

"Regression" Progression: Non-Photorealistic Rendering Choices in Game Design

"imitation of reality was not the Holy Grail that I had previously perceived it to be. Instead, it struck me that any visual artist, CG animators and artists included, must strive for deeper meaning. Style (impressionistic, expressionistic, photorealistic, etc.) and media (watercolor, charcoal, photochemical, etc.) are secondary to this goal, and, in fact, meaningless without such motivation. What affects viewers are not solely the images — fresh or exciting as they may be — but rather the ideas, emotional content, mood, tone and timbre of their contents."

- Michael Arias

Tom Hurlbutt

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The Legend of Zelda series is one of the most recognizable and popular computer game series to date. Every time Shigeru Miyamoto has stepped up to design the latest installment of the series, he succeeds in adding a unique twist to the game, differentiating it from those of the past. Each game provides a fresh, new look for the series, and occasionally for Link, the protagonist, every time the series jumps to the next generation system. In 2001, when the ninth game of the series debuted, both the game and Link had an interesting twist: they were completely cel-shaded¹. Using the emerging non-photorealistic rendering (NPR) technology available, Miyamoto had managed to make, what seemed to be, a living, breathing cartoon. Never before had a *Zelda* game taken such a radical turn, and never before has such a loyal and dedicated fan base risen up and revolted over such a change.

Since the late 1990's, NPR has slowly been working its way into computer game designs. While the inclusion of the technique provided an intriguing look to games, it never really had a significant impact on the players' experience within the game. With the release of *The Legend of Zelda: The Wind Waker* in 2003, the standard was set for NPR games to follow, as Shigeru Miyamoto embraced the NPR technology and utilized it to produce a highly emotional and immersive game. The significance of the game would not only solidify NPR as a legitimate choice in game design, but also affect and influence the inclusion of NPR in future games. The considerable negative reaction emitted by the loyal fans of the series over the graphical

representation of the latest game raised interesting, yet important, questions about NPR's place within game design, questioning whether or not there exist certain situations where it would be inappropriate to use this visual style. This case study aims to explore the development of NPR during the 1990's, how it was first used in computer game design, and the impact that *The Wind Waker* had on defining the elements of a true NPR game. Using this evidence, and the evidence from the reaction from the Zelda community about the game, the case study also seeks to draw conclusions about the future of NPR in game design, seeing whether or not there are implicit rules future game designers must consider when seeking to design a game with NPR graphics.

The Drawing Board: The Development of Non-Photorealistic Rendering

"Photorealism, like pornography, leaves nothing to the imagination"
– Cassidy Curtis²

When computers were first equipped with the capacity to translate bits and bytes into a graphical display, the results were very simple and primitive in comparison to today's standards. In addition to only having two colors (black and green,) early computer graphical outputs could only produce ASCII text³. The best that computers could do in regards producing graphics was to arrange the text in rows and columns in order to produce crude, two-dimension images. When computers were finally programmed to have the ability to manipulate individual pixels on the screen, the advancement opened the door for computer scientists to develop ways to render more complex images on the screen. Since then, computer graphics have jumped in leaps and bound, moving away from the early black and green ASCII art to near perfect renderings of realistic images.

For the past thirty years, computer scientists have strived to develop and refine algorithms and models for the development of photorealistic renderings, or output that resembles

images created by a camera⁴. Photorealistic renderings are based on the laws of physics, as the rendering software considers physical factors such as camera view, light source intensity, and actual items within the environment, in order to recreate the results of the physical interactions in the final image⁵. The progression that photorealistic rendering has made during the past 30 years is not too difficult to perceive: all one needs to do is compare computer graphics from five years ago to computer graphics today to see how much progress has been made in such a short period of time. The rapid progression of graphic development is due, in most part, to the rapid progression of computing power. As more and more transistors can be squeezed onto a processor, computers have been able to do more calculations faster than ever before. This capability allows images to have higher resolutions and clarity, thus making it harder for the naked eye to distinguish reality from virtual reality.



Figure 1
Though this picture looks as if it came from a camera, it is actually constructed using photorealistic rendering.

While photorealistic rendering is impressive with what it can do in terms of generating visual realism, there exist limitations to the technology. Ironically, the biggest limitation of photorealistic rendering is with the realism of the image itself. Amy and Bruce Gooch point this fact out using a photo of a boat to point out the limitations of the image:

Imagine a photograph of a sailboat out on the water on a fall day. From such a photograph a viewer can infer a vast amount of information such as time of day, the weather, wind direction and speed [...] However, such an image would be of little use to someone building a sailboat. A sailboat builder would certainly prefer technical drawings or blueprints, while someone who simply wanted to communicate the idea of a sailboat may only need to draw a shape representing the boat and a triangle representing the sail.⁶

They are implying that photorealistic rendering can only provide static information about the image it is emulating. This comes from the idea that, since the rendering is based on the rules of physics, the result comes from a rigid set of formulas and calculations, leaving little room for variation with the final product. While the graphics artist might have control of the factors (i.e. the time of day, the location, etc..) once the variables have been set, the result is essentially determined. In this sense, the technology is limiting in that there is not way to tweak the final product (such as enhancing, bringing out, and/or exaggerating certain elements of the image) without straying from the concept of photorealism, since the realism becomes compromised in the process.

Due to this limitation in communication, interest began to grow in the development of the field of non-photorealistic rendering, or NPR. NPR is generally used to refer to any process that, like photorealistic rendering, takes in parameters of an environment, but produces an output that

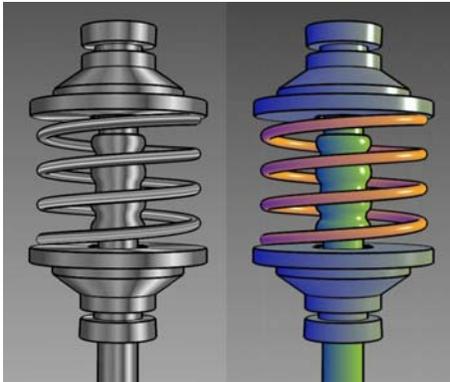


Figure 2
One of the main uses of NPR is to enhance and highlight specific elements of images; this is especially useful in technical diagrams

resembles some form of artistic style⁷. While there is currently research into different representations such as drawing and painting⁸, the most prolific use of NPR in the computer game industry is cel-shading (which will be given most of the focus in this case study.) In a general sense, if one was to compare the two image rendering techniques, one would find the photorealistic rendering procedure to closely resemble photography while NPR

would be analogous to drawing and painting. By making this analogy, it becomes clearer regarding the advantages of the latter medium. Strothotte hints at the nature of the differences of both techniques by explaining that through drawing, "it is possible to free oneself from physical

constraints of reality and to convey an impression rather than to convey the detail of a scene's appearance."⁹ He is implying that, while photorealistic rendering concerns itself with detail, NPR focuses more on getting a message across, much like how a piece of art tries to do the same. NPR is judged not by how close it resembles reality, but how effectively it communicates with the audience¹⁰. This fundamental feature of NPR, the idea of using graphics to communicate more than just a image, makes it an attractable alternative to photorealistic rendering in particular cases (generally, it is used when certain features of the object being depicted need to be enhanced in order to bring out more information, such as with medical drawings and technical illustrations¹¹,) and computer scientists are looking for more ways with which to apply the new technique.

The First Years: NPR and Computer Games

Currently, one of the fastest growing applications of NPR technology is becoming computer games graphics, as game designers are beginning to use the style more and more. This trend has only begun as of late, as opposed to photorealistic rendering, which has basically progressed along with computer games, due to the infantile nature of the field of NPR. While the idea of NPR had been thrown around and discussed during the 1980's and early 1990's, the technique did not gain widespread attention and interest until 1994 at SIGGRAPH, where two different papers published laid down the foundation for NPR. The two papers, both about pen and ink illustrations on computers, expressed generally, for the first time, how to achieve the effects that NPR seeks to embody¹². Only after that did the field actual come together and joint efforts were made to develop and refine various NPR techniques. As a result, it would not be

until 2000 when the field was mature enough for computer game designers to seriously consider using NPR in computer games.

In 2000, Sega released one of the first wide-spread NPR computer games, designed for its now defunct Dreamcast system. *Jet Grind Radio* (released in Europe and Japan as *Jet Set Radio*) was promoted as an action skateboarder game where the players' objective was to gain points by tagging the streets of Tokyo with their graffiti¹³. While the mechanics and objectives of the game were well designed and fun, what caught the eye of most gamers and reviewers was the cel-shading graphics of the game, as seen with this review from Gamespot:

A lot has been said about *Jet Grind Radio's* graphics in the months leading up to its release, and it's definitely worth repeating here: This game looks simply incredible. The characters and environments aren't made up of that many polygons, but the smooth animation and an amazing use of cel shading (which places a black outline around some of the polys, giving them an almost hand-drawn look - expect to see lots of games stealing this effect in the near future) make the whole greater than the sum of its parts¹⁴.

As the review implies, the design of the game broke open the dam for other games to adopt the cel-shading style presented in the game. The execution of *Jet Grind Radio* demonstrated how NPR could be used to provide a rich and lush environment in which the players could explore and play, enhancing the overall experience of the game. After *Jet Grind Radio*, various games such as *Robotech: Battlecry*, *Auto Modelista*, and *Cel Damage* adopted a cel shading style, thus spreading the popularity and use of the new technology¹⁵.

In addition to newly designed games, gamers also experimented with modding existing games using NPR techniques. This is significant because it represents the penetration of the technology into the actual gaming community; it is not the game designers who are making the choice of how the game is visually represented, but rather the gamers themselves. Games like *Counter-Strike* demonstrated how modding empowers the gamer to alter the presentation of the

game as he or she sees fit, in order to create an experience that is individualized and more meaningful to the player¹⁶. In the case of NPR, one of the most recent and noticeable modifications occurred with the Quake II engine. Around July of 2002, a member of the Quake mod community released a cel-shaded mod called *Quake2maX* to alter the appearance of the aging engine¹⁷. The mod, boasting cel-shaded

versions of the characters and environments of Quake II, became very popular within the Quake community. psychospaz, the creator of the mod, included cel-shading because he wanted to produce a "good-looking effect, for a unique feel¹⁸" for the game. Once released, the mod was well received, as players enjoyed the particular effect that the cel-shading provided, as it gave a different feel to the



Figure 3

A screenshot from *Quake2maX*, the cel-shading brightens up the appearance of the game and brings out a stronger contrast between the characters and the environment.

game (in addition to highlighting the different enemies and making them easier to find¹⁹.) The appeal of the mod even reached into the machinima community, where the mod has been used to create machinima using the distinct cel-shaded style²⁰. The success of NPR within these fields, ones dominated by players rather than designers, demonstrates how deep the appeal of NPR spread among the world of computer gaming.

While NPR had been gaining popularity and use with computer games, it never really seemed, up to that point, that it was being used for the purpose for which it was originally designed. Even though the graphics of games like *Jet Grind Radio* and *Quake2maX* were unique and well executed, their inclusion did not communicate anything extra to the player. As discussed earlier, the purpose of NPR was not to present an image, but communication

something about that image to the player. With the case of the examples listed above, they do not fit the characterization. It appeared that NPR was being used more as eye candy and less as a vehicle to enhance the computer game experience for the player. NPR was finding itself in threat of being deemed a fad and being quickly tossed aside once the new "thing" was discovered. However, a boy in green would change that, for once defining the conception of a NPR game and igniting a controversy that would alter the way that game designers would view NPR game design.

The Legend of Zelda: A Hero Reborn and Restyled

"We want to have a game where everything in the world feels like it is in its place. We think that when you play, you will see Link do something and react realistically. From that point of view, The Wind Waker is very realistic in terms of expression and the whole oneness of the world."
– Shigeru Miyamoto²¹

Shigeru Miyamoto has had unparalleled success with his *The Legend of Zelda* series. Starting with in 1986, Miyamoto has used the series to attempt to redefine the way console games should be designed. At Space World 2000, a ten second demo video was shown, depicting the most photorealistic representation of Link to date, in which he is battling his eternal archenemies Gannon²². The footage enticed fanboys to being to salivate over the first Zelda release for the latest generation Nintendo console, the GameCube. One year later fans and the media received their first glimpse of the new game, and their mouths literally hit the floor upon unveiling. How fitting of a response, as Miyamoto, once again, shocked the gaming community by showing off a cel-shaded version of Link, which looked and acted like an interactive cartoon. By opting for an NPR episode of the series, Miyamoto hoped to utilize the power of NPR to effectively communicate feeling and emotions to the players, creating, as Miyamoto sees it, the most "realistic" version of the series to date.

Miyamoto and director Eiji Aonuma based their decision to use cel-shading NPR in *The Wind Waker* on several reasons, the most prominent being the ability to leverage the technology to bring out the emotions in Link and effectively communicate that to the player. One of the most notable design features of the main character is his eyes. Aonuma felt that, as soon as the decision was made to pursue NPR, the game needed to be designed in order to bring out



Figure 4

Link's eyes are constantly moving in the game, giving the player hints as to what is occurring within the game.

features of environment, and that would be best achieved through the design of the eyes²³. "Link's got very large eyes and he's always looking around," stated Aonuma at a 2002 DICE press conference. "[His eyes] move so much, and they'll look at things and draw players' attention to objects in the environment²⁴." The effect of this design feature is to

give the player a stronger feeling that he or she is actively exploring the virtual environment along with

Link. At some point in the game the player might be directing Link in one direction, but he'll turn his head and look back in the other direction. Understanding that Link is attempting to inform the player of an object within the game that might be of importance, he or she may pause and go back to see what had caught Link's attention. In this way, the player is better able to connect and interact with the character within the virtual environment.

In addition to the eyes, the NPR style of the game also allowed the designers to have Link express a wide array of emotions, more so than any previous version of the series. In playing the game, Link's expressions accurately reflect the particular event that is occurring at a given moment for the player. In the game, when Link vanquishes a dungeon foe, he'll jump up and

down in the air, pumping his fists in victory. When Link is engaged in battle, his face will become fierce and aggressive, as he begins to battle.

When Link is about to be shot out of cannon, his face will go into shock and horror at the thought of being blasted into the night sky. These design choices have the effect of reflecting that emotion back to the player. The player shares in the event with Link when it occurs, whether it is battle or victory. What is most impressive, though, is the attention to detail to given to even the most mundane of tasks. When Link is sidling across a wall in the

game, for example, his face is slightly turned in the direction that he is moving, with his eyes squinted and a look of concentration of his face. Even though this is a repetitive and almost seemingly inconsequential task in the game, the game designers utilized the NPR technology to give emotional significance to the event, which is communicated back to the player through Link. The player, by interacting with a very expressive character that remains expressive throughout the game, becomes more inclined to invest himself or herself more fully into the game.

This impact that NPR had on character design can best be seen by contrasting this incarnation of Link with the one from *The Ocarina of Time*. In the earlier version, Link was designed to be very non emotional in the game, not straying from his neutral expression throughout. Even in the heat of battle or the glory of victory, Link's demeanor did not change.



Figure 5

Link's animation is dictated by the current event in which he is engaged. Right now, as he battles enemies, Link has a fierce, competitive expression, which is fed back to the player as he or she starts to battle.

In addition, the character of Link was not responsible for assisting the player in exploring the environment; that job was delegated to Link's guide fairy Navi, who buzzed around the



Figure 6

In *Ocarina of Time*, Link hardly expresses any emotions, which does not help the player to become emotionally involved with the game.

environment, highlighting enemies and key items during the game. This construction of Link greatly affects the relationship that the players have with the character. In *The Ocarina of Time*, the player perceives himself or herself as an omnipotent controller, a sort of puppetmaster of Link. The only emotional connection that the player invests into the game comes from his or her own prerogative, since there exists no design elements

within Link to encourage the players to invest themselves emotionally into his character.

However, with *The Wind Waker*, the player feels as if he or she is working as a team with Link, and perceives a more rewarding relationship with the character that adds to the experience of the game. As the player controls Link, Link gives feedback to the player about the events within his surroundings through his animation. The player can easily understand the gravity or levity of each situation based on Link's demeanor on the screen. Link gives cues to the players based on his animations and facial expressions, and the player takes in that information and processes it accordingly. If Link appears to be serious, the player then becomes more cautious with the control of him; likewise, if he appears to be wide-eyed and curious, the player starts to use Link to look around his surroundings. Because there exists this emotional feedback loop between the character and the player, the player's relationship with Link is much more mutual and personal, since it work of cooperation and rather of force.

This difference in the player's relationship to the game is what Miyamoto and Aonuma aimed to create when designing *The Wind Waker*, and this aspect of the game could not have been realized without NPR. Miyamoto stated his feelings about how his team was able to use NPR technology, as opposed to photorealistic rendering as done with *The Ocarina of Time*, to achieve the connection that he wanted to players to perceive when playing the game:

One of the most important things with the Zelda franchise is that players really must feel that Link is really almost themselves in the game. In that sense, there has to be very natural and fluid interaction between the player and the character. When you don't have that, you certainly lose some of the nature that makes Zelda what it is. So, if you were to go for a more realistic-looking Link, then you would have to have so much movement in the face for him to be able to essentially affect the emotions of the player and make it feel like the player is emoting through Link. That would require so much time and energy in order to create the graphics to allow the face to do that. Also, when you have realistic graphics, when you have a character with his arm moving through objects or his arm bumping into things in an unnatural way, it just stands out all the more. I think that's even more unnatural than having these toon-shaded-style graphics with extremely natural and realistic movement²⁵.

Miyamoto's and Aonuma's goal was to create a natural feeling game, where the interaction between the character and the environment is as smooth as possible, and this goal was better realized with NPR graphics than with photorealistic graphics. In fact, Miyamoto even goes as far as to claim that the design of *The Wind Waker* has allowed his team to create the most realistic *The Legend of Zelda* installment to date, realistic in the way the player interacts with game and not with how the graphics appear²⁶. The design team for the game desired to create an experience for the player as real and as natural as possible, and they achieved that through the use of NPR graphics. The use of this technology allowed for the player-character interaction and character-environment interaction that is compelling and engaging to the player, to the point that they forget the how the game looks and become engulfed by the game.

The significance of the game to NPR is that it helped to set a standard for how NPR should be used in future game design. The goal of NPR is to create images that facilitate a form of communication with the viewer; with *The Wind Waker*, that communication is achieved through Link's animation of emotions and actions, to which the player sees and reacts. In this sense, *The Wind Waker* distinguishes itself from all preceding NPR games. While the preceding games use NPR ornamentally, *The Wind Waker* efficiently uses NPR to its fullest potential and purpose, in order to convey something more than just an image to the user. From this standpoint, *The Wind Waker* could be deemed the first true NPR game, showing off the potential of the technology to the world. While it does not advance the notion that computer games should be considered a form of art, *The Wind Waker* does succeed in showing that graphics can do more than just be decorative.

"OMG!WTF! teh hell with thes crapixs they suxs and blos – The Revolt of the Fanboys

"Even those of you who don't hold with this opinion surely must agree that no other Zelda game has ever provoked such a divide amongst our community"

– PostLink²⁷

The Wind Waker had received critical fanfare and acclaim after its release. Game Ranking.com, a site devoted to compiling game reviews and rankings from different sources, stated that the game had an average ranking of 95 out of 100²⁸. It was deemed as one of the top games of the years by various media outlets, even earning "Game of the Year" honors from Gamespot²⁹. The game was even recognized by the Academy of Interactive Arts & Science as having the best art design for any game in 2003³⁰. Given the prestige and lineage of the series, its reception of all of these accolades is not surprising. What is surprising, though, is that, while the media appreciated the game, the established fan base of the series did not necessarily receive the game warmly; in fact, it was down right hostile. In the year leading up to the official release

of *The Wind Waker*, message boards all over the Internet were buzzing over what Miyamoto had done with the series. The reaction was intense and strongly negative, and it focused the hatred towards the graphics. *The Legend of Zelda* has been noted for its innovation in game design, but the latest one struck the wrong cord with the Zelda community in doing so. What exactly was wrong with the cel-shading of *The Wind Waker*? While the answer may not be clear and absolute, the reaction does provide new considerations regarding NPR use within future game design.

Many Zelda fans were outraged when they first learned of the visual design of *The Wind Waker*, nearly a year before they would be first able to play it. After the debut of the game, a poll placed on Gamespy.com pitted *The Ocarina of Time* Link verses *The Wind Waker* Link to see which one fans preferred; the former crushed the later 89.4% to 9.6%³¹ (Gamespy released the same poll after the game was officially released to the public; the old Link still won handily 79% to 21%³².) They felt that the cel-shaded graphics made the game appear too "cartoonish" and "kiddie." They were beginning to feel alienated and betrayed by Miyamoto and his team. Fans, for the most part, used message boards all over the Internet to voice their displeasure and anger regarding the graphics, as seen with a small selection of the thousands of posts that flooded the Internet from the initial preview until today:

I don't know where Nintendo came up with the damn cel-shaded graphics for a Zelda game. Don't take me wrong. I don't have a gripe with the graphics itself. I just don't know why Nintendo decided to tinker with the deep controversial style of Zelda with a kiddy style world that only fans of anime will immediately love³³.

WW looks like the compilation of a child's drawings (I call them crapics instead of graphics)³⁴.

wind wanker sux eije anumoa sux i cant beleive they ruined teh zelda series with tihs craoppy cell shading its so bad wat happend to that spaceworld video y did they cancel it?!11!?:?? probly becuz theyre gay i hate nintendo now they made my life miserable WITH THIS CRAPPY CRAP³⁵

While these postings do not give much insight as to why the graphics conflicted with the series (or may not bear any resemblance to the formation of a coherent idea or thought,) they do communicate the fact that fans had serious issues with Miyamoto's and Aonuma's decision to use NPR for the game. This is not to say that the entire Zelda fan community hated the NPR style of the game; many fans on the message boards actually posted messages on how they enjoyed the new look of the game³⁶. What is significant about this backlash is that it was based solely on the screenshots and videos released nearly a year before most players would have a chance to get their hands on it. The problems that fans found in the game were based solely on its look and presentation, bringing into question why there was such hostility towards the look of the game.

The largest factor contributing to the discontentment with the new NPR style of the game most likely arose from the existing photorealistic rendering representation of Link, which fans were quick to use as a ruler for comparison to the NPR style. In many of the posts, fans argued that they truly enjoyed the graphics from the Nintendo 64 edition of the games (which included *The Ocarina of Time* and *Majora's Mask*,) and questioned why *The Wind Waker* moved away from the previous style. One fan posted that "the adult Link in OoT [...] is the *REAL* Link and I am very disappointed that Miyamoto chose a different look of Link altogether for the future Zelda games³⁷." By "real," the fan is implying that the photorealistic representation of Link made the character more "real" to the fan. The fan here demonstrates how the "realism" he values different from the "realism" sought by the game designers. The fan does not care how real Link acts on the screen, he or she just cares that Link looks real enough so that he or she can relate to the character. These conflicting expectations of "realism" contributed to the fans' displeasure of the design choice.

In addition to the previous installments of the series, the demo given at Space World 2000, showing a photorealistic version of Link, added more fuel to the fire that was burning within the Zelda community. Although it was only a demo, the video established that a photorealistic Link *could*

be constructed using the GameCube hardware. Fans took in that information and started to form their own expectations over how realistic looking and grand the next Zelda game would be. In comparing the demo with the previous Zelda games, they could perceive a progression with the series in terms of graphics, each installment looking more and more realistic, with the



Figure 7

When Nintendo showed the above rendering of Link at the Space World 2000 Expo, many fans felt that it was representative of what he would look like for the first installment on the GameCube. When Miyamoto delivered the cell-shaded Link, they were stunned.

demo becoming the pinnacle of this progression. When *The Wind Waker* was revealed, the fans felt as if the series took a major step back. Where was the Space World 2000 graphics? What was this poor substitute for the Link shown a year earlier? The fans' expectations for the potential of the game were not met, and it was this discontentment that led many of them to revolt soon thereafter.

The Dust Settles – The Future of NPR

The Wind Waker can be seen as both a success and a failure. For the first time, a computer game managed to use new technology to change the mechanics of gameplay and to show off the true power of NPR. At the same time, though, never has an established series caused so much uproar and anger within its loyal community. Through its success and failure,

The Wind Waker has provided a true case study as to how NPR should and will be used in computer game design to come. This game is monumental in that that it will give game designers clues and leads in the future how to effectively use this new technology as it continues to grow and develop.

One consideration game designers will have to take into account when considering NPR is the intended tone of the game. NPR worked for *The Wind Waker* because the game, overall, is a lighthearted fantasy involving a young boy trying to save his sister from danger. The theme and tone of the game differed substantially from *The Ocarina of Time*, where impending doom is to befall the land of Hyrule, transforming it into a barren and desolate wasteland. Because of its bright graphics, strong hue, and sharp contrast, this technique works well for portraying the emotional content and feel of *The Wind Waker*, but would be inappropriate to use for *The Ocarina of Time*. NPR is better suited for games with a lighter, less dark and oppressing overtones, like *Jet Grind Radio*, for example. A contrasting example, games like *Silent Hill* are not great candidates for NPR since their themes are dark and frightening, and actually benefit



Figure 8
In *Silent Hill*, the gritty realism contributed to the scary and suspenseful feel of the game, a tone that could not have been easily achieved with NPR.

more from photorealism than from NPR. Fear and suspense are crucial elements to the games, and by making the appearance as real as possible, the player begins to lose perception of the fiction on the screen, thus suspending disbelief and buying into what is occurring in the game. If the designers were to use NPR instead, the game would not seem as grim and as dark, thus working against the fear and suspense that the designers desire to build. Game designers should note

what type of mood is appropriate for the game, and then see whether or not pursuing a NPR style is advantageous.

Game designers will also need to determine the appropriateness and risk of using NPR with establish series. As seen with *The Wind Waker*, the fans of the series used the photorealistic graphics used in the past as a benchmark to compare how far the series had come since the first installment. Once presented with a game that did not compare nicely to this benchmark, the fans rejected it almost immediately. It did not fit into the preconceived notion of what a Zelda game should look like, and therefore must not be a true Zelda game (which is ironic given the fact that the series prides itself by trying to be different and unique with each installment.) Zelda has enough history associated with it that the game designers took a serious risk by changing the look of the game. In this case, the designers were able to get away with it by claiming that this game takes place 100 years after *The Ocarina of Time*, so they could create a version of Link that differed from the previous Links, thus accounting for the makeover³⁸. However, this might not be applicable for series such as *Mario*, *Jak and Daxter*, or *Crash Bandicoot*, where the designers of the series are very unlikely to get away with redesigning the marquee characters by claiming they are different from their predecessors. In addition, with establish series, the intellectual property associated with the characters builds with each release of an installment of the series; it is the responsibility of the designers to protect that property from intrusion and/or destruction from other factors and influences³⁹. By redesigning the character, the game designers risk destroying all of the I.P. recognition that they have worked so hard to build up, as what could have been the case with Link. Game designers in this situation need to carefully determine what they will be gaining from making this change and whether or not it is worth it to risk to alter the look of the intellectual property they are trying to promote and protect.

While games that lack an establish history do not have the problem that *Zelda* had, game designers still must consider how and why the use of NPR is warranted within a game, and whether or not there is enough reason to justify its inclusion. In all of the games prior to *The Wind Waker*, NPR was used more as a flashy feature of the game that distinguished it from its competitors, rather than as a tool to convey a new form of communication between the screen and the player. In the early years, this worked because cel-shading was new, and it was intriguing to gamers. However, four years since the release of *Jet Grind Radio*, cel-shading has been established, and its novel look alone will not make a game compelling enough for a player to spend the money to pick up. Game designers should look to *The Wind Waker* as a model for how a NPR game should be done since the NPR technology contributes additional elements to the gameplay experience. A recent example, the release of *XIII*, a first person shooter based on a French comic by Ubisoft, effectively uses cel-shading NPR for its graphics, creating the experience that the player is exploring a comic book story⁴⁰. In this case, the use of NPR is



Figure 9

In *XIII*, the NPR helps create the feeling that the player is actually experiencing the comic book story along with the protagonist.

warranted because the game designers want the players to perceive that they exist within the world of a comic book, and the NPR graphics effectively communicates that feeling to the player.

Essentially, game designers need to carefully evaluate the consequences and benefits of including NPR technology in future games, both with the effect that the style will have on the reputation of the series and with the added benefit that the technology will do for the gameplay of the final product.

What to Expect - Conclusion

Right now, it appears that cel-shading is in its prime. Since *The Wind Waker*, several other prominent cel-shaded computer games have been released, including the highly acclaimed *Viewtiful Joe* and the already mentioned *XIII*. In addition, the sequel to *The Wind Waker*, which is rumored to be unveiled at the 2004 E3 Expo⁴¹, will utilize the same cel-shading technology, even in spite of the backlash it received with its predecessor (though the backlash subsided a few months after the game was released once players actually experienced the game, fans are still hesitant about the decision to continue with the cel-shading style⁴².) With NPR technology advancing year after year, we might find more NPR games utilizing different techniques, such as pencil shading drawings and paints, in the near future. NPR is growing, and will not soon pass away and forever be categorized as a "fad." Because of this, game designers need to treat NPR seriously as a game design element and use it accordingly.

Anyone who contemplates designing an NPR styled game should take the lessons learned from *The Wind Waker* seriously during the design phase. The game showed the power of communication that NPR graphics possess, but at the same time showed how the design choice might prove to hinder the reputation of game among not only the gaming community but also the loyal fans to the game itself. NPR, like any other tool, can be used or misused; it is the responsibility of the game designer to understand how to use this new tool properly. If game designers begin to take these lessons to heart, one can expect the world of NPR game to become more prominent and prolific in the next few years.

Endnotes

1. Ahmed
2. Gooch
3. Marshall
4. Strothotte, pg. 1
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13. "Jet Grind Radio"
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20. "Rebel vs Thug"
21. Miyamoto & Aonuma, "Behind the Legend," pg. 3
22. "Zelda on Gamecube"
23. Miyamoto & Aonuma, "Behind the Legend," pg. 5
24. "Nintendo Roundtable Q&A"
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26. Miyamoto & Aonuma, "Behind the Legend," pg. 3
27. PostLink
28. "The Legend of Zelda: The Wind Waker"
29. "GameSpot's 2003 Game of the Year"
30. "7th Annual Interactive Achievement Awards: Winners"
31. "Gamespy Grudge: Old Link vs. New Link"
32. "Shigeru a go go"
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38. Miyamoto & Aonuma, "Behind the Legend," pg. 2
39. Swartz
40. "The State of Cell Shading with XIII"
41. "Rumor Control: The Nintendo Nitro and Son of N-Gage"
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Figure 7 - <<http://cubemedia.ign.com/media/news/image/zeldacube/zeldacube3.jpg>>.

Figure 8 - <http://image.com.com/gamespot/images/screenshots/1/198641/silenthill_screen032.jpg>.

Figure 9 - <http://image.com.com/gamespot/images/2003/screen0/557910_20031118_screen011.jpg>.