buy and sell it, both figuratively within the game, and literally on eBay. At another How level, though, they learn how to control and manipulate a complex, people-based simulation; how to control characters, and how to design and create the graphics for houses, objects and even people – the tools to do this are included, and are a big part of the game's appeal.
- What – At the What level,** players learn that there are some situations that are very open, with relatively few rules and constraints, which allow players to go in almost any direction they choose, from building a successful family and career to burning down the house and neighborhood. This is not dissimilar to the “real-life” United States of America.
- Why – At the Why level,** players learn that life is a kind of story that unfolds depending on the choices you make. They learn this by exploring many of the strategies and paths one can take in the game, from clean and successful to dirty and tawdry. And as they learn, there is a site on the web where they can post their stories and learning for all to see.
- Where – At the Where level,** Sims players learn about 21st century America. This learning comes not only through the vast quantities of “stuff” available both in the game and online, but also through the wide range of activities Sims can engage in, and the wide range of professions available in the game, from military officer to aroma therapist. Players learn about what it takes to build a life and lifestyle – from making friends, to partying and dating, to having kids. They learn how many kinds of lives are potentially available for them to create, both good and bad.
- When / Whether – Finally,** at the When / Whether level players learn about the consequences of their life choices, from the small choices (e.g. not going to the bathroom) to the large ones (e.g. not working hard). It is interesting in light of all the criticisms we hear about computer and video games, that the most popular computer game of all time – The Sims – is one that directly and explicitly helps you learn “about life.” The Sims has extended the normal fantasy play of children and adults to a new level of explicitness and participation, and has created a “real-life” community of millions for sharing.

3. Grand Theft Auto III Explicit fantasy play is the also the theme of our final example, Grand Theft Auto III. GTA3 is one of the games the critics love to hate, citing, invariably, its options for gratuitous killing, violence and sex with prostitutes. Even though the game's makers provide strongly worded reminders about its being an “adult” game and it carries a “Mature” rating, GTA3, with over 6.5 million units sold, is extremely popular, and it's fair to say that – not unlike R-rated movies – it winds up in front of a lot of kids. So what do they learn? [Important note: I am NOT recommending kids play this game, but only commenting on what they learn if they do.]

- How – At the How level,** despite GTA3's “objectionable” content, players learn little, if anything that they don't already know from movies and television. As one writer puts it “GTA3 is to games as Pulp Fiction is to films.” 21 Kids already know there are people in the world who live by breaking society's rules; the game is about how to survive and thrive in their world. Because the game's characters are rule breakers – and players typically are not – their stories are often fascinating and engaging to players, and it's fun for players to play at being one. In this sense, GTA3 is the interactive version of The Godfather and The Warriors. Instead of being a business simulator or a lifestyle simulator, GTA3 is a “crime simulator.” 22
- But at another How level,** GTA3 players learn to move around and operate in one of the most highly complex 3-D simulations ever made, a more real-looking simulation world than even The Sims.
- What – At the What level,** GTA3 players are learning just how flexible a game's rules can be. As in The Sims – and as in more and more computer and video games – there are no “required” goals in GTA3. Instead, you go around the game's world making

choices and playing out the results of those choices. Some things move you along more than others, but the choice of what to do is up to you. I'd call this "real world" learning. Why – At the Why level, players learn to strategize, basing their choices on expected results and consequences. If you do enough bad things you'll acquire a reputation and die sooner. But if you instead steal ambulances and fire trucks and use them to save lives, you'll live longer (though you may not want to choose that strategy). Where – At the Where level, players learn many accurate details of the nasty world of ex-cons, the Mafia, and the results of violence – and most of these are not pretty. When / Whether – And finally, at the When / Whether level, since the betrayed bank robber one plays has just been unexpectedly sprung from jail, players learn that people whose life has gone wrong still have choices to make and options still open to them, which they can use for better or for worse. In making these choices players also learn that, as a game player, it's healthy (not to mention fun) to get one's aggressive impulses out into the open from time to time. "We depend on storytelling media [such as games] to help us sort through our conflicting values and mixed feelings about aggression and bring our impulses under control," says Professor Jenkins. 23 And GTA3 players learn as well there are consequences for negative choices. If you're really bad, the cops (and helicopter Swat Teams, the FBI, and even the Army) eventually do show up, and while you may get to battle spectacularly, they always get you in the end. Positive or Negative? I hope it is now becoming clear that what kids learn from playing video and computer games goes way beyond "mindless" hand-eye coordination. That a tremendous amount of learning takes place when kids play these games should no longer cause very much disagreement. But there is a great deal of disagreement about whether this learning is positive or negative, and about what the effect of the learning in existing computer and video games is on game players – especially kids – and on the society they live in. Those who think that the learning in video and computer games is negative have the following concerns: At the How level, these critics are concerned that kids are learning how to do "inappropriate" things. At the What level, they are concerned that the rules of the video games are too restrictive, not giving kids enough room for their imaginations. At the Why level, they are concerned that the strategies for playing and winning many games contain too much violence, too many "cheats," and other "undesirable" elements. At the Where level, they are concerned that kids are being socialized to be loners, misogynists, and social deviants. And at the When/Whether level, the critics are concerned that our kids are learning to be "amoral killers." 24 These concerns are nowhere near as valid as the alarmists claim. Consider the following: #1607; There is an extremely wide range of appropriate things to do in computer and video games. #1607; Most video and computer games are not violent – the games that draw the critics' attention because of their violence (those rated "Mature") represent less than ten percent of the total bought and played. And even those games are, in the opinion of many psychologists, emotional defusers, rather than inciters. 25 #1607; Each day games are becoming less restrictive and more open to players' imaginations and personalities, Game designers are adding many more open-ended elements that kids can use to exercise their imaginations and tell their own stories. #1607; Most newer games have multiple winning strategies to choose from, including cooperation. #1607; Video and computer games are quickly reclaiming the intense social connection that games have always had, as network technology continues to proliferate. #1607; Electronic games are becoming more open to girls, and girls are becoming more open to these games as well. #1607; Many positive messages exist, both inside and outside the games, and more can be created, to counter any "violence is the answer" idea that a small number of games may impart to an even smaller number of already troubled players. The problem with the nay-sayers' arguments is that they generally ignore all the underlying positive learning in video and computer games. Although clearly some games do require age-appropriate guidance – which is why we have ratings – on balance, the positive learning from computer and video games far overwhelms any negative elements. By focusing only on the negatives, the critics subtly and sadly distract our attention from the really important and useful question: How can we use the incredible engagement of computer and video games to help kids learn more things that we do want them to know? I am firmly convinced that as we learn to supplement the content of today's games with content of educational significance – and still keep the games fun – computer and video games will become the greatest learning tool we have ever known. The tricky part, of course, is blending the games' engagement with the schools' curriculum, a task that many, from George Lucas, to Microsoft and MIT, to the Lightspan Partnership are working hard at. Of course, as we do so, adults will always need to help young players distinguish their games from reality. Sony exhorts kids in its ads to "Live In Your World. Play In Ours." But as reality and simulation continue to blur to an increasing extent in contemporary life (and games are not the only place where this is happening), we can all use help keeping them straight. What Parents Should Worry About Still, there is absolutely no need for parents to be as worried about the learning that goes on in their kids' video and computer games as some critics suggest. In fact, in many ways parents should be happy their kids are playing. The amount of learning the kids are getting is huge, and the overwhelming bulk of it is positive. What parents should be far more concerned about is the relatively pitiful amount of learning going on in our classrooms. As the statistics clearly show, this is a worldwide disgrace. And it's certainly not the fault of the kids. Children instinctively want to learn, and are drawn to the places where learning actually happens – such as their video and computer games. In fact, game-playing kids learn so much it often intimidates their teachers. As we come to better understand 26 and be less afraid of the incredible hold computer and video games have on our children, and harness it instead to the curriculum and other positive uses, computer and video games will, I predict, be our salvation in the learning area. In 1984, Bruce Springsteen sang "We learned more from a three minute record than we ever learned in school." 27 Most of today's kids learn far more from their 30 to 100 hour video and computer games than they do in school, generally without even realizing it. True, right now most of this learning is not about the curriculum. But if we invest the money and effort to create games that do have specific curricular elements – but that remain fun enough so that kids still want to play them – our kids can and will learn incredibly more – and will – believe it or not – thank us. The "getting kids to learn" problem isn't new, but our video game opportunity is. In the words of George Lucas, who started Lucas Learning in order to blend his Star Wars video games with curricular activities, these "new kinds of learning experiences for young people...offer an alternative to some of the traditional approaches that did not work for me." 28 Notes 1. In an online discussion at <http://lists.debian.org/debian-jr/2000/debian-jr-200008/msg00001.html> 2. Dave Grossman and Gloria Di Gaetano, Stop Teaching Our

Kids To Kill, Crown, 1999. 3. Psychology Professor Patricia Marks Greenfield of UCLA was one of the first to point out this distinction, in the works cited below.4. Marc Prensky, *Digital Game-Based Learning*, McGraw-Hill, 20015. Patricia Marks Greenfield, "The Cultural Evolution of IQ" in U. Nesser (ed.), *The Rising Curve: Long Term Gains in IQ and Related Measures* (pp. 81-123), Washington DC, American Psychological Association.6. Grossman and Di Gaitano, op. cit.7. Patricia Marks Greenfield, *Mind And Media : The Effects Of Television, Video Games And Computers*, Harvard University Press, 1984.8. Sherry Turkle, *Life On The Screen*, Simon & Schuster, 1995.9. Kathleen Fackelmann, "Very Young Kids Absorb Tragedy" USA TODAY, November 14, 200110. Peter Applebome, "Two Words Behind The Massacre," New York Times May 2, 1999, quoting Johathan Katz.11. Incarceration statistics from : <http://www.als.uidaho.edu/scooke/onepercent/prison.htm>12. Estimate of TV hours by Marc Prensky. "Television in the Home, 1998: Third Annual Survey of Parent and Children, Annenburg Policy Center, June 22, 1998, gives the number of TV hours watched per day as 2.55. M. Chen, in the *Smart Parents Guide to Kid's TV*, (1994) gives the number as 4 hours/day. Taking the average, 3.3 hrs/day x 365 days x 18 years = 21,681.13. Danny Hillis, Address to the Computer Game Developers Conference, March, 2000.14. Eugene F. Provenzo, Jr., *Video Kids*, Harvard University Press, 1991.15. The term "transgression" used in this sense, has been popularized by Eric Zimmerman, a noted and highly original game designer. 16. Henry Jenkins, "Ambushed on Donahue," online at [Salon.com](http://www.salon.com) at http://www.salon.com/tech/feature/2002/08/20/jenkins_on_donahue/index.html August 20, 200217. Ibid.18. Noah Falstein of The Inspiracy, is the designer of numerous computer games, including several for Lucas Arts.19. Jenkins, op. cit.20. JC Herz, "Learning From The Sims," *The Industry Standard*, March 26, 2001 21. Jenkins, op. cit.22. Frank "Candarelli" Multari, online review of GTA3 at <http://www.gta3.com/index.php?zone=review1> 23. Ibid.24. Grossman and Di Gaitano, op. cit.25. Among those psychologists who believe that exposure to violent entertainment is more likely to defuse than to stimulate aggression is Seymour Feshbach, cited in a study on Violence and the Media at www.freedomforum.org/publications/first/violenceandmedia/violenceandthemedial.pdf. The report says that "different schools of psychology hold widely differing views about what causes humans to be violent and aggressive."26. Marc Prensky, "Why Games Engage Us" in *Digital Game-Based Learning*, op.cit. and online at www.marcprensky.com/writing/default.asp 27. Bruce Springsteen, "No Surrender," *Born in the USA*, Sony/Columbia 1984.28. "George Lucas' Vision," online at www.lucaslearning.com/aboutus/about_george.htm

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