



This article was published as a feature on Gamasutra.com's sister site GameCareerGuide.com on August 28th, 2007.



I've been following the ongoing debate about whether video games are art, and listening to the discussion has made me realize that perhaps a more important topic for developers to discuss is the artistic principles of video games.

This article does not delve into whether games are art, but simply discusses the use of artistic principles in games, both those that are unique to games as well as those that are just as relevant in other mediums. When we consider the history of games as a visual art, it helps designers to learn to use classical artistic concepts to push the emotion of a game.



A History From the Beginning: 1962



For the purpose of this conversation we are going to consider the beginning of video games 1962: the release of Spacewar! Around that same time, digital art was making its first appearance as well. The first exhibit of all computer-generated artwork was held at a private art gallery in 1965. At that point computer-generated art was a hard-coded program that forced a plotter to make designs on paper. It was obviously not the digital media we think of today.

Some of those computer-generated artists are considered visionaries, much like the early game creators. Vera Molnar, for example, is one of the early artists whose computer-generated works are what made her widely know. Creating early computer art was more a matter of knowing how to manipulate numbers and algorithms than anything that resembled "art" at the time.

Computer games were the same way. The developers were simply manipulating the machine's ability to handle math. This manipulation resulted in the display of spaceships, which the users could in turn control.

Even with games in their early form, there was discussion of visual appeal. For example, Spacewar! at one point was adapted to feature a true representation of the night sky because the randomly generated star field annoyed some of the developers.

The developers were so excited about what they were accomplishing with computers, they generally didn't consider the aesthetics. Although it may have been a stretch for the computing power of the time, those developers could have applied their techniques to games. It's curious how much more emotion we might

have seen in some of those early games had the artistic intention been there.

In 1972 Magnavox released the Odyssey home game system. Once again, the artistic medium was secondary, but it was there nonetheless.

The Odyssey system shipped with plastic overlays to put on the TV screen to simulate color and complex shapes. It was this representation that helped the players grasp what they were playing. Without these overlays, we may not have immediately understood that a game of baseball was what was on the screen. But once the color of the grass starts contrasting with the dirt, and once we see the familiar diamond shape, the game becomes instantly recognizable. It's this recognition that started the consumer demand for games.

The next major breakthrough for art in games was the release of the Atari 2600 home system. The system featured a groundbreaking 128 bytes of RAM and a 1.19MHz processor.

Most of the popular games for this system were limited to a mix of between four and six colors, and for this reason, many of the games were based on abstract ideas and worlds where a background was not needed. The developer needed to utilize the processing power to play the game and had to make sacrifices in the area of display.

Much like the primitive computer-generated art before it, the talent of these engineers came in the form of manipulating the system to display what they needed. The Atari 2600 had tricks of its own that many engineers caught onto for later games. This system forced sprites to be drawn in a single color, but through code changes, the developers could change a sprite's drawing color as it was created to make it appear to the end user as if it were two sprites. For instance, a character often had one color for its upper body and another for its legs.

The View is More Stimulating from Afar

All early computer game objects were just blocks of color. If you look at them very closely, you usually can't tell what they are supposed to represent. But when we pull back, our eyes fill in the gaps and complete lines that might not be there, and we see a known object. This phenomenon is known as continuity. We use continuity, combined with our imagination, to turn little blips of color into something meaningful.

In the realm of early video games, our minds were forced to make a lot of continuity conclusions on their own, which is very stimulating. The human mind loves puzzles. It loves the small push of adrenaline we get when we figure out the answer or connect the dots. Although these early games used primitive shapes and colors, the meaning conveyed was crystal clear in context, and the games were mentally and visually stimulating, even though it might not seem that way at first glance.

I contend that a turn away from this recognition was a large factor in the sub-par games that caused the crash of the industry in 1983. Pac-Man, for instance, was a hit in the arcades, and players loved the abstract idea behind it. The simple shapes displayed on the screen mirrored its simplicity of play. The color variations were subtle yet fully understood by the player. But when Pac-Man was ported to the Atari 2600, it was an enormous flop. The 2600 version featured monochromatic "ghosts" that flickered, a lead character that did not always turn the direction he was moving, and two color blocks meant to represent vitamins (replacing the famous fruit bonuses from the arcade). All these changes affect how the player recognized the game. The pulling away from this visual recognition helped put a halt to what was a thriving industry -- until the next breakthrough came along.

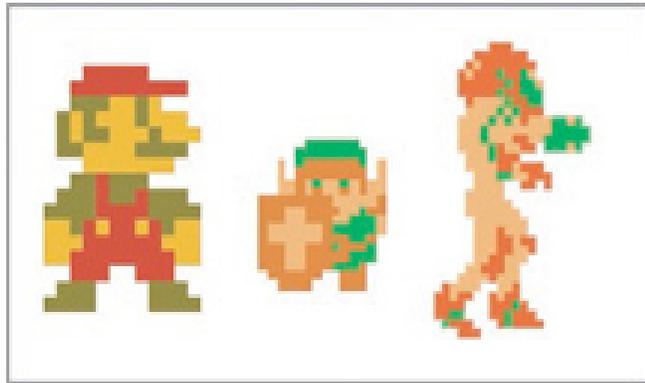
8-Bit Revolution and 16-Bit Refinement

Just in time to pull the industry out of the stagnant mess it was in, along came the Nintendo Corporation and its Nintendo Entertainment System. Players saw a few minor upgrades to the processing power for our games. These included a 1.79MHz processor and 2Kb RAM. Sixty-four sprites could be displayed on the screen at a time. The system also used 48 colors and five shades of gray. These upgrades allowed the artist to better portray playing fields, characters, and gameplay information.

From a visual standpoint, one of the greatest features that this generation capitalized on was painting world backdrops by repeating small graphics, or tiles. The original Legend of Zelda is an excellent example of this. The tiles are simple, and by repeating them, the developers don't use a huge amount of processing power. Although the world still didn't look realistic, it was enough to convey characters traits.

As you walk around in Legend of Zelda, you learn what types of enemies you're going to encounter based on the surroundings, which creates a sense of anticipation and can help the players make connections on their own, without being distinctly told.

Although the system allowed for a much broader range of colors, many of the most recognizable games did not need to use them. Instead, the processing power would be used to calculate game mechanics. Did this mean the artistic quality suffered? In some cases yes, but in others it definitely did not. Three of the most recognizable characters from this era -- Mario, Link, and Samus Aran of Metroid -- were composed of only three colors each. The simplicity of these characters in their early forms is amazing, yet they're still some of the most recognized characters not only in video games, but in popular culture.



Characters like these three stand out because of their simple yet distinct look -- not in spite of it. Many of the designers from this era used a technique in which they focus on two or three key traits to keep the characters clean and identifiable. Mario's overalls and Link's shield are two examples of these kinds of instantly identifiable features.



As was the case in the 1970s, artists in the NES days were figuring out ways to manipulate the limitations of this console. One standout case in my opinion was the Megaman series, and in particular Megaman II. The characters in Megaman II have a very distinct look, cartoonish with a thick black outline. This style allowed for minimal color use, but created characters that appeared much less pixilated than others of the time.

These games also used the aforementioned technique of world painting to its fullest. Enemies had their own world with completely different surroundings, henchmen, and themes. The use of these techniques creates an association to these characters for all players. Almost everyone who has played these games can still name their favorite enemy, or the board they remember giving them the most trouble.

These trends continued through the 16-bit generation of consoles. As processor power increased, designers were able to use more and more artistic techniques to convey their ideas. They were also able to refine the ideas they had already capitalized on prior to the generation.

Using distinct outlines to block a character became a very prominent feature of this generation and can be seen in the likes of Sonic the Hedgehog and Earthworm Jim, who both have distinct outlines and silhouettes.

Modern Day Implementation

Processing power bounds us no more. Over the next couple of generations, game console and personal computer power increased exponentially. Processors became blisteringly fast by comparison. And the amount of RAM increased more than 500,000 times that of the 8-bit generation. Games were now diving into full soundtracks, with dynamic changes between music. They were telling stories with rich cinematics. The artistic side of games was really starting to show, and a few games capitalized on these artistic concepts.

In 1993, *Myst* was released for the Apple Macintosh. *Myst* brought a visual side to story-driven games that had not been seen before. The artistic technique used was to focus on single screen images. The player did not have complete free motion in the world, which allowed the designers to set up their composition exactly the way they intended it to be viewed. Some argue that because there was no free motion, the game lacked what it needed to be fun, but you would be hard-pressed to find many people who found the visual side of *Myst* to blame.

Another series that has stood the test of time is *Final Fantasy*. The winning recipe for this franchise lies in the amazing character design of Tetsuya Nomura. As with the games of the earlier generations, the look of the characters in *Final Fantasy* is simple, yet highly recognizable. In *Final Fantasy VII* in particular, players can recognize the lead protagonist, Cloud, by simply viewing his hair, or even more so, his famous sword. Because the artists focused on only two or three key traits, the player can quickly recognize the characters. More important to the storyline, these recognizable features closely match the underlying personality of the characters themselves.

Our minds are very good at working with our eyes to interpret what we see, which worked perfectly in the early ages. Games like *Sudeki*, which had a distinctive, almost impressionistic art style, broke the mold and went away from that in some respects. Using foliage in shades that the mind is not accustomed to seeing, or designing weaponry, clothing, and vehicles in abstract form, forces the mind to rethink what it knows when it processes these visual cues. The rebuilding process can truly make players feel like they are viewing another world, and in turn, are being taught the story of that world.



Although realism is becoming more and more predominant in games, there are many titles that purposely strive for an unrealistic look. In the case of *Jet Grind Radio Future*, the designers use cell shading to create a look that's appealing, yet hardly representative of the physical world. Another game that warps reality in this way is *Psychonauts*, which uses distorted depictions of the human form to create empathy or angst toward certain characters. The use of colors and shapes are used to create contrast between the subjects when needed.

Game artists should strive to create amazing looks that match the incredible interaction that's possible in games. But it's also the job of the artist to learn the psychology behind interaction, just as it is the designers' jobs to learn and implement the concepts behind visual perception. Knowing just a few basic things about how the eye perceives and interprets visual stimuli can lead to a new level of game design.

Players have come to expect a realistic look in some genres of games, like sports titles, racing games, and training simulators. But are we sure that realism is what we want? Would our stories be better told through a perspective unlike the human eye?

There's no end-all answer to this question; each project must be treated individually. But unless the question is asked, an injustice is dealt to our product and in turn our player.

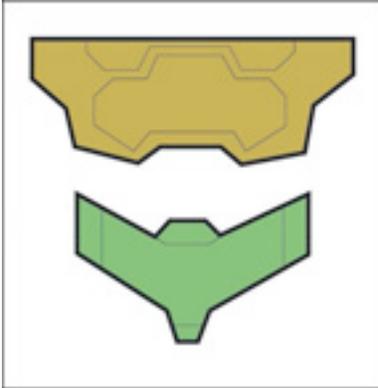
Implementation in Today's Design

In this new age of computational power, designers should not be allowed to forgo simple artistic considerations. Although game developers know (all too well) that something always causes their games to be rushed out the door before they're ever really ready, these simple artistic considerations are generally timeline independent.

Decisions about art style should be made well ahead of any drastic timeline cuts. To meet release deadlines, developers often yank features, characters, or levels to cut back scope (since they are the most time-consuming). This means that artistic considerations will generally remain in tact. Working out the artistic aspects early can be crucial to releasing a great product.

An example I have heard on multiple occasions is that a designer spends large amounts of time creating and balancing a special weapon only to have it pulled. This wasted time -- so early in a project, too -- would have been better spent discussing the artistic appeal of the lead character. With the exception of a few drastic cases, the lead character is in no danger of being cut from the project. The player's relationship to this character is imperative, and a few simple artistic design considerations can make or break that relationship. These same considerations can be applied not only to characters, but also to vehicles, levels, and even worlds. By considering the science of visual perception early you can create emotion immediately.

Color is probably one of the simplest places to start. Creating quick reads for the player with the use of color is a very easy way to communicate who is friend and who is foe. And the classic red-versus-blue routine is not the only way to use color to your advantage. Color psychology is an enormous topic that every designer should have at least a basic understanding of. Warm colors invoke a sense of urgency, cool colors radiate calm -- that's just the tip of the iceberg. Colors can portray whether a character, level, or prop is human or alien. It can also subtly guide a player along a path, much like a trail of subconscious breadcrumbs.



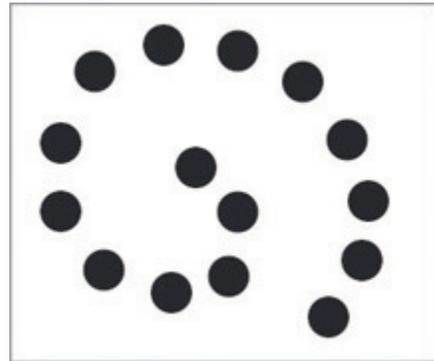
Lines create characters -- literally and figuratively. Any major character in a game should be recognizable by a few key lines alone. Two perfect examples are the faceplate of Halo's Master Chief and Metroid's Samus Aran, which have very similar styles (shown). Yet, most core gamers can distinguish between the two by the shape of the faceplate alone. If the player can recognize the character by silhouette, then you have done your job.

Comic books for years have used shapes and curves to show both a character's alliance and demeanor. Generally speaking, sharp lines show a character as stern and a force to be reckoned with, the antagonist. Curved or more whimsical lines can show rebellion and can be used to make a hero seem more relatable. Game designers can

play with this to trick the player, which in effect can generate a more genuine emotion as well; for example, a designer might create a curvy and relatable NPC that the player feels empathy for, only to later reveal him as an enemy. The sense of betrayal would be very genuine there.

Artists use brightness and contrast to draw the viewer's attention. Guiding the eye to certain aspects of a composition is just as important in games as two-dimensional art, if not more. Leading your players to plot points and drawing their attention to key areas can be achieved easily through strategic lighting. However, dynamic lighting is one of only a few artistic considerations that heavily involve the programming team. For this reason, artists have to be cautious that the programmers don't overdo it. Luckily, classic baked-in lighting techniques can still create these contrasts. As with color, use of light and dark is a key for driving emotion.

Another distinct concept that's directly relevant to lighting and lines is proximity. Proximity is the mind's tendency to group things based on their relative position to each other, the key idea being that the brain sees a large group of objects as one whole. Like lines and lighting, this concept can be used to manipulate players and alter their emotional responses by drawing their attention to or away from something. For instance, a lone enemy placed away from the rest of the horde.



The Expressive Movement

Game artists, like all other artists, are trying to invoke a feeling in the player viewer; we simply have the medium of interaction to aid us. It's this new level of complexity that makes games one of the most challenging art forms to master.

I encourage both artists and designers to continue to consider how the artistic concepts of interactive media can be used to better video games. We need to focus on the quality of the work we can do for the industry and realize that the argument over where scribbles end and art begins is futile. Using these artistic concepts alone can create that immediate attachment games should be striving for. Combine this with the artistic movements of music and storytelling, and you have yourself a fully encompassing game experience.

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