Factors Affecting the Design of 3D Game Scenes

Disheng Wu[*]

University of York, Heslington, York, UK

* Corresponding Author Email: Dw1358@york.ac.uk

Abstract. With the rapid development of video games at present, 3D games as a big branch of games are also developing rapidly. Different 3D games vary greatly from each other. They bring different sensory experiences to players, game play and so on, but these contents set each other off and rely on each other. In every good 3D game, a good scene design is essential. However, the literature on 3D game scene design is scarce. Therefore, this article will analyze the influence of world view, art style, game genre and player experience on scene design, so as to bring some inspiration and guidance to the scene designers. At the end of the article, this paper concludes that there are many factors affecting 3D game scene design, not only the ones discussed in the article. In addition to the considerations mentioned in the article, a good scene designer should bring himself into the player's point of view. It is from the player's point of view that one can know more clearly what a good scene design is.

Keywords: 3D game scene design; sensory experience; artistic style; player experience.

1. Introduction

A good game scene design can provide players with a complete game design experience. In this environment, players can perform any behavior that is consistent with the rules of the game world in which they now live, and experience the fun of the game brought about by the interactive feedback of behavior. Scene design is an extremely important element in the game [1]. In the virtual entertainment world of the game, a finely crafted and exquisite game scene can set the atmosphere of the overall game. A good scene can quickly bring the player to the game plot, so that the game player can feel the game connotation and game culture that the game planner wants to convey.

Then, for different game designs, the factors affecting the game scene design are not all the same. The responsibility of level designers lies in how to reasonably process, embellish and combine the materials according to these influencing factors. The level designer's job is to create a game experience that is close to perfection.

Although the game scene is always visually represented in the player's eyes, the game scene designer is often the most neglected profession. Compared to character designers, this profession is even less known. With the rapid development of the game industry, game scene designers are getting more and more attention. However, there is relatively little literature available for people who want to become game scenario designers to study. So, this paper will discuss how they influence 3d game scene design by giving examples of comparison from game worldview background and art style, 3d game genre, and player experience. It is convenient for scene designers or people who want to become scene designers to bring some experience and inspiration.

2. Main body

2.1. The influence of game worldview and art style on scene design

Even though current games are classified in a variety of ways, they are more chaotic. However, there are many factors that affect their scene design that are common. Two of the most important is the worldview framework and art style that most games will have. This paragraph will explain in detail how these two factors affect the scene design of 3D games.

2.1.1. Game Worldview Framework.

Most games have a worldview framework. The definition of a worldview framework is that it is used to set and regulate the overall theme, elements, and conceptual settings of the game world. It is also a clear guide to the subsequent game content design and output. One of the most important game backstory and setting is also the most profound influence on the scene design. Different backstories can influence the scene design very directly. Space, time, atmosphere.

Take the "Cyberpunk 2077" [2] that was in the limelight some time ago. It was deep in the whirlwind of public opinion about the game's lack of completion when it was first launched, and was criticized by players for being half-baked. The fact is also true, the menu interaction is very cumbersome, BUG inevitable, the character model blurred and so on. But so many shortcomings still cannot hide the biggest advantage of this game, that is, the game scene design is very good. According to the scene designer of this game players can enter these skyscrapers, take the elevator to the middle of the building, and then climb the stairs to the roof, the whole process is seamless. Players can see rows of chairs, newsstands and other stores, clothes hanging out of windows, passersby sitting on balconies, delivery drones, and other details during the game. Fig.1 shows that the environment design team combined many things we know with futuristic elements to create a unique cyberpunk style.

Figure 1. Screenshots of Cyberpunk 2077

One of the designers of the game scenery mentioned that in the worldview framework Night City is located in California, and the reality of the place also provides a lot of inspiration for the game world. The design team visited many cities in California, especially the suburban areas. The movie "Blade Runner", the "cyberpunk bible", was also another source of inspiration for the game's design. He also mentioned that the team borrowed some inspiration from works such as the Japanese anime "Akira" and "Attack of the Bulge" [3]. The rough and tumble style architecture in Night City is also a very important part of the city scene design. As illustrated in Figure 2, this school of concrete and brick architecture began in the 1950s, and the team felt that its brutal and wild style of architecture was a perfect match for Night City's mega-corporate-dominated underpinnings.

Figure 2. Game screen from Cyberpunk 2077

So having a clear and distinctive worldview framework will have a significant impact on the game scenario design from all aspects. Conversely, excellent scene design will enable players to be more deeply involved in the story under the game's worldview.

2.1.2. Artistic style of the game.

The art style of the game and the worldview framework are complementary to each other. Neither can exist independently of the other. As answered in Ljubomir Peklar's interview [3], it was the game's theme and concept that influenced the art style in the development of this game. In this regard, Giguere's art expresses a similar theme and tone to Scorn, and once you get into that mood, it becomes natural to integrate his art style. And different art styles have different effects on scene design. The realistic style of game scene architecture is closer to the real world. For example, "A Way Out". And again, like the game "It Takes Two" [4], although both games are produced by the same company Hazelight. But the art style of "Two People Formed" is more cartoonish, relatively speaking, the scale of the scenes and characters in the game is different, and the players experience different effects.

Figure 3. Game screen from It Takes Two

"It Takes Two" is aimed at couples, so the art style of the game is set to be more cartoonish. Let players feel relaxed when playing. Also because of the cartoon art style and part of the background story set, the game's scenes are also designed to be more cartoonish and fantastical. The main character manipulated by the player in the game from the normal scale size of the character was reduced to a miniature figure, and the surrounding environment that people are usually familiar with living in suddenly looks huge in contrast. This allows the player to have a fantasy adventure from a more novel perspective in this novel scene. As illustrated in Figure 3, the game's vacuum cleaners, dolls, paper airplanes, and small animals all become more intriguing than usual because of its artistic style. This makes it possible for players to play with a relaxed, curious feeling all the time.

Figure 4 Game screen from A Way Out

On the contrary, the backstory of "A way out"(Figure 4**.**) is that the two main characters try to escape from prison with the help of each other. In this realistic background framework makes the player most of the time in the atmosphere of tension and excitement [5]. It gave birth to a more realistic art style. Everything in the game scene, doors, tables, fences, and characters are of the same scale as in the real world. This can make the player more immersed in it. When the player is deeply brought into the role of the characters, the realistic scene design gives the player a more realistic emotional experience. It allows players to empathize with the emotional changes of the characters in the game according to the plot, and even feel the deep betrayal at the end. There are even players who have quarreled and lost their temper with the two after the tour. So, it is easy to see that the game's art style largely influences the game's scene design. And the scene design can bring different experience effect to the players through these different art styles.

2.2. The influence of 3D game genre on scene design

As discussed in section 2.1, game classification is currently confusing, and many games can even contain many game genres at the same time. Therefore, this paragraph will focus on the factors that influence the scenario design of FPS, RPG and AVG games.

2.2.1. FPS Games.

FPS games are a general term for shooter video games that are played from the player's first-person perspective and usually require the use of firearms or other weapons for combat. There are many factors that influence FPS games, the most important of which is the rhythm style of the game set during the game design process.

Figure 5. Game screen from APEX Legends

For example, APEX Legends (Figure 5), Apex, produced by Rebirth Studios, is a fast-paced shooter that encourages players to actively play against each other as a team. In order to allow players to adapt to the fast pace of the game. They have added many mechanics to the game that encourage players to fight, such as upgrading armor, when players deal enough damage, their armor will be upgraded. In addition, the most obvious thing is that the terrain and buildings in the game scene are encouraging players to fight more often [6]. Players can intuitively feel that most of the buildings in apex have no glass windows and are mostly replaced by grilles. This also leads to the player cannot hide in the building, only forced to engage in combat. It is also because of this write building let apex in the birth of a variety of complex body style, a variety of climbing walls, slide shovel, jumping parkour action, which further accelerated the pace of the whole game.

Figure 6. Game screen from PUBG

PUBG (Figure 6), which is also a battle royale type fps game, gives players more options. The beauty of PUBG is that the game meets the expectations of different types of players. In this game, strong competitive players are no longer the constant winners, and luck and ingenuity will become extremely common. This feature is attributed to many factors, such as the familiar random events. But here in this article will focus on the analysis of the map planning this factor. Figure 6 also demonstrates that the map in PUBG also corresponds to different areas for different playing styles. The rules of this battle royale mode led players to clash over resources and advantageous locations, as these help-to-help players survive to the end. Strong competitive players who like to fight will choose towns with more concentrated resources and more enemies. Players who prefer to stay alive will choose areas with fewer resources, but also fewer enemies [7]. In addition to the overall map design, the design of some of the pubg buildings will also affect the different game experiences of these different players. For example, the same tall building, players can choose to hide in the corner of a room waiting for the next safe zone to refresh. Or perhaps run to the roof to shoot the enemy.

Figure 7. Game screen from CSGO

The traditional shooting game like CSGO (Counter-Strike: Global Offensive, 2014) needs to be more strategic while balancing both sides of the map as much as possible. As can be seen in Figure 7 it is not difficult for players to find that the popular level maps in CSGO often have some connectivity and detour structure, and this structure can greatly increase the strategy of the game, players have more tactical ideas when attacking, and the turn points are more fluid. The attacking side can make strategic offensive transfers through the middle, while the defending side can also gain certain information resources here. But at the same time, if the layout is too complex, the whole map will change like a spider web-like maze, players will be obviously dizzy in the map, the game experience will also be greatly affected, so how to weigh the trade-off is the test of the designer's moment. Not only that, but because the map is smaller than in Battle Royale games, every area of CSGO has the potential for combat. Therefore, the map scenarios of these games should be designed with enough cover to meet certain encounters, while trying to avoid large and empty map designs.

So, in general, the scenario design of these shooters has its own unique design elements. These are influenced by the different rhythms of their games. Different game rhythms give rise to different scene designs, and the two complement each other to bring players a smoother and more comfortable gaming experience.

2.2.2. RPG and AVG games.

The reason for including these two game genres together in this paragraph is that most of these two types of games will contain a game storyline. While RPG may have upgraded elements compared to avg, and this also affects the scenario design, this section will be explained in detail in 2.3 of this paper. The impact of the plot on the scene is very direct and significant. Because the most basic elements of the game plot are time, place, and characters. The scenario design contains exactly the place and the time. In short, an RPG game is a failure if it lacks a sense of immersion and immersion.

Because the player can only fully enjoy the game world in the role they play, the production staff carefully designed things. And any design that affects the sense of immersion, in RPG games should not appear in the failure.

Like in the Legend of Zelda Breath of the Wild this RPG game (Figure 8) in the story is taking place in the catastrophe hit the kingdom of Hailaru 100 years later. At this point the game's scenario design should be in line with this setting, and Breath of the Wild did do. The entire map is filled with dilapidated buildings, but also has a recovery of the town after the disaster. Everything is in line with the background setting. And although this is an open world, there is an obvious visual center point, which is the final boss where Hailaru Castle is located. In line with the plot design, designers also need to take into account the impact of gameplay, such as the various temples and shrines in this game. There are more than 100 different ways to solve the puzzle or combat gameplay, and this gameplay is also composed of the scene elements. Move the ball, rise the water level, ride the wind, and so on are realized by the different devices and props in the scene. So, in RPG and AVG games, the scenario designer needs to consider many factors. These factors not only affect whether the game plot can be shown to the players in full, but also whether the game play can be perfectly realized.

Figure 8. The Legend of Zenlda: Breath of The Wild

2.3. Player experience

In the end, the most important thing in the game design process is the player experience. Can the players bring themselves into the game? Will they feel proud and excited during the growth of the main character? Will they feel sorrow and anger because of the loss of the game characters? In order to achieve this level, the scenario design must be immersive enough. The scenario design must be immersive enough to influence the player's experience by inadvertently driving or hindering the game's progress.

In order to make the player more immersive, the game scene must be reasonable enough. Scene items must fit the background setting [8]. Imagine what it would be like to play Assassin's Creed set in the Middle Ages and have an airship full of laser cannons appear on the side of the road. But at the same time, not everything in the scenario design has to make perfect sense in order to have a good experience. In some cases, designers need to bring out their ghostly side and make the reasonable appear unreasonable to achieve the effect of amplifying a certain experience.

Take The Legend of Zelda Breath of the Wild as an example. In the early stages of the game, there is basically no mandatory guidance for the player, but rather through the plot and the player's exploration layer by layer. Separate teaching the basic operation, backpack system, weapon and equipment system, Hica's Stone map system, state system, cooking system and basic combat, Link ability. And a large part of this is done through the map design to guide [9]. For example, in Link just woke up will find in a temple, and if you want to leave the temple will have to climb a high platform cannot jump on. At this point, the player inadvertently learned how to climb the wall, but also learned to climb the wall when consuming the physical bar set. After leaving the temple, with the camera and Link's movement. Along with the music that moves the heart, the game gradually shows the player the core target location of the game, Hailaru Castle. But more importantly, the side of the conversation

shows the player a pathway, the player can easily find this weak guide path and follow its action. And all of this in a sense belong to the player's own discovery, which certainly improves the immersion of the player.

But the premise of all this is that the scene design is reasonable, is in line with the background setting and the player's perception. But on the other hand, as a scene designer must learn to turn the unreasonable into reasonable, so that the reasonable in the unreasonable. This can highlight some things. For example, the Elden Ring [10]. At the beginning of the game, it also has a similar design. When the player wakes up and discovers a series of background and scene settings, the player will enter the battle, allowing the player to familiarize himself with the operation of the game. But because the monster is too powerful for the initial protagonist, normally the player will be killed and then fall off a cliff. But if the experienced or talented players defeated the monster, then as a designer should be how to further promote the next plot development. Elden Ring did a good job, they placed a message note next to the cliff, and players will be curious with the idea of why there will be a message note here to the cliff to see. At this point the player will be in the hands of the level designer, the cliff collapsed, the player will still fall to the bottom of the cliff. This is a reasonable and unreasonable clever control and design.

3. Conclusion

In conclusion, as a scenario designer in the scenario design planning to take into account a lot of factors affecting. The first is to consider the game's worldview framework and art style factors. Both of them largely determine the visual performance of the scene design. In addition to this, the type of game should be taken into account, and the influences that need to be taken into account vary from game to game. At the same time, a good scenic designer should also try to take into account the player's experience, especially in terms of improving immersion. But as a good scene designer, the most important thing to pay attention to is not only the content mentioned in the article, but also to bring yourself into the player's perspective. Only from the player's point of view to make a better scene design. In the future, the importance of scene design will be understood by more and more people. And with the development of technology, it will be easier and faster to design a scene, such as using AI painting to create the original scene art. So this will lead to scene designers need to learn more productivity tools to design better game scenes. And how to make reasonable use of these tools will be the future scene designers need to solve a major problem.

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