

Pixel Art for Game Character Design

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Abstract—This paper analyzes the development, basic design foundations, and design principles of character designs that are often found in today's games. This discussion relates to the ability of pixel styles to survive even though the design styles of the current digital art era are developing with diverse thoughts. Pixels are the basic elements of design that are capable of producing attractive design work. Looking at the current development of pixel styles, in the midst of the proliferation of 3D-based visual works, we can find that pixel styles still have an irreplaceable influence. Pixel-based designs are still being put into practice and applied in the form of games by more designers and artists

Keywords— Character Pixel style, Game Character Design, Retro Game Design

I. INTRODUCTION

The Video games are a work of magic. He can create his own world, with narration, drama, music, and visuals that involve players to actively participate in the world that is present in the game. In a game, the user interface is an important thing that allows the player to interact with the game world. It plays a very big role in being able to bridge users with the things that are offered in the game. The functionality of the GUI is very important for establishing a connection between the player and the game world.

Pixel art is an art and aesthetic style that we can still find in the visual design of a game. Until the mid-90s this art form was the only one that could be applied to digital game consoles and PCs. its shape can be likened to a cross stitch or digital mosaic. This stems from problems related to hardware limitations in the 8 and 16-bit computing era when the resolution is small and the number of colors that can be displayed is still very limited [5]. As technology evolves, pixel art is becoming increasingly displaced by 3D graphics as newer hardware rendering capabilities improve. Around the 2000s, pixel art was mostly found on handheld consoles and cell phones and is not expected to last long as hardware technology develops. However, this assumption turned out to be unproven as the number of games that used this style remained popular. Pixel art is a unified whole and is now present not by limitations but appears as a visual style [11].

A. Pixel art as graphic tool

As a unique art style, pixel art presents images intentionally limiting to a certain Resolution. In particular, the dithering pattern adds a bold and expressive style to the image and gives aspiring character designers and new media designers to experiment freely. The fact that pixel art has never before emerged as a kind of art is a strong incentive to keep it as a tool in the hands of artists. As unique character

designers have appeared pixels in their designs. here is the will to produce designs by using computer graphics to create amazing designs.

Pixel art is the technique of creating images and animation using the smallest unit of color that a computer can render.

As an illustration, we can see the similarity of the visual concept of mosaic or cross stitch with pixel art. All of them are composed of a smallest unit of image. At early time pixel art as a graphic style is used in computers and digital game consoles because there are strict size limits to the screen and limits on the content that can fit on the cartridge or CD. In 1983 the Nintendo Entertainment System was limited to 54 color pixels it can only display 25 colors on the screen at once. The Nintendo Entertainment System has a total screen resolution of 256 x 240 pixels. In 1990 the company released the Super Nintendo Entertainment System and the technology has improved enough to manage 32,768 colors. To create retro-styled pixel art, artists simply set similar limits on the image resolution and colors used. [2]

In today's modern era, its presence is truly an aesthetic choice. This style is popular partly because of the nostalgic value of older games, besides that this style is easy to develop without losing its characteristics. The simpler the animations and camera angles of a game, the more the power of pixel art emerges. Pixel art doesn't require any sophisticated tools. all it takes is time and skill.



Fig. 1. Pixel style character
(Source: Personal)

B. Pixel Art Technique

Due to the fixed palette and limit of available colors, the pixel character designer developed several dithering techniques to mix colors and add shadow and depth. The most common dithering effect is to draw two colors in a checkerboard pattern. Changing the density of any of the colors will change the tone of the area. Stylish dithering is two

or more colors that disperse spontaneously, small rings are also common.

Creating a partially transparent image for use in video games is commonly referred to as *spriting*. Images are usually used for foreground and character animation or still images called *sprites*. Sprites are sometimes used to describe the act of creating pixel art, although sprites can also be high-resolution 2D graphics. Due to the origins of its activities, in some communities “*sprite art*” and “*pixel art*” Is the same thing.

Sprites can also be used in a 3D environment, this is called *billboarding*. It gets its billboard name from how the sprites are positioned to always face the camera, just as billboards are strategically placed to always face a car on the road. *billboarding* is used for both aesthetics and performance optimization.

Using pixel art as a visual option will save both in terms of money and the number of people involved but of course they must have sufficient skills to produce good work. Because this style severely limits the size at low resolutions, each pixel must be carefully positioned to enhance the character's appearance. At first the problem was the file size and available colors. Nowadays, the retro look and impression that every pixel is placed with careful consideration will be lost if the sprite is too large and detailed. In other words, the more detailed the resulting pixel art, the more retro impression will fade.

C. Character Design

Character is the main thing in the story presented; soul that animates the story. In a film, a character will take the audience along with their adventures, following them until the film ends. In a game, characters are often avatars whose appearance and attributes can be modified, based on player preferences. The characters will then face challenges, which take place at levels that have different levels of difficulties.

A character is designed based on a story idea or storyline. Character designers are professionals who constantly challenge themselves to explore their imagination to find the perfect and unique character that is different from the existing ones. Character designers typically work with walls full of drawings, piles of sketches, and references from books, music and films, photographs, and research data. The whole process is a long one to get the soul into the character and bring it to life. The goal of a character designer is to create a character that meets the needs of the script, scene, game, or story and fits the storyline.

We can lists six important aspects of dramatic personae, which can be applied to the design of game characters, as well:

- Dramatic need provides a purpose, focus and direction of story; it is the reason why the protagonist is in the story
- Point of view explains how the character sees the situation(s) • Attitude explains the stance the character takes to the situation(s)
- Change makes the character intriguing and realistic
- Weakness/negative trait makes the character realistic and is also a convenient way of building obstacles. This is also perhaps the aspect that the character will be able to change in her/himself.

- Mannerism/habits Identifiable parts of the character that differentiate it from other [5]

The image that has the most potential to attract people to read the game description is the game character. After they click on the character icon, all game features will be displayed, from description, version, game detail information, game developer, some game level preview images, to customer ratings and reviews. Both the characters and the visual appearance of the game create a journey of visual experience that allows people to experience adventures and challenges in the virtual world.

The characters in the game play a unique role. It is a representation of the player as it happens in a virtual world full of adventures and challenges. Players can find different adventures and challenges in each level of the game. The appearance, attributes and even personalities of some game characters can also be controlled and customized. Design characters and other game assets are included in the game art. Games tend to differentiate themselves first by their visual style, then by their gameplay mechanics, and finally by their narrative.

The visual style might appeal to people, but if the gameplay isn't fun, the characters won't help. If the game is fun and exciting, then players won't really mind the weak story. Ideally, all elements are equally strong, but this is rare. A good game character is one that enables and supports a great game. This is much more important than a strong marketing image. Character is also something that reveals itself gradually to a player.

Characters in the game are divided into several types, one of which is a character who is the embodiment of the imagination and wishful thinking of players who play themselves in a game. Although these characters do not represent the real life of the player. Some examples include figures such as racers, elite squad leaders or knights.

Another type as stated by Scott McCloud as an iconic character. McCloud applies this to comic characters but we also find it in game characters, even famous game characters like Mario are present in that form.

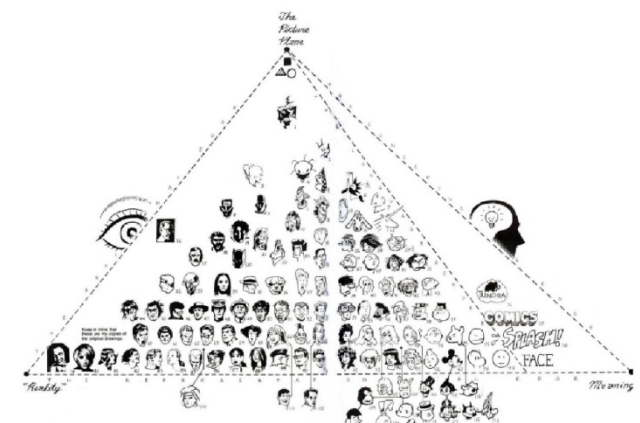


Fig. 2. Range of style [7]

a) *Player Character*

The personality and attractiveness of the player's character stems from his movements in response to the player's control actions as well as watching excerpts from complex scenes. Most of the time spent with the player character will take place over time as the game progresses. The player's character is rooted in the visceral and cognitive layers and their social self and fantasy emerges not solely due to the linear story presented in the existing game genre. [4]

A Game character designer should consider to set explicit criteria for each of the four layers:

- **Deep.** How does it feel to become this character? Is it fun? What powers does he have? How does this character move.
- **Cognitive.** Do the player's own instincts about what to do next in the game match the cognitive strategies this character will have? Does the character feel like a perfect avatar to players?
- **Social.** Does the character's social persona match the basic game play style and motivation? Are social personas interesting and appealing to players? Does it fit the NPC cast and their social roles? Can the player perform the social action he wants, based on his character?
- **Fantasy.** Is this a character that players want to try out? Do the characters' backgrounds and motivations match the game itself—is it a fantasy persona that really fits into the core game mechanics?

b) *Non-Player Character*

NPCs have various objectives in the game. An Non Player Character may have many kind of abilities that are useful to players. Beyond the ability just to provide assistance in the game world, friendly NPCs may also be able to provide moral support in achieving game objectives. Those characters can also act as companions for players or can provide social motivation. Even unfriendly NPCs can enhance the player experience, providing resistance and conflict. NPCs in neutral roles can provide a positive response for players when they approve of their actions.

NPCs in games are often positioned as character that already became a part of the player's life. An NPC may have a kinship role toward the player's character (Team mate, long time boy/girl friend, or the like). This means that the player already has a connection toward and investment in the NPC based on their past, and the NPC has been designed to have "connection" as well. Relationship also grows during the game. The most powerful NPC interactions and connections can arise from the building of obligation and investment through mutual actions during game play. [4].

II. RESEARCH METHOD

One of the most important things of game design is to create an experience, which is inseparable from the player character experiences during and after the game played. Game design with great player experience is the successful design. There is a level in the interaction between game mechanics, game dynamics and aesthetics [8] and at the same point there is character design. Every visual aspect in a game is a tool that translates the programming language into part of the player experience and can further create immersion [10]. From the perspective of psychological meaning, the interface can be

divided into two levels: perception (visual, tactile, auditory, etc.) and emotional. Games are designed based on the results of human-computer interaction and programmed information. [1]

The aim of this research is to broaden the academic understanding of pixel art by exploring some games so that we can get an idea of how the pixel style can stand out among the other styles.

III. DISCUSSION

While it is undeniable that 3D images have become the design mainstream, the pixel art style still has an indelible influence. The pixelated design, as an exploration between retro and trend, also attracts the hearts of many new consumers with its uniqueness. In design, the pixel style is independent and permeates all aspects of people's lives. An unit of blocks are put together to abstractly show various forms, but they also have a unique beauty.

Pixel art is similar to cross stitch, where if the character designer keeps pushing the available pixels, they may end up being able to represent a recognizable shape in a very limited space. Limitations give birth to innovation in the world of design. It is known that many character designers often limit themselves strongly, through their choice of equipment and expressions. This creates a design problem, a problem the artist must be able to solve. Whenever we look at a work and try to evaluate it, we compare it to our own mental image. If we can learn to stimulate and harness this vision, by creating boundaries and goals, then intuition will grow stronger. New solutions have to be born and unique ways to solve problems are found. By clarifying boundaries and seeing them as challenges and opportunities for innovation, not barriers, practitioners can gain an understanding of their own aesthetics.

Pixelated visual language is the painting of choice in the age of mechanics. Indeed, pixel art is a product of the times. It also represents a combination of rationality and sensitivity, as well as digital media and artistic creation. Pixel style has appeared in painting, graphic design art, etc., depicting people's attractive world of imagination.

Because boundaries and boundaries are part of every artistic process, whether we realize it or not. Reflections on why the character designer chose to do it a certain way can be invaluable. And it is often this process of reflection that makes us grow as artists. Even in the realm of pixel art, where the enhancements may run counter to what the general public might expect. Basic knowledge of how to design a character is fundamental because with pixels we have to reduce design elements to a minimum level. In the discipline of character design we can use the silhouette technique to define shapes for easy identification.[6]

There are so many different styles in character design, in general the image styles that can be applied are realistic styles, semi-realistic styles, and iconic styles. Unlike in the past when pixels were a solution to technological limitations, now technology has been able to produce realistic images, even to photographic images, this affects the resulting visual form, meaning that we can create semi-realistic pixel art, even realistic ones.

As we know that basically a game consists of foreground, middle ground and background components which are one

unit in the scene. Of course, most of the games that we know have a main character who is part of the journey of the game itself which is usually a series of obstacles in achieving the goal. [8]

It is not about a good or a bad decision but it have to be about how far the picture can claimed as a pixel art. The picture art is supposed to be an integration of every elements in the picture. It is not a montage of several picture in pixel art style with different resolution. We can see some similarities or as we called it syntax in the characters that used in the game as we can accept the limitation and the uniqueness form of those character and have no doubt whether it is 8 or 16 bit style pixel art.



Fig. 3. Visual style [7]

We can see the character designs which are a single common thread which is then translated into pixel art. The chosen iconic form will blend with the visual experience and mental reflection of the player even though the form presented is not a real form that can be found visually in everyday life. By borrowing the term that was conveyed by Scott McCloud, we can see a glimpse of the picture when applied to a character in a game that uses a pixel art style.

Changes in shape as stated earlier when we decided to use pixel art are not shapes that imitate reality and project them with realistic shapes. Pixel art will lose its uniqueness if you do that. Many visual artists are trying to pixelate realistic images and make pixel art realistic, it seems there is a problem in understanding the diversity of styles.

As a cross development, it may produce new forms, but the thing that must be maintained is that pixel art is a method that does not refer to the visual style of its predecessors, but refers to forms that can be achieved with the existing technological conditions at that time.



Fig. 4. Visual style comparison [7]

We will use this opportunity to give a little discussion in the form of a description of the game player and onplayer, which is the enemy of the main character.

The design of these two characters uses the iconic style with the same ratio of about 1:2 heads. The thing that distinguishes the two are the attributes and forms attached to the resulting visualization. The main character has a form that is the normal standard for characters in the game where he wears work clothes equipped with a long-sleeved coat, shirt and tie and wears trousers and shoes. For the head looks neat hair with a normal face plus a little beard.

For the enemy, which in this case is a zombie creature, wearing untidy clothes such as a t-shirt or clothes that have an imperfect shape, wearing long pants. For the shape of the face we can see that the shape is not normal when we compare it with the previous character. His eyes seemed to widen, his mouth was covered in blood and he seemed to have damaged his head like a big wound .

To create a series of characters using pixel art is that all are bound by a guideline about limiting the number of pixels. As previously stated, a scene consists of three layers. The calculation when determining the smallest pixel is when the design stage is able to determine the smallest part of the image that still needs to be recognized. For example, the smallest body part that must be recognized. That's why we often see a character that uses a pixel art style that doesn't describe the face in detail, such as the eye. If this is done, the number of pixels will be large because it will also be applied to the property and background or environment. Following the limitations that caused this style to be born we have to calculate between details and gestures.



Fig. 5. "Infector" Toge Production [3]

Design is a process and an aesthetic activity. Design consists of actions and choices, this applies to every decision even for the smallest. Pixel art has its limitations. These boundaries or limitations may not be the same for every project or artist, but they are important for the work to be considered pixel art. Realism is not at the core of pixel art; pixel art is not meant to produce realistic work that demands a resemblance to nature and the greater the resemblance to nature, the less likely it is to be considered pixel art

IV. CONCLUSION

Pixel art is a medium that deserves to be explored because until now its uniqueness is still echoing both in the general public and in the academic realm. Its existence, which was initiated due to technological limitations, has now become a challenge to creativity.

Pixel art has to do with color conservation and composition. It's easy to get started but hard to master. requires an understanding of tools and techniques that can only come from experience and reflection. Indeed, it is these limitations that distinguish pixel art from other forms of digital art, such as digital painting. Contemporary pixel art is a deliberate attempt to limit the use of available technology.

Pixel art offers different visual forms which were originally a consequence of technological developments, which at that time were not what they are today. Its current existence is no longer due to this reason, but rather as an alternative that can be chosen to convey visual messages that are strung together in many media, one of which is games. We know that the game industry is currently very excited to present games that bring players into the game with very realistic visualizations and melt into it. Pixel art offers play and keeps the player aware that he is playing a game.

Pixel art is a visual approach that is able to produce visual signs that can distinguish one character from another. This technique is also a technique that allows the realization of a game with a production process that is simpler and cheaper. This advantage can support game artists to produce games more productively or even educators who need media to enrich the teaching process which is often referred to as edugame.

This is not an attempt to develop true pixel art or an official definition, but rather to demonstrate that it is indeed a wider medium and craft, not just a nostalgic style or practice.

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