

What Kids Learn from Video Games

Five "Learning Levels" and their Implications for Public Policy

By Marc Prensky

There is much video game-bashing going on by adults these days, along with many calls for public policy action. The two most oft-heard criticisms of video game by adults are that "video games are too violent – our kids are learning to kill," and that "video games are mindless – our kids don't learn anything by playing them." It's interesting to note that these are actually mutually exclusive. For if kids don't learn anything from video games, why would anyone care about the violence?

For reasons I will give in a bit, I disagree that our kids are learning to kill as a result of video games. But I strongly agree that video games cause kids to learn. In fact I think that video and computer games are the *greatest devices for learning ever invented – by far*. They are – at their best – as good or better at producing learning than all but our greatest teachers (although this may be hard for many old-timers to accept.)

"We learn more from a three-minute record, baby, than we ever learned in school," says Bruce Springsteen. We learn much, much more from a 100+ hour video or computer game.

And, with attention and creativity, I believe we can make our games far, far better, *putting their power to highly useful social purposes without sacrificing any of their attraction to the players*.

Let's talk about how to make this happen.

What do Kids Learn, Anyway?

In a recent article entitled "Video Games and the Attack on America" I wrote:

"[Games make kids learn] on a scale that dwarfs anything ever seen (think Pokemon)."...

"[Kids who play video games] are learning that "enemies" are hard to defeat...that fighting is ugly,

and dangerous... that as soon as you beat one enemy, there is another, harder one on a higher level, and that at the top sits a really big, really evil "boss" who requires all the skills you can master to conquer. ...

"[On the positive side kids are learning] that if you persevere and learn enough, you *can* defeat all the enemies and beat the game. That unlike the movies, the outcome depends on *you* and not on some writer – on *your* choices, *your* skill, *your* persistence. That information from your friends and other sources can help you defeat the enemies more quickly. That while there is always another game and another struggle, it is something to look forward to – it further tests your mettle and your skill."

In response to this, a respected friend and fellow game designer wrote me:

"I think you may overstate the case to suggest that video games teach kids about good and evil, or even that evil is hard but possible to overcome. I think kids are better at making the distinction between games and reality than that - they learn that it's that way in games, but I don't think they generalize it to real life. Of course I believe in the power of games to teach and influence, but I think we have to be careful about buying into the rhetoric of people who blame Doom for Columbine and ignore the fact that those guys were building pipe bombs in their garage and their parents never noticed. I think that the large majority of kids understand that games are not real life, *and are not particularly influenced by them* (italics mine). Now, if they saw a Squirtle on the street and they happened to have a Pokeball they'd know what to do with it - but for better or worse, *I don't think the game really teaches them about life* (again, italics mine) as you suggest."

While my friend makes several valid and important points, I think that in the area of games' influence and teachings about life, he is *far, far* off the mark.

For if video games don't "really" teach kids about life, then neither do books, movies, stories, fairy tales, parables, or sports. Aesop, the brothers Grimm, and Will Wright (designer of Sim City and The Sims) are all failures, and so is Marshall McLuhan, whom my same friend is fond of quoting as saying: "Anyone who makes a distinction between games and learning doesn't know the first thing about either." In fact it would mean that nature – in the guise of the cats and other animals that play hunting and fighting games – is wrong, not to mention all the sports coaches, psychiatrists and language arts teachers of the world!

For it seems to me that *whenever* one plays a game – video, computer or otherwise – and *whatever* game one plays, learning, not just about that game but "about life," happens constantly, whether the players want it to and are aware of it, or not. In fact, learning "about life" is one of the great pleasures and positive consequences of all game playing. And it happens *every time*, in *every game*, continuously and simultaneously, on several levels. One need not even be paying much conscious attention.

Five "Levels of Learning" in Games

I'd like in this article to focus on five of the "levels" on which learning happens in video and computer games. This is not intended to be an exhaustive list – I'm sure there are several others, and it's clear that they intertwine.

For purposes of this article I'll call these five levels the "**How**," "**What**," "**Why**," "**Where**," and "**When**" levels of learning. While there are no doubt much more sophisticated academic names for them, I'd like to avoid jargon as much as possible and keep this in terms that even the kids can understand, since it is really about them.

(NB: Many observers distinguish between "older" kids and "younger" kids. I think this distinction is useful and often necessary, and can be usefully broken down even further. But I am going to ignore it here, except in one or two specific instances. This is because I think these five levels apply, to a greater or lesser extent, to *all* game players, at *any* age. I leave it to others to explore the nuances.)

In addition, it's important to note that there is a lot of emotional baggage and lack of knowledge associated with critiques of video games. Were I to write an article on "What Kids Learn From Books" most adults would quickly distinguish in their minds many kinds of books, from classics, to non-fiction, to porn, and many kinds of learning that come from them. But most adults are ignorant of the games their kids are playing – not because they want to be, but because they are "Digital Immigrants" from a very different culture than their "Digital Native" children.)

So let us look more closely at what kids actually learn about "real life" from the video and computer games with which they spend so many hours (10,000 by the time they finish college according to my calculation.)

Learning Level 1: Learning How

The most explicit level of learning that takes place as you play a video or computer game is that you are learning **how** to do something. As you play you learn, gradually or quickly, the **moves** of the game. You learn how the various characters, pieces, or anything else, can move, and what you can make them do. You learn how to drag tiles to build up a virtual city or theme park. You learn how to protect yourself in a fighting game and what weapons to use to defeat your enemies. You learn how to train a Pokemon creature and make it evolve and fight. You learn, as my friend observes, how to use tools, such as a pokeball on a squirtle. And of course you learn the physical manipulations of the controllers involved in doing all this.

An additional, non-conscious message that you learn playing a game, of course, is that in video and computer games **you have** control of what goes on on the screen, unlike when you are watching movies or TV. Even infants learn this and are fascinated by this ability to control the screen. I have watched many children 3-and-under sit moving the mouse and watching the screen with glee for long periods. This is, it seems to me, "real world" learning.

What else do kids learn about the "real world" at the *How* level? It depends. If the games are pure fantasy, then the explicit "how to do it" moves, such as using a pokeball, as my friend notes, may be pretty useless in the schoolyard or workplace. But their learning about how to flip Tetris pieces may enhance their mental spatial processing abilities, which could help them on a "real world" non-verbal test. (Patricia Greenfield)

And the more a game "simulates" anything in the real world, the more one learns about how to do things in that world. One of the earliest computer games I played ("Life and Death") was about doing an appendectomy – in great detail, from diagnosis to surgery. Did playing the game make me a real-life surgeon? Dream on, Marc.... But at the time when I was playing the game daily, had I been called upon to do an emergency appendectomy in an airplane, I like to think I would have acquitted myself reasonably well. The game was designed by a surgeon (and, of course, I had caused a lot of toe-tagged virtual patients as I learned.)

Simulation games and their designers pride themselves on the games' becoming ever more realistic and "lifelike." One may not be able to learn to do everything (there are kinesthetic cues, for example that you need to learn in a real airplane simulator or on a real horse), but what you *can* learn how to do is huge, and still vastly under-explored. Can games teach you to monitor and use the controls and gauges of a real life airplane or train? Can a game show you your way around a real-life oil platform? Can you learn via a game the mechanics of trading financial instruments? Can you learn to manage a theme park? Can you learn to aim a gun and be stealthy? You bet you can. And gamers often choose their games because they are interested in learning these things.

Typically in games, players not only "learn" how to do these things in terms of knowing the procedures, but they also *practice* them over and over, until the learning is internalized and becomes second nature. One video game critic (Lt. Col. Dave Grossman) highlights the aiming accuracy of a young mass killer, which he attributes to such practice. This may, in fact, be the case. But let's also remember that although one learns *how* to do something, it doesn't mean one has learned *when or whether one should* do it. I will deal much more with this later.

The "How" level also extends deeper, to more transferable learning, by enhancing ***non-game-specific skills***. Heavy video and computer game players learn *how* to parallel process and multi-task because they have to in order to succeed at the game. 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. Through practice in the game, they get better at integrating these perspectives simultaneously into a single world view. They learn how to incorporate peripheral information, a skill that has been shown to be enhanced by computer game-playing as well. (Patricia Greenfield)

So, returning for a minute to Pokemon, we can ask "What – at the "How" level – does a kid learn about "real life" from playing the game?" Principally, I think, he or she learns not how to use a pokeball, but rather *how to use and manage a large database of information* (he learns this, of course, non-consciously, and without thinking of it at all in those terms.) This is a quite socially useful type of learning that could easily be applied to other large bodies of information such as to real plants and animals, geographic or sports data (for those who consider that useful) – if the context were as compelling as Pokemon!

Finally, before we leave this first level, we should ask: "How do we *know* the learning at the "How level actually takes place?" This one is easy – we can observe it. People who practice something over and over learn it and get better. This is common knowledge.

So at just the *How* level, the video or computer game player learns quite a bit. But we have barely even scratched the surface of the learning that goes on in video and computer games. Let's dig deeper.

Learning Level 2: Learning What

At the next level of learning in video and computer games, 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 the game environment, and video and computer games are no exception. The very process of game-playing can be viewed as learning to understand the "rules code" (Sherry Turkle).

Before computer and video games, players typically learned the rules of a game *before* they started playing it. However this is typically different in electronic games. In video and computer games the rules are built in to the programming, and you learn them as you play. Players learn the rules by trial and error – by playing and finding out what they can and can't do, rather than by reading the list ahead of time. You find out by playing, for example whether a shooting game allow you to attack someone on your own team, or whether a simulation game allows you to do destructive (or self-destructive) acts.

Some critics find video and computer rules "restrictive," and therefore limiting to a child's learning. But one interesting feature of many video and computer games is that you can frequently *change* the built-in rules, by using the easily findable codes (known, to the dismay and misunderstanding of adults, as "cheat codes") which are part of most games and passed around from player to player via the web, magazines and word of mouth. These codes give you extra weapons, lives, power, etc. that let you essentially alter the rules. In *Age of Empires*, for example entering the code "*how do you turn this on*" gives you a fleet of heavily armed automobiles in the middle of your medieval battle, with predictable effect.

So game players learn rules aren't necessarily fixed, but can be changed, and that games provide different challenges with different resources at your command.

What do a video game's rules teach kids about "real life?" Plenty! Above all, I think, they make a player, no matter what his or her age, reflect – at least subconsciously – and compare the game to what they already know about life. Players are *constantly* comparing the rules of whatever game they are playing to what they have learned elsewhere about life. When there is a conflict, players ask themselves "Is this a dumb rule," or "Is it a rule that is good for the game even though it is dumb one in life?" Example: Players in games "die" and come back to life. Now no one above a certain tender age (an age that *is* important, of course) thinks this happens in "real life." I think this is what my friend means when he says "they learn that it's that way in games, but I don't think they generalize it to real life." Game players constantly ask themselves "Are the rules of this game fair, accurate, etc. in terms of what I know?" And the more the rules do reflect the real world kids know, the more they believe the games reflect reality.

How do we *know* this comparison happens? Because games with wildly unfair or inaccurate rules get quickly identified by players as "bogus" and don't get played very much. If the rules were that small, under-equipped forces could defeat superior forces (except by stealth, guerilla, or other special tactics) no one would accept them. If *Sim City* allowed you to build a modern city without electricity, no one would care. Game designers spend a lot of time "tweaking" the rules of games to make them seem reasonable – this is known as "balancing" a game.

Gamers of all ages often argue heatedly whether about game rules reflect the "real world." This happens in terms of physics (e.g. "What is the true trajectory of a missile in space?"); it happens in terms of the reality the game is modeling ("Could a person really sustain that hit and live?"); and it happens in terms of human behavior ("Would an opponent actually do or say that?") among other things. And the rules of games certainly get applied to "real

life." This is why the Duke Of Wellington could say that "The battle of Waterloo was won on the playing fields of Eton."

Some refer to the direct examination of game rules as "metagaming." Metagaming is about asking "What rule changes would make the game better?" and then implementing those changes. In video and computer games designers and players are constantly trying to tweak the rules to make the games better.

Before we leave the "*What*" level, there is also some learning that goes on in video and computer games about rules in general, i.e. "What if we break them?" Kids learn to shout "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, we've seen a great variety of learning in video and computer games, much of which applies readily to the "real world." But still, we are not even *close* to all the learning that goes on in these activities.

Learning Level 3: Learning Why

A third level of learning in video and computer games is learning *why* you do something. Players learn the **strategy** of a game as they play it (which, of course, depends on, and flows from, the rules).

Successful players learn that in some games and situations to succeed you need to attack openly, and in others stealthily. They learn in some games you need to horde and be selfish, in others you need to cooperate, and that in some there are multiple winning strategies. They learn that small pieces have more power when used as a group. They learn that "combination moves" are more effective than single moves. They learn that buying everything in sight, or building as fast as you can, works (or doesn't). They learn that reserving some of your resources for defense is important. They learn that some bosses need to be attacked from the rear, or in groups. They learn that hitting the head or the torso with a weapon is a more effective way to hurt someone than hitting an arm or leg. They learn that eyes and underbellies may be vulnerable. They learn to keep their guard up, be prepared, and not attack until they have the right strength.

These, it seems to me, are all "real-life" lessons. Game strategy (and tactics) are full of such learning about "real life" Like the rules, the strategy in games needs to be "life-like" for the games to make sense, even if the characters, like Pokemons, 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 has to have something – strength, endurance, weapons, spells – that makes him more powerful.

The military has known for millennia that military strategy can be learned by playing games, and they have adapted and adopted video and computer games to their own learning needs far ahead of the curve. To help their people learn better and faster they use a combination of existing off-the-shelf games, specially modified games, and games specifically commissioned from game-makers. All branches of the US Military use video and computer games for learning at all levels from recruit to commander. Military video and computer games are used to learn squad-based teamwork, flying, safety, shooting, submarining, commanding multi-branch forces, and

countless other things. The Air Force now just takes it for granted that its pilot candidates have played every military flight simulator game there is. They expect these people to have learned not so much "how" to fly a plane, but what are the *strategies* for fighting in one.

That sports and business strategy and tactics can be learned by playing video and computer games hopefully needs little or no explanation. It is now commonplace.

Just as in the other levels, there are deeper "*Why*" lessons that get learned from video and computer games as well. 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.*
- *The value of persistence.*

All this, and still there are two more learning levels to come! Let's move on.

Learning Level 4: Learning Where

The "where" level is the "context" level, as in learning about "where you are." This level encompasses the huge amount of ***cultural*** learning that goes on in video and computer games. Psychologists tell us that games are one means through which kids learn to understand their world. At the "*Where*" level the player learns about the world of the game and the values it represents. He or she acquires cultural metaphors and images to use in describing the "real world." It's on this level that kids learn, both consciously and non-consciously as they play, their games' "ideas."

Video and computer games particularly reflect the "big ideas" – or "myths" – of our culture: Right versus wrong; good versus evil; victory versus defeat; skill versus luck; the desire to help; the striving to rise. "[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." (Donald Katz). Players learn to handle cultural relativity, and deal with different peoples, races, 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.

It's at the "*Where*" level that game playing kids learn that "enemies are hard to defeat, but that if you persevere and learn enough, you *can* defeat all the enemies and beat the game."

Many thinkers, from Plato to McLuhan, have described our games as a reflection of our society. Those who deplore violent games, for example, should look at the statistics that show that our society – despite what we might *like* to think – is a pretty violent and not especially law abiding one, with a higher percentage of its population incarcerated than anywhere on earth. Video and computer games also reflect and interpret the culture(s) and sub-culture (s) in which they are created. They reflect the ideas and fantasies of their makers – *their* heroes, *their* villains. And the players learn this. They learn to identify with the game characters, and with the cultures they inhabit.

Do kids playing video games *really* learn these things? Whenever my nephews, 6 and 10, sign in to a game that requires a name, they fight over who gets to be "Link," the hero of the Zelda games. He 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. And game learning goes right into kids' language and concepts when a 6-year-old Nintendo player speaks of his teacher as "the boss." (Eugene Provenzo, Jr.)

For better or for worse, kids use video and computer games as a filter through which to understand their lives. This is not so different from the past, where their hero and filter for interpreting life might have come from a story e.g. "I want to be Lancelot" (This is before they learn he steals the King's wife... Remember Link only rescues the princess.) But one big difference between games and stories is that kids learn they have *control* over this life.

One of the great games techniques for transmitting the "*where*" is through *immersion*. It seems that the more one feels one is actually "in" a culture, the more one learns from it – especially non-consciously. With recent improvements in graphics, sound, smells, and "force-feedback" controllers, video and computer games have become incredibly immersive. (Soon there'll be appropriate food or gum to chew, I predict.) Language teachers especially are 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.

And since no simulation is ever perfect, and designers must make choices, the learning in the immersive worlds is *very controllable*, via what the designers choose to amplify, and what they decide to reduce. For example, if the designers amplify the difficulty of defeating enemies, in order to increase the challenge or prolong the game, the message the player will get is that "enemies are hard to defeat." Kids will learn whatever messages are in the game.

And this is the importance of the final, and what may be the most important level of all.

Learning Level 5: Learning When and Whether

Finally, we arrive at the "*When*" and "*Whether*" level of learning. The learning at this level is the deepest, most interesting learning that goes on in video and computer games. For it involves the *non-conscious emotional* messages – the "sub-text" as actors say. And it is the level where game players learn to make *value-based* and *moral* decisions – decisions about whether doing something is right or wrong. It is therefore the most problematical of the learning levels, and the one that causes the most controversy.

The mechanisms for creating the learning at the "when" and "whether" level range from the extremely simple and obvious to the most complex and subtle. At the simplest level it can come through the game's amplification of certain factors (through repetition and other means) and reduction of others, as we have already seen.

At more complex levels it comes through the use of allegory and symbols, and through the manipulation of images, situations, sounds, music and other emotion-producing effects and combinations of effects, just like a novel or movie.

It is hard to argue, I think, that the combination of "amplification" and "emotional" cues in certain games doesn't lead players to learn that the answer to "Is it OK to kill this character?" *in the game context* is "Yes." But to me the more important question is "Are kids also learning this about "real-life"?" As my friend asks, "Do they generalize these messages to the actual world they live in?"

I have thought about this quite a bit, and here is my sense of what happens. Just as with the rules, players are *constantly cross-checking*, 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.

So, in a warped culture where killing were encouraged, the messages in a killing game could indeed, I think, encourage a young 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 severely disturbed. (This is one place where we many have to distinguish the very youngest children). I think my friend is right when he says: "We have to be careful about buying into the rhetoric of people who blame Doom for Columbine and ignore the fact that those guys were building pipe bombs in their garage and their parents never noticed." We will always have kids on the fringes, who do not get society's message from their parents or elsewhere. But they are the exception.

A great example of this "consistency checking" is a player who told me that a lesson he had learned from games is that "in a video game it's usually more fun to be the outlaw or bad guy." This would, of course, also be true in life if there were no restrictions. But most players get the message that the penalties society imposes make it a lot less fun later on. Clearly the player in question realized this, since he is not an outlaw in "real life."

This comparison of the "*when*" and "*whether*" learning in the game with the "*when*" and "*whether*" learning in the rest of life is the reason why shooting games can help kids learn how to aim, without their learning to kill. To really "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 – at least in the US and other civilized countries. Of course this is precisely what Lt. Col. Grossman, Gloria DeGaetano and Eugene Provenzo Jr. argue is happening. Whether they are right or wrong, I think it is certainly in our public interest to keep the counter-messages as frequent and strong as possible. As reality and simulation blur, (and games are not the only place where this may happen), someone needs to help us keep them straight. This has important implications for policy makers, as we shall see in a minute.

Positive or Negative?

I trust that the premise of this article – that people who play video and computer games, especially people who play them a great deal like so many kids do, *learn a lot from them* – will not cause very much disagreement (although I'm certain many will debate the details.)

But where there *is* a great deal of *fundamental* disagreement is in the question of whether this learning is positive or negative for games players – *especially* those who are kids – and for the society they live in. The major concerns of those who think the learning in video and computer games is negative are, I think, as follows:

- At the *How* level, people are concerned that kids are learning *how* to do "inappropriate" things (such as aim guns accurately).
- At the *What* level, people are concerned that the rules of the video games are too restrictive, that games don't give kids enough room for their imaginations.
- At the *Why* level, people are concerned that the strategies for winning many of the games contain too much violence, too many "cheats," and many other undesirable elements.
- At the *Where* level, people are concerned that kids are being socialized to be loners, misogynists, and social deviants.
- At the *Whether* level, people are concerned that kids are learning to be "amoral killers."

All these concerns should be heard and listened to. I personally do not think they are as valid as the critics claim, for many reasons. There are tons of *appropriate* things to do in the many varieties of video and computer games. Even for the things critics dislike the games are, many think, a useful defuser. Games are becoming *less* restrictive and more open to players' imaginations and personalities every day, with many more open-ended "toy-like" elements that kids can use to exercise their own imaginations and tell their own stories. New games have *multiple winning strategies* and so-called "cheats" are in reality only alternative games. As network technology proliferates, video and computer games are quickly going back to the *social orientation* that games have traditionally had. Video games are becoming more open to females and females are becoming more open to video games. And other messages exist – or can be created – to counter the "killing is the answer" message that some games may impart to a small number of players.

The problem for me with the nay-sayers' arguments is that they generally ignore all the positive learning that goes on, *and, more importantly, could go on*, in video and computer games. In my view, this can far overwhelm any negatives.

In the end, much of it comes down to one simple fact: *time spent*. For all of the reasons cited above, video and computer games are incredibly powerful learning tools, *but they are effective mainly because of the thousands of hours kids spend playing them*. This has enormous implications for the design of future learning games.

Video Games and Public Policy

So what should we do?

Clearly the cry to ban or regulate violent games lobby is getting stronger. On the other hand the voice of the many millions of gamers has yet to be heard. Here's an example, sent to me in an email:

"Americans want entertainment in all forms, violent or non-violent. I have never harmed a hair on another persons body, though I play what you would most likely consider, inappropriate games."

As I said at the start of this essay, I believe video and computer games are, along with our greatest teachers, by far the best learning mechanisms we have ever seen. *If developed and used correctly*, I believe that they can be, in collaboration with those great teachers, incredibly powerful tools for education.

It is therefore our responsibility – as educators, trainers, game designers and researchers – to recognize and acknowledge this potential, and to do the development required to make it happen.

The question no longer is *"Do kids learn from video games?"* As I have shown, the answer to that is a clear *"Yes, enormous amounts, in many different areas."*

The question should no longer even be *"Can they learn anything useful in video games about "real life"?"* I have tried to show that the answer is *"Yes, a wide variety of things, and we should be aware of this so we can shape this learning through the design of the games, just as game designers – consciously or unconsciously – do now."*

But this still leaves the questions *"What do we want them to be learning?"* and *"How do we achieve this?"* These are what we should debate, I think, as matters of public policy.

More and more people are coming to realize that we *can* make great, socially acceptable and productive learning games that kids will *want* to play. More and more individuals *want* to make them and have great ideas. But funding their creation is very difficult. The two most obvious sources – the games companies and the learning software companies – each have problems doing this.

The games companies – both the hardware and software makers – totally eschew anything that smacks to even slightly of "education" or "learning." They do this out of fear (correctly) that it will turn their buyers off. I have heard both Sony and Microsoft say this explicitly in regards to their consoles.

The learning software companies, on the other hand, are committed to "traditional education methods with animations" rather than to what gamers would call "real games." Plus, they have seen the bottom drop out of their market, have little to invest in big expensive ideas and have no idea how to change. I once went to one of these

companies with some new ideas and was told that their product release plan for the next five years was "set in stone."

So it is time to invest large amounts of public research money, not only into more studies of the effect of existing video and computer games, but into *the creation of new ones, from which the players will learn what we, as a society, consider "positive" things*. It's time we created examples of video and computer games that everyone agrees are both useful and effective, and as much fun to play as the best-selling games today. I am sure this can be done – the ideas and talent is out there. But in my experience only George Lucas, Microsoft Research and perhaps a foundation or two are putting any significant amount of dollars into this.

As we do this, we need to set some criteria and guidelines, so that we don't end up with just more of what we already have (the oft-criticized "edutainment,") but create some entirely new animals. At the same time we need to give creators freedom to create. This needs to be a process of enormous experimentation, trial and error, and iteration, until we reach our goal.

So the first implication for public policy is "send money."

The second implication for public policy is that if we are concerned about potential "negative" messages from playing some video games, than we'd better start producing a lot more "positive" ones to counter them. My preferred analogy for video games is not to drugs, but to food. We all know that high fat, high sugar "junk food" is bad, and even kills – more, I dare say, than video games. And yet that is almost all we find on the shelves. Why? Because *that's what Americans want and buy*. Parents buy their kids the products and then complain about them, just like with the games. But no one is recommending banning junk food or labeling it as "age appropriate." (Imagine: Twinkies – PG17.) We say "Let's provide messages and information that help people learn about proper nutrition."

If our kids get enough "don't kill" (or don't whatever) messages –especially from trusted sources – those messages will cancel out *whatever* negative effects there may be, even from all those hours of playing, except in the most deviant cases. It is surely society's responsibility to provide these messages – not in a preachy way, but in a way that reaches kids. This *can* be done – we did it with seat belts, we've done some of it with smoking, and we're finally getting around to doing it a little better with drugs, although we still have far, far to go. And remember, these lessons can come from many places. Although it was in the most terrible way possible, our kids certainly learned a lot of new messages about violence on September 11. I'm sure we can do it more gently, and still effectively, without needing to ban any games.

My final public policy recommendation is this: In a time when the skills and interests of today's "Digital Natives" are *fundamentally different* from those of their "Digital Immigrant" parents and teachers, it makes little sense to even *try* to make public policy about things like video and computer games without seriously including the Digital Natives' point of view. Any serious listener will, I think, find this point of view markedly different from that of many of the adults.

And as we hold our policy debates, and make our decisions and investments, I would suggest that we always try to remember one thing above all. Kids – especially today's kids – really *do* want to have fun – it's an important part of being a kid. *That is why* they play thousands of hours of videogames – just ask any of them!

So whatever policies we decide to make about video and computer games, and whatever educational or social messages we try to put into them and communicate to the kids who play them, *none of it will matter unless*

their games remain really, really fun – not from our perspective, but from theirs!