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Research of Design and Development of Educational Game

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Abstract: The current social background shows the development trend of a "learning society", and lifelong learning is regarded as an effective way for social individuals to meet the challenges of the rapid growth of knowledge, shortening of information update cycle and accelerating iteration frequency. In this context, educational games, as an innovative form of education, are gradually receiving social attention. Educational games have the characteristics of combining entertainment and education, which can provide a more attractive and interesting learning experience, so as to stimulate learners' learning interest and initiative. This paper mainly studies how educational games are designed and the current situation and prospects of educational games. The purpose of this paper is to explore how to make better educational games nowadays, when educational games are becoming more and more common but the quality is uneven. This paper is mainly through literature analysis and review research. This paper finds that the production of educational games needs to create a learning environment, stimulate learning interest and keep players learning.

Keywords: Educational game, Design, Child education

1. Introduction

In 2002, the Woodrow Wilson International Center for Scholars in Washington, D.C. launched the Serious Games Initiative to encourage the design and development of games that address policy and management issues. In 2003, Jason Della Rocca, the event manager of the International Game Developers Association (IGDA), gave a keynote speech titled "Serious Games: The Potential Impact of Games on Socio Economy" at the China Joy Conference. He defined "serious games" as "games that do not primarily focus on entertainment" and cited "Simulation City" for training mayors, "Virtual Leadership" for training chairman Classic game works such as "The Speakers" for training employees and "Doom" for training Marines[1].

Nowadays, it is still a new thing and there is no clear definition in the industry. Here, "educational games" are defined as computer game software that can cultivate the knowledge, skills, intelligence, emotions, attitudes, and values of game users, and have certain educational significance. The definition of "educational game" is relatively broad, and there is no particularly clear boundary between "educational game" and "non-educational game". Although some games are not specifically designed for educational purposes, they have strong educational significance and can also be included in the category of educational games.

An average of 99.1% of teachers believe that teaching through games has been effective and durable and 88.7% of them proved it. As a result, learning through games offers children an effective

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and durable input, which proves to be crucial in the learning process [2]. Educational games have good educational value. It uses the fun of games to stimulate learners' learning motivation, making learners more willing to explore and learn new knowledge, and improving their learning initiative and enthusiasm. Educational games can also adapt to audiences of different ages and different learning needs to meet the needs of differentiated teaching and personalized learning. Through gamified learning, the learning process can be more lively and interesting, and at the same time, it can better meet the individual needs of learners. In the context of lifelong learning, educational games, as a form that can combine entertainment and education, can provide people with a more convenient and efficient way to learn, and help people better adapt to the changes and needs of social development. Designing a good educational game in this context has a lot of positive implications. This paper specifically studies how to create a learning environment, learning motivation, and keep players learning in educational games. This paper is mainly studied by a summary method. The research of this paper can help the design of educational games and promote the development of educational games.

2. Educational Game Design

2.1. Creation of Learning Environment

Gamified learning has gained a lot of attention in the realm of education. A more engaging, inventive, and productive learning environment can be produced by fusing game aspects with educational and learning features. For instance, the integration of virtual reality into the classroom is strongly supported by virtual reality technology. Students can participate in and experience real-world scenarios firsthand in this learning environment, which enhances their awareness and enthusiasm in learning. They can also develop a more intuitive comprehension of the material they have learned. For instance, students' self-motivation and self-driving skills can be enhanced by the introduction of competition and incentive systems, which will increase their excitement and engagement in the classroom.

2.2. Creation of Learning Motivation

In educational games, goal setting is the key to stimulating learning motivation. The goal should be clear, specific, and challenging, allowing players to clarify their direction of effort. At the same time, the goal should be closely related to the game content, so that students can gain a sense of achievement in the game. For example, in mathematical games, goals related to mathematical knowledge can be set, such as solving specific problems, completing mathematical challenges, etc. The reward mechanism is an important element in the design of educational games. Reasonable rewards can motivate players to put in more effort during the learning process and enhance their interest in learning. According to the principle of "timely rewards" in psychology, timely and reasonable rewards should be designed to ensure that players can quickly obtain satisfaction and maintain interest in learning.

2.3. The Craft of Level Design

The craft of level design is one of the fastest-growing areas of game development, and has many unique challenges, principles and techniques of its own [3]. Educational game design is the same, in the innovation, people need to pay special attention to the game level setting, which is a challenging thing. The specific level design is as follows:

a. Set clear learning goals: Before creating a level, first clarify the learning goals that the level should achieve, which can help players better understand and master knowledge in the game.

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b. Integrating learning content into levels: The design of levels should be combined with learning courses to ensure that players can learn and understand relevant knowledge during the game.

c. Add incentive measures: Levels can be combined with game incentives such as rewards, badges, and level upgrades to attract and motivate players to continue learning and exploration.

d.Personalized levels: Based on players' learning progress and grades, personalized levels can be designed, allowing each player to find their own challenges in the game.

E. story plot design: Design levels in the form of a story, combining knowledge points with the story plot to make the levels more attractive and help players better understand and remember knowledge.

f. Interactivity and feedback: In level design, emphasis is placed on players' interactivity, as well as providing timely learning feedback to help players understand their learning progress and effectiveness, thereby better mastering the learning content.

g. Gradually increase difficulty: Levels should gradually increase difficulty, from simple to complex, and from easy to difficult, which can help players better master knowledge and skills.

3. The Future of Educational Games

3.1. Problems of Current Educational Games

The current development status of educational games is not optimistic, as there is a lack of excellent educational games and the existing educational games are limited to promotion[4]. Overall, there is a lack of high-quality educational games in the domestic market, mainly due to the following problems: a lack of games tailored to teaching content. Some games can help exercise learners' thinking, expand their understanding, and have a certain degree of educational significance, such as board games and strategy games. There are some educational games on the market that focus on knowledge memory, such as word reading, typing exercises, and Chinese Pinyin matching. These games are specific to specific teaching content, but overall, the form is relatively single, the design is simple, and the content lacks creativity.

For example, some math games only allow the player to solve dry math problems, without providing game elements such as beautiful graphical interfaces and sound effects, which makes the game less engaging and fun. Some science-themed games do not receive any updates after their release, while scientific knowledge and technology continue to evolve and update, making the content of the game obsolete and ineffective.

3.2. Suggestions and Countermeasures for the Development of Educational Games

According to statistics, the global education game market is expected to reach $10 billion by 2025, indicating the increasing importance of education games. Game designers can maximize player enjoyment through meaningful choices that offer various risks and rewards. Such challenges, combined with rules and limitations, force players to overcome obstacles and problems using a variety of skills including dexterity, puzzle-solving, intelligence, and strategy [5]. Industry related practitioners need to enrich the teaching game mode, develop various types and difficulty levels of games with the goal of what is needed, and allow children to have comprehensive sensory, mental, emotional, and other perspectives. While enjoying the game results, children can continuously receive and dissipate information, achieving the effect of improving their willingness and ability to learn independently and stimulating their creativity. When designing educational games, full consideration can be given to the development of human multiple intelligences, such as logical reasoning, language expression, spatial perception, etc., to make the gameplay more diverse and diverse. By designing innovative game mechanisms such as challenging levels and unlocking achievements, players' interest in learning and desire to challenge are stimulated.

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4. Conclusion

This paper mainly discusses how to better design an educational game, as well as the present and future prospects of educational games. We should improve the learning environment, learning motivation, and level setting so that the player can enjoy the game while being educated and stick with it for a long time. This paper does not study the existing educational games and the development history of educational games, but only gives suggestions on the design of educational games. Future research could also focus on how to promote educational games.

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