

Essential Principles of Video Game Character Design: Impact of Bugs on Gameplay and User Engagement

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Abstract: *This paper examines core principles in video game character design and how design errors affect gameplay and user experience. By analyzing character aspects such as visual identity, animation smoothness, behavioral adaptability, and audio effects, the study identifies critical factors that enhance player immersion. Errors in these design aspects, like visual or audio desynchronization and predictable behaviors, disrupt player engagement. Findings underscore the importance of a comprehensive approach to character development, aligning visual, auditory, and behavioral components to ensure a cohesive player experience.*

Keywords: character design, video game immersion, user experience, animation realism, cognitive tension

1. Introduction

Character design for video games is a process that requires consideration of multiple aspects, such as visual aesthetics, behavioral patterns, animations, and sound effects. Characters in gameplay form the foundation of the narrative element, creating an emotional connection with the player and influencing their perception and immersion in the game world. This aspect of game development is especially relevant in the competitive video game market.

The importance of this topic is underscored by the fact that errors in character design—such as inappropriate animations, weak AI, or visual inconsistencies—significantly degrade gameplay quality and cause cognitive dissonance for the user. Poorly developed characters break immersion, leading to a loss of interest and reduced user loyalty. Attention to detail in character design has become a necessary aspect of video game development, determining the product's success and competitiveness in the market.

The purpose of this study is to analyze the main principles of character design for video games and examine how design errors impact gameplay and user perception.

2. Materials and Methods

Methods of theoretical analysis, synthesis, and comparative analysis were used.

The article by Bouquet E., Mäkelä V., and Schmidt A. [1] analyzes constructive aspects that enhance the perception of companion characters in video games. The authors emphasize features fostering a strong connection between the player and character, focusing on the design and behavior of virtual companions. The study notes that the player's emotional response influences overall engagement in gameplay.

The study by Sierra Rativa A., Postma M., and Van Zaanen M. [2] investigates how the appearance of game characters—specifically anthropomorphic animals—affects the user's level of empathy and immersion. The article demonstrates

that virtual characters resembling real animals encourage empathy and engagement, in contrast to robotic counterparts. These findings underscore the importance of visual appeal and character similarity to living beings in creating emotional attachment.

Kim S. K., Ai He Y. U., and Kim S. K. [3] focus on character design that influences player interaction with the game. The study notes that a well - thought - out character design enhances engagement, as players more easily identify with such characters. The research emphasizes the importance of color palette, shape, and details that form the hero's image.

Garavaglia F. et al. [4] examine the integration of agents with distinct personality traits to enhance storytelling in video games. Characters with different personality types, such as those inclined toward sadness or joy, expand the possibilities for gameplay interactions, as they allow for the creation of diverse scenarios.

Huang R. F. [5] discusses the concept of “flow,” defined as the effect of deep engagement on video game perception. The author notes that the ability to create a flow state is closely linked to immersion, influencing satisfaction and players' motivation to replay the game.

Mikhailov M. S. [6] describes the stages of creating a character in 3D graphics, emphasizing details that give the character vitality and authenticity. The author discusses the features associated with modeling and animation, showing how they affect emotional perception.

Kucher T. [7] analyzes principles and practices in developing educational game environments. The author emphasizes that well - designed game worlds promote active learning and user motivation, with primary attention given to the interaction between educational content and game mechanics, which should be intuitive and stimulating.

These studies highlight aspects of character development and game environments, demonstrating that attention to detail in visual appearance, characteristics, and interaction greatly influences players' emotional perception and engagement.

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3. Results and Discussion

Designing characters for video games requires analysis of numerous aspects, from visual aesthetics to behavioral algorithms, which are crucial in creating a complete experience for players. Creating believable characters goes beyond appearance, as it includes developing response mechanics and action execution in interaction with the environment. However, errors at any stage lead to cognitive dissonance, causing players to feel detached, which reduces interaction quality and disrupts the perception of the game world. Central characters have significance beyond their plot role; they serve as mediators through which hidden meanings and story symbolism are revealed. Thoughtful design creates fully realized personas that transform narrative boundaries and establish an emotional connection with the audience. Key aspects for developing complex, realistic characters are presented below.

A fundamental trait of a believable character is “humanity.” To achieve this, the character must be imbued with the capacity to experience emotions and inner dynamics: autonomy in decision - making, responses to conflicts, and transformations influenced by events. This approach forms a unique persona that undergoes both physical and psychological changes. In this case, conflict is an element that adds depth to the character. Internal dilemmas, triggered by beliefs or life experiences, enrich the personality and make it multi - dimensional. External conflicts, arising from encounters with other characters or circumstances, deepen a world of complex relationships and struggles, making it more convincing.

A character’s backstory and motives help add depth to their persona. Detailing their past, personal goals, and circumstances enhances the rationale behind their actions, making choices more realistic. This method adds layers, revealing the internal world. Table 1 below presents aspects of character creation.

Table 1: Description of each of the aspects for creating a character in a fictional world [6]

Category	Description
Integration with the surrounding world	The character should stylistically harmonize with the fictional reality surrounding them, enhancing the impression of the world and helping the viewer become more immersed. For example, if the setting is a grim universe of spaceships and barren planets, a bright fantasy - style hero with swords and magic would look out of place. This underscores the necessity of synergy between character and environment.
Consideration of canon and context	The character’s appearance should align with the rules and canon of the created universe to avoid stylistic conflicts. Exceptions include projects where style fusion is foundational (e. g., “Rick and Morty” or “ARK: Survival Evolved”). In such projects, stylistic experimentation is allowed but requires a thoughtful approach to maintain coherence.
Clarity of visual appearance and role	The character’s appearance should immediately convey their function in the world; body type, facial expressions, and clothing should emphasize their role. For historical or realistic projects, particular attention to detail is required, achieved by studying credible sources. This approach helps the viewer instantly identify the character’s purpose and significance in the narrative.

Visual expressiveness of a character should be based on a concept that reflects their personality, background, and role in the story, maintaining unity with the surrounding world. Professional design requires consideration of shapes, volumes, color harmony, and textures, which intuitively convey character traits and aid player orientation. A breach in visual integrity, such as a hyper - realistic character in a cartoonish environment, complicates logical associations and reduces immersion. Detailed descriptions of appearance complement the inner world, creating a memorable image that evokes associations.

Gameplay interaction creates a connection between the character and the player. Animation conveys the essence of the main character, creating an illusion of life. Developing movements, from simple actions to combat maneuvers, requires attention to smoothness and adherence to the laws of physics. The application of inertia, weight, and flexibility allows characters to blend seamlessly with their environment, enriching the gameplay. Delays in animation or synchronization issues, especially in games with intensive mechanics, disrupt the continuity of movement, reducing the enjoyment of the game.

Character behavior logic requires flexibility so they can react to player actions and maintain realistic behavior in changing conditions. Dynamic behavior patterns ensure interactive engagement. Errors, such as predictable actions or lack of adaptability, make opponents easily vulnerable, diminishing the game’s appeal.

Audio accompaniment enhances the character’s impression by complementing visual and behavioral aspects. Sound effects help track character activity, such as footsteps, strikes, or other actions that may serve as danger indicators. Sound integration errors, like desynchronization between sound and action, create cognitive strain and reduce immersion, especially in games where sound design plays a significant role, such as stealth games.

Elements such as multi - variant dialogues, interactive scenes, and side quests contribute to emotional engagement and deepen interaction [6].

Character creation begins with selecting the game’s genre and world. Anthropomorphic characters, which are relatable and evoke emotions, elicit the greatest response. These include elves, xenos, dwarves, and other anthropomorphic creatures. Table 2 below presents types of characters in the game world.

Table 2: Types of characters in the game world [7]

Character Type	Description
Humanoid forms	Characters that combine human and animal traits, such as animals with human characteristics. They add diversity to the game world, giving it a unique flavor. An example is the Sonic series, where characters exhibit human attributes.
Robotic beings	Robot companions for resource gathering in Deep Rock Galactic, adding a sci - fi element and realism through well - thought - out details or functions.
Abstract forms	Characters with undefined outlines, such as mystical cube - shaped bosses or abstract creatures. Often serving as antagonists, they create an atmosphere of mystery, like certain bosses in Genshin Impact with unusual, abstract forms.

The main character should be visually appealing and easily recognizable. To achieve this, the following requirements must be considered:

Clarity of role. For the character to fulfill their function successfully, they should be tested in various scenes to ensure that each detail aligns harmoniously with their image.

Harmony of shape and color. Mistakes in shape and palette choices can reduce interest in the character. Excessive stylization in historical projects may cause dissonance; for

example, an oversized sword may disrupt the perception of authenticity.

Emotional expressiveness. Facial expressions and movements bring the character closer to the viewer. Preliminary sketches with various facial expressions help create a more detailed and dimensional image [7].

Table 3 below describes the impact of errors on gameplay and user perception.

Table 3: The impact of errors on gameplay and user perception [7]

Category	Description
Immersion and emotional attachment	To create emotional attachment to a character, detailed development of visual, audio, and behavioral elements is essential. This helps establish a cohesive, multi - dimensional image. Errors, such as mechanical reactions or visual inconsistencies, disrupt this effect, causing detachment and reducing immersion. For example, if the character's behavior appears unnatural, the player loses a sense of connection to the game world.
Interactive engagement and interaction satisfaction	Enjoyment in interacting with the character is achieved through precise animation, realistic physics, and appropriate sound accompaniment. Errors in animation or weak AI reduce interest in the game. For instance, a poorly developed animation system or predictable behavior patterns lead to boredom, especially if the character has a limited, repetitive set of actions.
Cognitive strain and negative perception	Animation delays, repetitive behavior of secondary characters, and desynchronized audiovisual elements become noticeable to experienced players, leading to negative emotions.

Developing the strengths and weaknesses of a character helps achieve harmony in their personality. Strengths, such as intelligence or emotional resilience, shape a positive image, while flaws—such as impulsiveness or stubbornness—add realism, deepening the understanding of the character.

4. Conclusion

This study concluded that successful video game character design requires cohesive alignment between visual, auditory, and behavioral aspects. Design errors such as inconsistent animations and predictable behaviors can significantly disrupt player immersion and enjoyment. Implementing fundamental design principles ensures an engaging experience that promotes lasting player engagement and strengthens user satisfaction.

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