

4D Sandbox-MMORPG for Cooperative Learning in the Historical Context

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Abstract

With the rapid development of technology, people's multimedia use habits are gradually changed, and the digital games have provided simulative situations for multiple uses. This research hopes to use Sandbox games genre and multiplayer cooperative learning concept to realize the historical context of Taiwan Wu-Xia novel "Pussy". In this research, a 4D Sandbox-MMORPG Taiwan Epic Game was designed to present the 19th Southern Taiwanese history and geography culture. Learners can freely roaming and exploring in the game world, and through the guide of cooperative Instance Quest to treat Taiwan's folk customs, cultural conflict from the perspectives of various ethnicity. Quantitative and qualitative research and evaluation methods will be used to measure learning outcomes and analyze players' gaming motivation.

1. Introduction

1.1. Research Background

With the rapid development of technology, online games have rapidly become daily life entertainment. The Groos [4] thought that practice through games has the embedded meaning of learning due to its systematic process of it. Students can obtain the learning experience by operating the games. It can enhance students' motivations to do the learning exercises.

As Griffiths and Davies [3] pointed out, online games are more educational than traditional computer games because they are normally not single-player games. It can provide online interactive environment that the player can cooperate with other players to complete tasks, interact with others to form relationships, share information, and carry out negotiation [2].

1.2. Research Motivation and Goals

Cooperative learning has been widely applied in various disciplines of education. Many research have pointed out that in cooperative learning, students would be stimulated to learn from establishing mutual assistance between peers, share views, and problem solutions in the learning process; as a result, to enhance learning achievement and learning attitude. However, little research was done about combining the features of digital Games and cooperative learning concept.

The main purpose of this research is to design a 4D Sandbox-MMORPG "Taiwan Epic Game" with Taiwan Wu-xia novel "Pussy" [10] as the main story structure. The five elements of multiplayer cooperative learning are integrated into the four essential factors of game including character, situation, setting, and system.

Using the characteristics of sandbox games such as no specific game objectives and highly free exploration, players can choose from different ethnicities to participate in the context of 19th century Southern Taiwan. Different from the traditional 3D Role-Playing Game (RPG), the game designed in this research has added a Time Axis into the structure to strengthen the concept of "spatiotemporal simulationist". By the innovative design of the "4D" elements, the players can experience the diversity of games in regard of the corresponding changes according to the time axis.

At the same time, players can propose their own perspective for the team members to discuss through multiplayer interaction in the Cooperation Instance Quest. Players can take various stands of different ethnicity to see the progressive development of historical events so that they can have more positive and objective views.

2. Literature Review

2.1. Sandbox

In the early time in the game field, sandbox referred to mean an open basis of an interactive environment. Until 2001, "Grand Theft Auto III" the characteristics of high degree liberalization and the interactive environment, "Sandbox" became a term representing a new type of game. In sandbox game, via the interaction with the objects, players can arbitrarily do whatever they want. In terms of the storyline, players can choose from the main quests and sub-quests in the story, and randomly come back and forth. Completing the quests becomes interesting things to do. The nonlinear game structure includes Branching Storytelling, Nonlinear Level, and Sandbox World that are the three parts different from the traditional design [8].

1. Branching Storytelling: The game would generate different stories or quests based on the actions of the players.

2. Nonlinear Level: Allows players Level quest order in accordance with their own ideas, unlike the traditional one-way course.

3. Sandbox World: It is a game world that has its own life without been controlled by players.

This research hopes to adopt the characteristic of the Sandbox game. Combining with historical spatiotemporal background by a large number of quests, to promote players' motivations as well as enhance their learning and understanding of the historic development of Taiwan.

2.2. Cooperative Learning

Cooperative learning is a structured, systematic teaching strategy [11], in which Cooperative learning emphasizes on the group cooperation process and individual accountability that in heterogeneous group, students work with peers and support each other. They critic and share views and make adjustment of their own viewpoints. Finally, the students would share their common results and culture more cooperative behaviors in this environment [9]. "Cooperative learning group" is different from the traditional "general learning group" which only divides students into small groups. It includes the five elements of cooperative learning [7]:

1. Positive Interdependence: It emphasizes on the acknowledgement of the community of life by the team members. The individual efforts would decide the team's success or failure.
2. Face to face promotive interaction: Through positive interactive discussion between the team members, exchange messages and feedback, players help each other to achieve goals to enhance learning and success.
3. Individual Accountability: The team's success is defined with the success of each individual's success. Therefore, each person must make personal contribution.
4. Interpersonal and Small Group Skills: The players need to be cultured to effectively communicate with others, build mutual trust with others, and respect different point-of-views to increase interpersonal skills.
5. Group processing: Gaming groups must regularly review the team functions or analyze the reasons of failure to reach the goals.

Hence, this research hopes to integrate cooperative learning characteristics into the five elements of game to create a multiplayer digital games environment to enhance the motivations.

2.3. Sandbox-MMORPG

Among all types of online games, Massive Multiplayer Online Role-Playing Game (MMORPG) takes are most popular. Through the three-dimensional effect, it realism of the game world is strengthened that the core concept is to allow players to create a role with personal style or use any avatar as he wishes. Through one or more roles in the game, players interact with objects, scenes, and NPCs, chat with friends, or team up to resolve quests [1]. Therefore, when the players are in the game, he will take the point of view of the role, and participate a variety of different activities and immerse in the situations

[5].MMORPG is an ongoing virtual game world that when the players leave the game, the virtual game world is still in operation and continue to evolve. MMORPG is different from the traditional single-player games that players can team up for multiplayer Instance Quest. When they are in the Instance Quest, the system will give the team a copy of the map area in which the players would not see any other players outside of the team.

In today's new generation of network game, games such as "ArcheAge" has integrated the Sandbox concept. Its emphasis is to give the players a prototype of the game world with essential features only that players can create their own game content and play through the game with personal preferences to reshape the game world [6].

This research tries to place the learning message into the game by adding the Multiplayer Instance Quest to enable the players to achieve the effectiveness of cooperative learning.

3. Game Design

The content of the game designed in this research is based on the character "Xiao-Mao" in the Wu-Xia novel "Pussy" [10] to depict the heroic act of a common man in the big time integrating the Taiwanese cultural content. The game uses Sandbox game genre which permits the highest exploration freedom to allow players to experience the historical context through the simulation of character, situation, setting, and system.

3.1. Character

There are two kinds of characters: NPC and players. The NPC include the characters in the story such as Xiao-Mao with his unique cat-like face. When players enter the game, they can choose from the four ethnicities to role play in. They can create and adjust personal features in terms of hairstyle and appearance as long as they are in the styles of the ethnicity. The choice also defines the players' starting point and main tasks. The attributes of their abilities were also different according to their innate skills. Instead of choosing occupations and jobs, players focus on enhancing skills in the game. Therefore, all players regardless of ethnicity can learn all skills through the completion of the tasks. Among those, there are life skills such as forging, and martial art skills such as Songjiang Troupe. The promotion of skills is acquired through the points obtained when player levels are promoted and through the mastery of the skills with times of practices. Also, martial art skills such as Hakka Boxing can be learned by all ethnicities but only some specific ethnicities can master them.

3.2. Situation

The game is designed with multiplayer Main Instance Quest that generates stories with multi-branches. Players can choose sub-tasks like delivering goods to help NPC to

solve all kinds of problems. In the process, the players can experience the change of scenes and cultures in different areas. The Main Instance Quest includes multiplayer cooperative quest and multiplayer confrontation quest. It only allows teams that meet the requirements of the task. Members in the team can discuss their strategies, and the team leader makes the decision to move forward. There will be time before and after the tasks to allow the players to discuss, reflect, and decide whether to do the task again. In addition, the transitional animation of the Instance Quest will be presented to show team. For example, the multiplayer cooperative Instance Quest in Dong-Gang, players need to use their respective skills to cooperate in collecting construction materials to rebuild it according to the design. The players get to know the meaning, and construction of the King Boat Ceremony. In the multiplayer confrontation Instance Quest, emphasizes on the use of strategies, members dispatches, and communications and cooperation among team members.

3.3. Setting

The game world is built based on the 19th century Southern Taiwanese history context. In order to allow the virtual environment of the game to approach the reality, the special architectural features in different areas in the early times are designed in the game including the scenes, object placements, buildings styles, and so forth.

To increase the sense of immersion in the virtual game world, the time axis concept is added to create the innovative 4D concept for the MMORPG. Thus, the space simulationist was transformed into spatiotemporal simulationist that helps to achieve the Spatiotemporal Instance. The simulation has pushed the environment to show their diverse appearance which also led to the variation of story tasks. When players is going to enter a certain main instance quest created, the game system would send out warning messages to confirm the action since the actions done in the spatiotemporal instance would push the players to a irreversible side track.

Following the progress of the tasks, Akauw City would become Taiwanese volunteer army dominated or Japanese army dominated so that the city would show different cultural appearances. Therefore, the players can feel the time flow and all the objects in the game were alive in some sense. The interaction between players and NPC would generate different sense of closeness due to the different ethnicity. However, through the tasks players completed to acquire necessary objects and communicate with each other every day, the players' sense of closeness be increased.

3.4. System

It is about the rules that the players must follow in the game and the judgment standard of the responses to players' actions. For example, in the tasks, as assisting

teammates, defeat the enemies, and task completion times. Then the system would give awards according to the rankings. In order to prevent teammates to viciously restrain the progress, from the tasks so the damages were done to the team's success, the system would punish the players by preventing the re-entrance to the game in one hour, and add a star to his negative appraisal. Other than that, in order to maintain the good quality of the game environment, the system would evaluate the players' talks. Content of the talks over 75% similarity would be prevented to sent out from the system.

As the guilds were founded in the game, prescribed channels would be assigned to allow big groups of players to gather. They can search for unfamiliar things, help players to successfully stay in the game. As long as the chief of the guild agree, anyone can request to be in the guild. However, once the players withdraw from the guild, they would be punished with 7-day real time ban from the game.

4. Research Evaluation

4.1. Cooperative Learning Game Design

Since traditional single-player games are embedded with educational meanings, this research hopes to add multiplayer interactions into the game so that players can cooperate and share viewpoints online. Current MMORPG mainly allow players to enter the Instant Quest of the game in teams, and continuously fight with monsters. Such games do not have the effectively the cooperative learning, this paper will talk about how this game takes the game theory as the framework to design from the aspects of character, situation, setting, and system to reach the goal of enhancing players' cooperative learning.

1. Positive interdependence: Every player chooses roles with different levels of skills in various orders. The player can act as the expert in some specific area; for example, NPC only provide basic tools and equipment repairs, but the equipment can be freely created by the players. Therefore, the players have through the inter-dependent relationships, market mechanism, the players adjust and create the roles in the game. In terms of the design of situation, there is time limit of tasks. Even a player mastered in all kinds of skills, it is still difficult to accomplish the task along. However, players with more skills can help his team members during the game.

2. Face to face promotive interaction: In the situation element, players can discuss about their past strategies and search for better method to complete the task from those experiences. Sometimes the players would get the notice from the old players about the tricks to accomplish certain tasks.

3. Individual accountability: In multiplayer confrontation Instance Quest such as Hengchun City battle, the goal is to break into the city gate. Therefore, the number of

enemy defeated does not count toward the success. The players should take the stand of the Taiwanese Volunteers and use the water canons to attack the Japanese cannon on the city gate to impede their fires. Thus, the individual performance in the team would influence the success of the task. The rankings and punishment in the system would encourage players to make contributions.

4. Interpersonal and small group skills: In the situation element of multiplayer confrontation Instance Quest, it emphasizes on the use of battle strategies. It might cause the conflicts between players of their different thoughts so that the communication and trust between each other became the key to reach the goal. On the other hand, in terms of the system maintenance, since it is important to keep the positive competition between players, there is language use limitation to encourage players to rationally accommodate with others and respect other players.

5. Group processing: In multiplayer cooperative and confrontation Instance Quest, there will be discussion and reflection time in the beginning and ending of every task in which time the players decide whether to make adjustment of the team cooperation strategies.

This research integrates the five elements of cooperative learning into the game design so that when the players enter the game, they enter the multiplayer Instance Quest, they are in the cooperative learning situation without aware it. They cooperate, interact, share, and discuss with others, and learn to respect others.

4.2. Cooperative Learning Game Analysis

In the future, after the testing of the game prototype, there would be a long time online experimental gaming period to test the learning effectiveness. This research expects to use qualitative methods to observe learners about their cooperative learning patterns, communication effectiveness, as well as their ability to take multiple perspectives to deal with the events around them, and positive cognition toward different ethnicities.

The experiment would be conducted in three phases: First step is to use questionnaire to survey about players' background information and experiences. The second step, there will be investigations about players' drive of motivation, and their mastery of skills chosen in the game, different gaming strategies, communication logs in the Instance Quest, and then analyze the data. The third step is to conduct in-depth interviews to evaluate their players' learning process and feelings. The analysis heuristics would be developed according to the cooperative learning and game theories.

5. Conclusion

The purpose of this research hopes to create a Sandbox digital game to truly present the 19th century Taiwan and show the historical events and culture of the time. Players can be immersed in the context, play different roles as

they wish, and explore the environment to experience the virtual world. Furthermore, by using multiplayer cooperative learning model, players can share their own opinions during the task solving process. In order to accomplish the common goals, players need to provide mutual support, and interact with each other.

In order to increase players' motivation to explore Taiwan history, this research intends to use the game to attract players to actively participate the learning process and experience the historical and human cultural environment. In the future, through both quantitative and qualitative research methods, we can understand players' gaming condition in terms of psychological and behavioral status. The evaluation would be generated by the flow theories, cooperative learning theories, as well as game theories. It is hoped that In the process of achieving better learning effectiveness and educational goals, players are nurtured to look at the historical event from different perspectives of different ethnicities.

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