Proceedings of the International Conference on Social Psychology and Humanity Studies
DOI: 10.54254/2753-7048/9/20230137

Exploring the Impact of Game Human-computer Interaction Design on Enhancing Users' Immersive Experience

Mingxuan Chen[1,a,*]

[1]*Zhejiang Wanli University, Zhejiang Province, 315100, China*
a. cmxcmx1156469516@163.com
**corresponding author*

Abstract: As a new form of artistic expression with infinite possibilities, interactive film games first trace the history of the creation and development of interactive film games at home and abroad; and then show the characteristics of the interactive film form with examples. This paper focuses on the interactive experience and the development process of interactive cinema, and the relationship between film interaction design and the user's immersive experience. Interaction design accurately plans and describes the behavior of things, and effectively describes and communicates this behavior, which is an integral part of the user's immersive gaming experience, while the behavior fed back to the user by interaction design directly affects the user's gaming experience.

Keywords: immersive experience, game users, interaction design, interactive film games

1. Introduction

Interactive cinema has become one of the important trends in the future development of cinema. The result of audience participation in interactive sessions leads to a multi-threaded plot direction, and this multi-threaded and non-linear narrative approach make the audience pay more attention to the unpredictable ending of the story. The game turn of film narrative and the narrative value of game stories and how to make users have a better immersion experience have also has attracted a lot of attention from scholars [1]. In response to the inevitable trend of development, some thoughts are given on the constraints and effects of interactive movie games on user immersion experience. Interactive movie games adopt an interactive and non-linear narrative approach. Players can participate in the plot during the interactive part of the movie and feel the psychological experience like never before. Therefore, the author intends to illustrate the development process of interactive movie games and give examples of related games.

2. Introduction to Related Concepts

2.1. Interaction

Interaction is a form of communication. Interaction design is the communication and interaction between human and computer. It relies on sensory art and electronic art to stimulate the viewer's senses and receive this information. And it provides information feedback to the viewers through their senses and reactions.

DOI: 10.54254/2753-7048/9/20230137

2.2. Immersive Experience

Immersive experience is one of the most important aspects of positive psychology, and usually refers to a state of forgetfulness in which an individual is fully absorbed in a situation. Immersive Experience is about focusing on a target situation created by the designer, using sensory and cognitive experiences to create an atmosphere of pleasure and satisfaction that allows participants to briefly forget about the real world. Immersive Experience requires a context based on temporal and spatial environment.

2.3. Theory of Mind Flow

The theory of mind flow refers to the feeling of betting one's mental energy completely on a certain activity, which is accompanied by a high level of excitement and fulfillment [2]. This means that when work is fun we have created complex, but negotiable challenges, challenges that allow the individual to engage or disengage, to work harder or work safer [3].

The theory of mind flow has been used in many fields of research, including sports, education, online gaming, and corporate offices. As a cutting-edge theory in positive psychology, the mind flow experience brings people mainly positive feedback experiences, and if they cannot control themselves and over-immerse themselves, they may engage in behaviors that lead to the so-called addictive behaviors. It is easy to understand that compared to other activities, online games are more likely to stimulate people's mind-flow experience because of their graphic stimulation, skill challenge, and timely feedback, but excessive immersion in the game can lead to addiction. By comparison, we can see that the positive experience perception and user self-control characteristics in the concept of mind-flow experience fit the core of positive psychology theory, compared with the general user experience, which lacks positive and negative attributes, and the addictive behavior, which lacks self-control. In communication, marketing, and other related disciplines, the mind-flow experience is mainly referred to as an immersive experience.

2.4. Interactive Game Movie

Film and video games have always occupied a pivotal position in the entertainment market, and the integration of the two seems to be a trend. Interactive film is a kind of interactive art using moving images as its medium, and its core feature is interactivity [4]. It exists between film and video game(as shown in Figure 1), with both the audiovisual art expression of traditional film and the interactivity of video game, making the audience positioned as both film viewers and game players. It has a high value in text analysis.

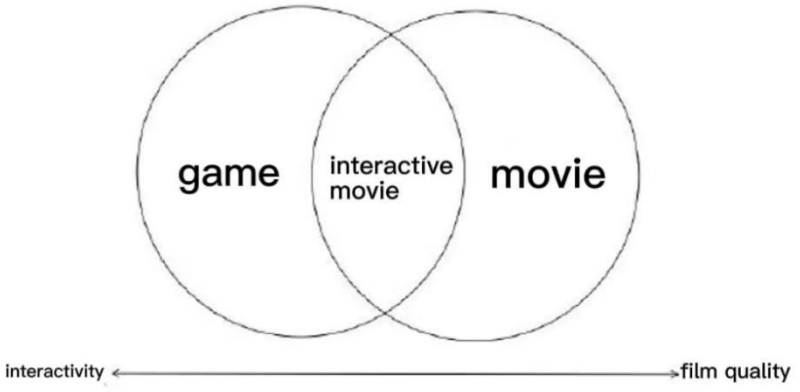

Figure 1: Interactive game movie [4].

DOI: 10.54254/2753-7048/9/20230137

3. Innovation in Interactive Movie Games

In addition to the movie-like effects, immersive experience, and operation, the core of interactive cinematic games is the branching options in the plot. In the chapter-divided Telltale Games game series and *Life is Strange*, each player's choice is more like a fine-tuning of the plot details, but can not affect the final ending of the game. This powerless and out-of-control emotions will greatly affect the player's immersion. But in Quantic Dream's latest release, *Detroit: Become Human* (as shown in Figure 2) [5], the game's background is set in the virtual city of Detroit in 2038, and players will play the three protagonists, Carla, Connor and Marcus, respectively according to the chapter, making different choices to determine the game's ending. Not only does the main plot offer multiple endings and multiple choices, but the combination of different options will also bring about different results. In addition, similar to the "filler"-like positioning of the environment interaction also exists in a large number of branches for the player to choose from. Whether it is the number of choices, the scope, or the consequences, all provide a large number of options and interactive elements, allowing players to experience the essence of the plot more deeply. Detroit: Become Human does not devote a lot of space to the science fiction setting, but rather roots it in interaction; it provides players with a large number of branching options so that they can experience the different directions of the plot and make each difficult choice more meaningful; it is detailed but unobtrusive in its setting, allowing players to gradually dig out the original picture of events; it appears to tell a story that takes place 20 years in the future. It seems to be telling a story that takes place 20 years in the future, but it projects the present with the future, and everything that happens in the story has already happened in reality; through the bionic man, which is no longer a novel subject, it constantly asks the player's soul, “Will the bionic man become human? And what makes a person human?”

Figure 2: Detroit: Become Human [5].

4. Database Narrative

4.1. Cognitive Features of Interactive Movie Games

In contrast, interactive cinematic games have the same narrative threads as interactive movies, which are also click-and-fill. The earliest interactive cinematic games were created in the 1970s and 1980s. The first interactive cinematic game was Nintendo Games' *Wild Gunman*, an arcade game released in 1974 that used film reel projections to display live FMV footage of gunmen. The Japanese game company DECO first introduced branching paths in its 1983 laserdisc game *Combat*, in which the crosstalk animation had multiple options, requiring the player to ultimately choose the correct one to advance the main game line, and the result of the player's choice would also affect the

DOI: 10.54254/2753-7048/9/20230137

appearance of subsequent scenes The order of the subsequent scenes. Due to technical limitations, each batch of this interactive cinematic game has been released at long intervals. In order to clarify the narrative function and achieve better and better cinematic graphics, each generation of the game could only appear at the end of a different technical level. This intermittent advancement process is quite slow compared to the development and popularity of movies. The current interactive cinematic games already have a performance effect close to that presented by the cinematographic footage. Therefore, in terms of narrative, the advantage of the game is the expansion of narrative branches and the increase in environmental interaction. The infinite expansion of interactive elements makes the narrative context realistic and flexible, and increases the credibility of the narrative content. Interactors have a rich sense of experience through multiple levels of exposure and their choice of plot. The in-game worldview perceptions that are constantly cultivated in multiple narrative threads are similar to those of the film. The interactor is able to ask and answer many questions for himself and face the final ending. The formation of the interactor's subjective emotions becomes reasonable, and the analysis of the narrative and the choice of threads becomes an objective treatment of the present plot, justified by the ending.

In interactive movies, the audience can feel the interactivity, but needs to follow the director's schedule and has chosen a different storyline at an earlier stage. In interactive movie games, time tends to slow down a lot, and interactors can interact at multiple points within time and space, choosing the next section of the story by touching multiple clues. In either the former or the latter, the viewer is exposed to a network of links between different elements and events through a selection of devices that gradually reveal the structure of the story outside of the fictional universe. The viewer then constructs a cognitive map that continues to reveal the structure of the movie game. For example, there are multiple train routes on a map, each of which crosses the others, with some tracks converging at certain points and then continuing to diverge. A particular train travels, necessarily, in one direction. Each train is akin to a narrative in progress. The director is the main description of each confluence point, and the game planner is introducing each route. Ultimately, the audience can complete the entire map by assembling the distribution of the convergence points, or the distribution of the routes. Through this process, the viewer has a perception beyond any character: he knows almost everything about each character, and the alternate editing gives him the ideal perception and gives him the illusion that he is the one driving the movie.

4.2. Time and Space Restrictions

Such a narrative can be limited by time and space outside of the story, so early interactive filmmakers generally believed that the narrative structure of interactive films should be as concise as possible, with fewer parallel editing processes. As a result, the audience's emotions would rise and fall more quickly, and the satisfaction level would be higher. However, along with the continuous expansion of information interaction technology and film aesthetics theory, this perception was soon broken. The American film *Time Code* is an attempt and challenge to parallel editing [6]. The film screen uses a four-frame split screen, so that all four stories can be displayed simultaneously. The audience can focus on the story of their choice to edit, or they can be informed of all the clues at the same time. Although no interactive equipment is used, the director has instead enhanced the interactivity. There is only one main story line, and the other three are interfering with the audience's ideas. The director does not overemphasize the main line, but uses sound as a clue to draw the audience's attention to the main frame. The audience chooses different frames to watch, and in the process of shifting the frames, the narrative and structure of the film are reflected. Usually the viewer is unable to see the entire structure of an interactive film, whereas in this film it is possible to see one of the four endings through that route by focusing on just one frame. The complex narrative structure and the multiple lines of parallel editing of the game process actually

DOI: 10.54254/2753-7048/9/20230137

both rely on the prevalent use of data-Base narrative. The user of the story navigates the database by following links between pages created by the database creator. Hyper Narrative can be understood as a collection of multiple trajectories within a database. A traditional linear narrative is a choice among several trajectories. That is, it is a specific choice made within the Hyper Narrative framework [7].

The director and game planner create a database of stories, of which the regular linear narrative is only one route. The audience interacts to create multiple routes within the database to understand the different points of view within the story world. The hyperlinked approach allows for map editing of all possible paths. As the story progresses, so do the viewers' perceptions. These perceptions come not only from the initial database, but also from the real world outside the story world, so the viewer may deviate from the main narrative path. In an interactive film, the director tries to assemble the audience's perceptions in a database and predetermine some paths; in an interactive film game, other smaller databases are set up, also with the purpose of setting the scope of the possible perceptions generated by the interactors in advance. The former is attributed to the director's editing, the latter to the rich database setting. In all interactive experiences, what the interactor is trying to accomplish is a reframing puzzle. They will randomly piece together different clues into narrative images and set certain tags that will help the audience build an open-ended narrative vein through the game or film footage. This is where the immersive experience comes from, where the audience feels a linear narrative versus a linear fictional narrative, and where they want their participation and attention to move the story toward its goal, so that keeps us engaged and attentive in the narrative is a dramatic alternation due to a causal logic and a sense of progress toward the goal, not a spatial exploration Immersions [8].

In contemporary works, narrative mechanisms are increasingly enriched, and the openness of narrative content is recognized. The interactivity of interactors has become a logical and cognitive act by nature.

Figure 3: Black Mirror: Pandasnaki [9].

Episodes of the Black Mirror series are presented as predetermined paths through open worlds, allowing viewers to think deeply about every issue that arises. *Black Mirror: Pandasnaki* [9], produced by Netflix in 2018, significantly enhances the audience's experience by fully empowering them with the possibility of a fictional narrative through up to 100 million possible paths. Under the rich interaction, the director arranges loops and directs the audience to a specific narrative thread eventually, using both the method of assembling perceptions in a database and adding to the setting of the database. Of course, accomplishing such effects as an interactive film required extensive scripting, while Netflix also specifically adapted the viewing software and changed the regular video format to GIF looping animation to accommodate these playback requirements. The

DOI: 10.54254/2753-7048/9/20230137

production consumption is huge, but it shows the superiority that only interactive movie games have. It is easy to see that viewers want a clear and effective narrative path in a multi-cognitive state, with a deeper immersive experience to understand the story world and the main narrative in its entirety. With an appropriate database capacity, effectively guiding the audience to the main narrative in interactive movies, such as the circular path approach in the above-mentioned films, also massively enhances immersion and encourages interactors' sense of protagonism in interactive movie games. For both viewers and interactors, they get a rich experience and awareness without missing the final ending and are willing to go through a new experiential path to another ending. Although there is a high degree of difficulty in setting up the database and interaction format, this is by far the most desirable situation for the audience.

5. Conclusion

The immersive experience of interaction design starts with the content of the subject matter and the theme of creation, looking for visual space and expression, integrating digital art, science and technology. Its works are infused with modern aesthetics and language, presenting scenarios and emotions in three dimensions with technological interaction, and creating empathy with the story. The artworks evolve into interactive design works of immersive experience through digital technology, multimedia, and cross-border integration, creating inter-dimensional scenes from all angles, thus creating an unparalleled visual and interactive sensory experience for the audience. Nowadays, with the development of all-area tourism and experience projects, the interactive design and immersive experience industry has become an important engine to promote China's economic development, urban revitalization, and rural revitalization. Along with the demand for related industrial projects, the demand for talents in related fields will increase in the future. As a university student in computer science, the author should combine theory with practice in the process of understanding and learning related theoretical knowledge, apply it to his software engineering research, and present the results to the public in a diversified way as much as possible.

References

[1] *Li Qingrui. (2019). The game turn of film narrative. Social Science Series, 04:207-212.*
[2] *Csikszentmihalyi, M. (1990). Flow: The Psychology of Optimal Experience. New York: Harper and Row.*
[3] *Bernie Dekoven, Of Fun and Flow, DeepFun.com, Online: http://www.deepfun.com/funflow.htm*
[4] *Sun Jing. (2016). Interactive film: cross-media integration of film and video games, Educational Communication Media Research. Journal of Education and Media Studies, (5):78.*
[5] *David Cage. (2018). Detroit: Become Human. Interactive movie game issued by Quantic Dream.*
[6] *Mike Figgis. (2000). Time Code (Film).*
[7] *Lev Manovish. (2001). The Language of NewMedia. Massachusetts&London: MIT Press.*
[8] *Nitzan Ben-Shaul. (2008). Hyper-Narrative Interactive Cinema: Problems and Solutions. Amsterdam-New York.*
[9] *David Slade. (2018). Black Mirror: Bandersnatch (Film).*