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Discussion on the Sense of Exploration in Games

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Abstract: This paper explores human curiosity and desire to explore, particularly how these desires are stimulated in unknown environments. Electronic games, as a medium that is completely unknown before the experience and gives players freedom of movement, can particularly arouse players' curiosity. This article analyzes existing game design examples, studies how to meet players' exploration needs, and proposes several design ideas that help enhance the sense of exploration. Firstly, this article emphasizes that games should try to avoid excessive guidance and interference, reduce players' frustration in exploration, and ensure that the immersion of the game world is not disrupted. Secondly, the article proposes that maintaining challenge and appropriate difficulty in games can increase the excitement of exploration. At the same time, by setting diverse reward mechanisms and unexpected surprises, the fun of the exploration process can be further enhanced. This article summarizes these design strategies and provides specific guidance for exploratory games, aiming to help game designers better meet the needs of exploratory players and stimulate their desire to explore, enabling them to have a richer experience in the game.

Keywords: Curiosity, Exploration, Game design, Electronic games.

1. Introduction

Everyone has a desire to explore, and the mysterious and unfathomable places seem to awaken the indescribable impulse in everyone's hearts, an instinct deeply buried in their blood, eager to unravel the mysteries of nature and history. The essence of this desire is actually a kind of curiosity, which can be divided into two categories: one is the detection of information gaps caused by cognitive conflicts, and the other is the detection of situational prediction errors caused by the detection of novel situations [1]. This exploratory desire mainly comes from the latter. When an individual is in a new or changing environment, there is a gap between the predicted reality and the key brain area of the hippocampus that forms the cognitive map, which in turn stimulates the subpopulation of hippocampal neurons and triggers exploratory behavior to solve uncertainty. So in fact, in any unknown environment, the hippocampus will detect scenario based prediction errors, generate curiosity, and drive people to actively explore the unknown world, making unknown scenarios known. Before experiencing each game firsthand, the entire world it shapes is completely unknown. Therefore, electronic games are a particularly easy medium to stimulate curiosity, and it is not only in games that serve exploration that players have a desire to explore. Almost all games that allow a character to move freely in a certain area can arouse players' curiosity. And this group of people with strong curiosity plays the role of exploratory players in the Batu player model in the game, eager to

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explore the various mysteries buried in all game types [2]. This article aims to explore what kind of games are more exploratory for players, and how games can attract exploratory players, hoping to provide some design ideas for games that serve exploration.

2. Analysis of Methods for Maintaining Players' Exploratory Desire in Game Design

Due to the fact that every player spontaneously develops this desire for exploration, the sensitivity level varies among different individuals. So it's best for every game to maintain players' curiosity as much as possible without affecting other features. The following text will introduce the elements that need to be considered in game design to maintain players' exploration desire and interest, and explore them through case studies.

2.1. Avoid Disturbing Guidance

When players enter the game, a problem that designers must face is how to make players play the game in an ideal way, and the one responsible for this function is guidance. But exploration is a process of following one's curiosity, and no player would want someone to chatter incessantly along the way. Therefore, in order for players to focus on exploration, the first problem to be solved is how to prevent them from being distracted by guidance.

The role of guidance can be divided into two categories. Firstly, mechanism teaching, which will be analyzed through examples.

Counterexample1: *Final Fantasy 7 Rebirthhe* game will suddenly pause and forcefully insert a knowledge point that needs to be read during all natural running processes. Hard guidance like this will interrupt the player's flow and disrupt the immersion during gameplay.

Counterexample2: *Uncharted 2* will only use relatively short text reminders on the screen at the time when the protagonist needs to operate to prompt players on how to operate. This is called soft guidance, which retains the player's freedom to operate, but like strong guidance, it will still appear unstoppable on the screen, and players may not want to watch it.

Solution 1: Let the player trigger the teaching themselves. For example, in A Short Hike, the method of teaching players how to climb is to arrange a climbing club on the beach along the way. When the player sees its members doing this skill that they have not yet learned, they will become curious and ask.

Solution 2: Let players understand the teaching themselves, for example, in The Half Life, the method taught to defeat zombies is to use a removable saw blade to block the player's path before the zombie appears. Players naturally guess that they should throw the saw blade out of their hand, which is also the ideal way to defeat such enemies.

In solving the teaching problem, guidance still faces another challenge, which is how to control players' behavior and make them play the game according to the route set by the designer.

Counterexample: For example, in *Cyberpunk 2077*, in a mission to search for Non Player Characters (NPC) in bars, the target objects at the bar entrance and connector will be marked with a prominent yellow exclamation mark on their heads, allowing players to easily find their targets without thinking. Strong guidance like this, accompanied by an overly clear goal, will make players focus only on the goal itself, while exploration is focused on the process.

Example 1: In *God of War*, the next direction to take is marked with a golden symbol to remind players. The symbol integrated with the environment in the scene tells us the direction of our home's progress, replacing the Head Up Display (HUD) in the counterexample.

Example 2: When *The Elder Scrolls V* is about to part ways with La Rochelle, he will tell the nearby town of Riverwood that his sister will help people, allowing players to trigger interactive

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elements of the game as the game progresses, and integrating the guide into the story of the game. In this way, players will feel that these guides already exist in the game world.

This weak guidance will integrate the guidance into the game world itself, without making players feel abrupt.

Solution 1: Let the player see the route. Compared to *Journey*, the player will always see a prominent mountain in their field of vision, and the location of that mountain is the direction the game is going to take.

Solution 2: Let the player try a route, such as *Holow Knight*, from the Forgotten Cross Road to the Azure Path, which is the only direction the player can move forward after trying other roads without success.

2.2. Avoid Disappointing Thoughts

Controlling actions also includes another aspect, which is how to prevent players from going to places they shouldn't.

Counterexample: Air walls and everything else will only be discovered by players after they try. For example, there are many air walls in *Octopath Traveler* that appear to be walkable but cannot be walked. This counterintuitive collision will dampen the player's thoughts.

Solution 1: Visible is reachable, for example, in The Legend of Zelda: Breath of the Wild, all walls and slopes can be climbed.

Solution 2: Reduce the generation of thoughts. For games with a serious tone that are not suitable for wandering around,

In this way, it is possible to avoid the situation where the game only meets the expectation of reaching a certain place in action, and the frustration of thoughts is more likely to occur in interaction and feedback.

Counterexample: The bullets in *Starfield* do not have any splashes when they enter the water. According to the laws of reality, it can be done but not, contrary to intuition.

Solution 1: Set enough interactions in advance. The tables in *Enter The Gungeo*n can be kicked over, pushed, broken, or blocked. Can catch all the thoughts of players.

Solution 2: Directly assign physical laws that conform to reality to objects, such as the rope in *The Last of Us: Part II*, where players can perform all their intuitive actions on the rope,

2.3. Avoiding Game Settings from Playing Out

In addition to the disturbance caused by guidance and the frustration of thoughts, there is another factor that can greatly damage the player's focus on exploration, which is the game's setting of the play. This section mainly discusses the level settings that are particularly important for the exploration experience, as other settings are equally important in all types of games.

Counterexample 1: *Sifu's* fourth level building appears large on the outside, but the interior space for walking is only a few hundred square meters, resulting in a lack of unity between the interior and exterior of this level.

Counterexample 2: *Dark Souls II*, the bulldozer tower appears as an independent building when viewed from the outside, but when taken by an elevator, it leads to a lava filled oil valley, which is spatially disordered.

Solution 1: Make all levels conform to internal and external consistency, avoiding solid rooms and spatial errors.

Solution 2: The level can be designed in the form of a dungeon, as the design of the rooms dug out underground is relatively simple. The gaps between rooms, including the exterior of the rooms, are

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made of soil, and it is difficult for the exterior to be inconsistent with the internal structure. At most, only the issue of whether the rooms will overlap in the same space needs to be considered.

Another key factor in making game settings play is the loading process. Since the late 1980s, when game storage media shifted from cassette tapes to magnetic tapes, it has always been a challenge that game developers must face. However, due to technological advancements in memory reading speed, the loading process of games cannot be truly eliminated at present.

Counterexample 1: Black screen loading occurs during the transition scene of Tales of Arise, because according to IBM researcher Doherty's research, any system needs to respond to the user's operation within 400ms in order to keep the user focused, and such loading obviously harms focus [3] .

Counterexample 2: *Ridge Racer* stuffed a playable mini game into the loading process and even applied for a patent for this method [4]; Persona5 can use the transformation of splicing clippings to make the loading process look very smooth; HifiRush always takes advantage of every opportunity to switch levels and tell stories. These methods are considered good solutions compared to the former, but they still belong to strong perception loading design, which will make players jump out of the game process and not very suitable for exploration.

Solution 1: Channel loading. *In Portal*, players will always board an elevator when switching scenes, and the process of descending with the elevator is reserved for backend loading.

Solution 2: Slow loading, *Tomb Raider* deliberately slows down the player's movement speed during scene switching to delay loading time.

Solution 3: When loading the camera, *Hellblad*e will slowly move the lens to the protagonist's face, depicting the inner activities of the female lead while following her perspective to complete the scene switch

This type of loading belongs to a weakly aware loading design, allowing players to pass the loading process without realizing it, and cleverly packaging to hide the loading process.

3. Analysis of Methods that Make the Exploration Process Enjoyable

Merely maintaining the desire to explore in the game is not enough. What we just discussed is just the deduction items that the game should avoid.

3.1. Stimulus

One of the reasons why exploring this behavior is interesting for many people is that they can experience the excitement under crisis. This experience is similar to the experience of haunted houses and roller coasters, where players only enjoy the thrill of fear when they are in a controllable crisis. From this perspective, electronic games are an excellent carrier for enjoying this pleasure, so games must make players feel like they are in danger, which means they are prone to death and have difficulty [5].

For example, most of the time in my world is of high difficulty. This block world is full of dangers, and those areas are full of threats for players who are new to it. The experience at this time is full of excitement, but as they conquer one difficulty after another and their weapons become more complete, the series of challenges they once faced gradually no longer pose a threat. At this point, the excitement of being in a crisis also disappeared. So maintaining a high level of difficulty at all times is crucial for stimulating the exploration process.

However, relying solely on high difficulty is not enough to feel stimulated, as players fear the punishment of death rather than death itself. For example, *Getting Over It with Bennett Foddy*, the difficulty curve of this game varies reasonably with the process, and the difficulty of each stage is equivalent. However, the later stages of the game are definitely more tense than the early stages,

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because in situations where failure is equally easy, the distance between failure and decline in the later stages is even greater.

So the thrilling experience in the game requires both high difficulty and high death penalty.

3.2. Rewards

Activities that only have excitement should probably be called adventure, and spiritual wealth may not necessarily convince people. Substantive rewards are obviously more motivating for most people.

Rewards are not something that makes people feel happy just by receiving them, in fact, the entire process of expecting rewards is joyful.

In this paper on the neural mechanisms of rewards and expectations, researchers tested the stimulation levels of neurons in the ventral tegmental area and substantia nigra of a group of monkeys under different expectations and rewards [6]. This area of the brain has a group of dopamine neurons specialized in processing reward events. According to the experimental results, dopamine neurons have already shown a significant increase in activity when they anticipate that rewards will appear. When this indicates that pleasure comes from predicting that we will reap rewards on this journey and that the journey has already begun, so when players predict that they will receive rewards before and after exploration, they can feel happy. The process of predicting their own step by step approach to the reward during exploration is itself happy.

However, when the reward matched expectations, these neurons did not show significant fluctuations compared to before. If players can accurately predict rewards, the moment they receive them does not bring us pleasure. Therefore, a game that tells players what specific rewards will be obtained after completing a task before each task does not generate any satisfaction when the task is successful. To make players feel happy when receiving rewards, it is necessary to create a positive deviation between the rewards and expectations.

The way to generate positive bias is to assign reward uncertainty. In this paper on uncertainty motivation, an experiment was conducted, in which participants were randomly divided into two groups and required to complete a task of drinking 1.4 liters of water. The participants in the definite group will receive two dollars after completing the task, while the uncertain group will receive one or two dollars based on the result of flipping a coin [7]. The result of the experiment was that 70% of the uncertain group successfully drank 1.4 liters of water, while only 43% of the determined group. This indicates that when the values of the two are comparable or even slightly lower in uncertainty value, most people are more willing to pursue uncertainty rewards. So unpredictable rewards are more attractive than definite rewards. That's why collecting larvae to exchange for gifts with Grandpa Bug in the Hollow Knight is particularly enjoyable, because I don't know what I will get. So, except for games like Monster Hunter that require repeated gameplay, it's best not to let players know in advance what rewards they will receive.

And it is also necessary to make players unable to guess what the reward is, that is, to increase the richness of the reward. For example, after defeating the boss with *Elden Ring*, players may receive one of more than a dozen types of weapons, ashes, Lingzhu, reminiscence, props, and so on. In addition, there are 472 types of weapons and downloadable content (DLC) alone, completely eliminating the possibility of players guessing rewards and making them more valuable.

3.3. Discovery

In fact, the only thing that drives players to explore for the first time in the game is the curiosity mentioned at the beginning. The producer of *Outer Wilds* stated at the Game Developers Conference (GDC) that curiosity is the only driving force in this game without any character growth, and this alone is enough to attract exploratory players. This intrinsic motivation, which disregards external

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rewards, drives players to fly into space countless times in *Outer Wilds* without knowing that it will bring any external rewards. And what players crave is to discover novel things. Novel stimuli can significantly activate the substantia nigra and ventral tegmental area, which are the key brain regions for managing reward events mentioned earlier [8]. So for players, aside from substantial rewards, encountering things they have never seen before during exploration can bring an intrinsic reward, which is the true intrinsic motivation of exploration. And what game developers need to do is to provide as much novelty as possible. So in Dark Souls III, the experience of crawling out of the cemetery and seeing Irushir will elevate players.

But in addition to novel things, there are often many hidden elements in games. Game developers would rather take risks that most players cannot experience than spend huge costs to produce content that is difficult to discover. Because whether by chance or intentional exploration, players do not have expectations before discovering them, so there is another sense of surprise. And those things often also meet the standards of novelty mentioned earlier, and this unexpected discovery can make one feel a sense of awe that has never been felt before in this life. This explains the significance of placing a hidden door at the entrance of the *Dark Souls* I tree hole, which will not make missed players feel uncomfortable, but will also amaze players who accidentally discover it.

And this situation is an experience that is difficult to achieve in reality, because as time goes by, the secrets that the Earth hides from humans become fewer and fewer. Almost every place that can be thought of has been imprinted with human traces, and any finger on the map can find the name of a adventurer there. This experience can only be achieved within the game.

4. Conclusion

This article mainly discusses how games can maintain players' exploratory desire and how the exploration process can become interesting. It proposes that exploratory games need to avoid guiding and disturbing players' exploratory desires, prevent thoughts from falling through, and set up scenes. In order to make the exploration process interesting, they should strengthen the provision of three emotions: stimulation, reward, and discovery. This paper still needs further research on the impact of specific examples on player exploration behavior. Future research can focus on enhancing exploration behavior methods and new game design strategies, as well as the connection between psychology and player behavior.

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