Research on the Teaching Reform of Higher Education Based on the Depth Integration of Information Technology and Teaching

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Abstract. Computer education game was developed using virtual reality, image processing, animation and other advanced computer technologies with education and psychology knowledge. The computer education game integrates the computer games with the curriculum content, which can fully mobilize the students' learning initiative and enthusiasm. Based on the analysis of application research present situation of educational computer games in the domestic and foreign universities, the paper studied the connotation of computer education game, the role of computer education game in the reform of higher education and put forward suggestions to carry out teaching with the computer educational games, to provide a reference path for the teaching reform of higher education in China.

1. Introduction

University students are one of the main forces of online games; all kinds of online games are popular in Colleges and Universities, such as League of Legends, DOTA and so on. Many university students love games and even indulge in them. How to make the best use of the situation, and let the students not only achieve happiness in the playing game process, but also improve their professional knowledge and comprehensive ability, is a problem that Chinese universities should seriously consider at present.

If add the content of the university course and the ability to solve problems in the game, it will be an important role for college students to learn and improve their ability in the playing game process. The computer education game deeply integrates the information technology and the curriculum education, and it can fully arouse the initiative and enthusiasm of the students. In this paper, domestic and foreign university computer education game situation, the basic connotation of educational computer games, the role of computer games in the education reform of higher education and using computer education game to carry out teaching reform proposals were discussed.

2. The Status of University Computer Education Game Research

2.1 Overseas Research Status.

Since the middle of the eighteenth Century, the theory of game has been studied in the western academic circle. Early studies mostly focus on the game factors in a domain, rather than the game as a subject to study, such as the game theory of Schiller, Kant and Spencer were mentioned in their psychological or philosophical works. There was a book devoted to game theory, "Person: Gamer" was written by Johan Huizinga of Holland author. Johan Huizinga believed that the game was the most primitive human instinct; civilization was produced and developed in the playing game process. [1]

At present, many of universities, research institutions and companies, such as Educational Communication and Technology Department of UK, Media Lab in the United States Massachusetts Institute of Technology, Microsoft and Games2train are committed to the development and production of game learning software. The Games-to-Teach project was jointly undertaken by the Massachusetts Institute of Technology and the Microsoft Company, which was designed to develop appropriate games to support students' learning in the field of engineering and mathematics. The
Uni-Game project was supported by the European Commission (which was consist of the UK, Sweden, Italy, and Greece), was dedicated to the research and promotion of the concept and practice of game based learning. In fact, the game based e-learning has become one of the most important directions of E-learning research. [2]

There are many cases of computer games used in university curriculum teaching abroad. Using the computer games, literature [3-7] separately carried out teaching research on the object-oriented programming course, the industrial engineering introduction course, the university entrepreneurship education course, the business and market education course and the software engineering course. By educational computer games, the literature [8] studied computer education game evaluation, literature [9] studied the social and cultural force of higher education, the literature [10] studied the sustainable development of higher education.

At present, foreign computer game theory research earlier, but the research theory of computer games in the higher education is not more; more were the computer education game in higher education application practice exploration.

2.2 Domestic Research Status.

Domestic research on educational games started later than foreign research, many scholars thought it has been studied since 2004.

In the research of educational game theory, mainly researches on the essence of educational game, the value of education, the concept of design and development, the research of psychological mechanism, and so on. The literature [11] expressed the essence and value of educational game, the literature [12] put forward the RGB electronic educational game design model, the literature [13] put forward the influence model of educational game stickiness theory based on the GameFlow model.

In the development of practice research, formed certain R & D teams. In 2002, China's first educational game research team, the Pre-Olympic Game Learning Research Center was established. In 2004, East China Normal University - Suzhou Industrial Park Post-Doctoral Research Station of education technology was established. In 2006, the China Education Game Research Network was opened, which provided a communication platform for educational game researchers. In 2007, the first National Conference on educational game research base was held in Nanjing Normal University, established an educational game development base composed of Nanjing Normal University, Zhejiang Normal University and Xuzhou normal university. Since 2007, the National Conference on educational games and virtual reality has been held almost every year, it provided a platform for further research and exchange of experts on the latest research results of educational games. These teams and some game sites have developed educational games for primary and secondary schools, and conducted relevant studies.

There are not many researches on the application of computer educational games in higher education, but only some college teachers have explored relevant courses. The literature [14] probed into application of education light game in C language teaching, literature [15] discussed the application of computer games in the engineering geophysical exploration course assessment, literature [16] investigated on computer network games on university students' ideological and political education.

In short, the current computer educational games research in China mainly focus on the development of primary and second school, theoretical research and practice of computer education game of the university is not sufficient, need the university administration and teachers actively explore.

3. The Basic Connotation of Computer Educational Game

Computer game is a new entertainment form, which is realized by through human-computer interaction, can reflect the higher level of current computer technology. From the point of view of the game, the computer game is a recreational cultural product that allows the player to pursue certain goals and allow the player to gain some kind of winning experience. In general, any game has a certain
educational meaning, can train the game player's challenge, competition, innovation and cooperation ability with other players, etc. What this paper discussed the computer educational games were in a narrow sense; take computer games apply in subject education, such as mathematics, physics, biology, computers, engineering, chemistry, agriculture and other subjects. Through the combination of computer games and subject knowledge, can improve the efficiency and quality of education. The application of computer games in the education can promote students' learning enthusiasm and active.

4. The Important Role of Computer Educational Games in the Reform of Higher Education

4.1 It is Beneficial to Improve Teaching Efficiency and Quality

The combination of computer technology, the modern education theory and subject knowledge to design a computer game with strong interest, moving story and rich subject knowledge, have a great attraction for students, will improve the students' initiative and enthusiasm to participate in the game. In the process of playing computer education game, in order to achieve the game winning goal, students will actively explore the game environment, rules, tools, partner, knowledge and so on, and actively enterprising, constantly struggle, always toward the final goal of the game. People's curiosity and winning psychological, will promote students to reach the goal of the game in their fastest speed. It can be foreseen that a good computer education game will improve the efficiency and quality of students' learning.

4.2 It is Beneficial for University Teachers to Change Their Teaching Ideas

Computer educational games include curriculum content and professional knowledge. In order to teach, teachers must take the initiative to explore the educational game content, level of knowledge and ability, understanding every level game knowledge and students' feelings, design teaching content and the direction of teaching research target, interact with students, make students learn basic content in the game, further enhance the students' level of knowledge and ability to solve problems. The effect of computer educational game makes university teachers to change the traditional classroom teaching, transfer to the teaching mode of taking students as the core, teachers as the counselors.

4.3 It is Beneficial to Carry out University Scientific Teaching Evaluation

The evaluation of university teaching mainly includes the evaluation of students' learning and the evaluation of teachers' teaching.

The evaluation of students' learning mainly consists of two parts, the final exam and the routine homework. Because the students' homework was done without supervision, it was likely that some students copied other students' homework, so it is difficult to guarantee the fairness and quality of the process evaluation. The final examination time is limited, it is difficult to conduct comprehensive assessment, and cannot fully evaluate the students' learning. In the process of playing computer education games, students' every operation, the used knowledge, the used tools, cooperate with others, and the used time data can be recorded, through the analysis of these data, can accurately diagnose learning situation of students, provide accurate guidance for students to learn the next contents. The basic knowledge and basic operation of the course have been evaluated in the process of playing computer games, and this kind of examination can be carried out repeatedly, which is helpful to promote the students' excellence in learning. The final exam can examine some comprehensive questions, such as academic courses papers, etc. This way of learning evaluation is more scientific and reflects the true evaluation of students learning.

At present, the teaching evaluation of teachers was mainly based on students grading to the teachers. Because of the influence of many factors, the students' evaluation to the teachers' teaching exposed many problems, such as the randomness of the scoring, the human factors and so on, which leads to unfair phenomenon. Review results was not scientific, the aim of student evaluation to the teachers' teaching is to urge teachers to improve their teaching, improve the teaching level, but in the actual work, some college students' evaluation results to the teachers' teaching only serve as an important basis for promotion, rewards and punishment, but how to improve teachers' teaching level measures are not in place [17]. Through computer education game to teach, the problems and
difficulties that students encounter in the game, the teacher must give answers, and student’s question time, questions, teachers' response time, teachers answer will be recorded in the database. According to the students' learning in the game, the courseware of teachers designing, the interaction with the students, the effect and efficiency of the students' learning will be recorded in the database. According to the data in the database, develop data modeling and carry out statistical analysis, then can draw a comprehensive contribution of teachers to teaching. Using computer education games for teaching evaluation requires students and teachers to work together, strengthen cooperation, and form a teacher-student community, so as to speed up the teaching efficiency and quality [18]. The evaluation of this method is not only fair to each teacher, but also more scientific.

4.4 It is Beneficial to Promote Equality of University Education

Computer education game was once developed, it executed on the cloud computing platform, as long as the terminal can be connected to the Internet, where students can use the computer educational games for entertainment, learning and exploration, if the students have problems in the learning process, they can get help from the cloud computing platform FAQ system, also get help from the online teachers, timely get explanation. It can be said that computer education game is a powerful tool to solve the problem of education Equality in china.

4.5 It is Beneficial to Improve the Efficiency of Education Investment

Not only the nation invested quality course construction, the provinces also invested high-quality curriculum courses construction, to the same course, the country invested huge. At the same time, each course requires a teacher, person cost is huger. A computer educational game can involve a subject course, or two subject courses, even multidisciplinary courses, which can be shared by universities across the country as soon as it is developed. At the same time, the students have learned the knowledge and ability in the playing computer games process, and the teachers do not need to repeat them in class, or just speaking precisely. Therefore, compare to the current teachers' time and vigor of inputting to curriculum construction and daily teaching, can be greatly reduced, the saved time can be used for the teachers' scientific research work, effectively solve the balance problem between teaching and research, but also enhance the national investment benefit.

5. Suggestions of Teaching Reform by Using Computer Educational Games in Chinese Universities

5.1 Emancipating the Mind

According to the present situation of college students addicted to network games, colleges and universities should emancipate the mind, should not block that the students playing network games, fully see the positive side of the network game, and combine the network game and the education, to guide students to play computer education games, make students combine learning with playing network games, effectively solve the problem of university students' addiction to network game.

5.2 Increase Support for University Computer Education Game Projects

The government should increase support for computer education game research projects, and speed up the design and development of computer educational games in universities. Computer education game is a perfect example of depth integration of information technology and education, computer game design involves the computer virtual reality, image processing, database, distributed processing, big data, cloud computing, information transmission, information security and other advanced computer science and technology. In the process of game design and development, not only can make effective use of the comprehensive of these technologies, but also can promote the development of related software and hardware technology, can put forward many research subjects about the culture construction of virtual world, is a comprehensive test field of the general research on the virtual world. Therefore, the government support for university computer education game projects will be a positive significance to the promotion of teaching and research work in Chinese universities.
5.3 Popularization of Computer Educational Games in Chinese Universities

Universities should begin from the development, design, promotion and use of computer educational games from some basic courses and public courses, and promote them to specialized courses on the basis of using experience. In the key universities in the north east, north China, east China, central China, southern China, southwest and northwest areas, to select 2 to 4 pilot universities, to carry out computer education game teaching reform experiment, give full play to the initiative and enthusiasm of the pilot colleges and the leading role, actively summarize experience, guide the universities to develop computer education games to be integrated with the aspects of professional curriculum system, the course contents, teaching methods and teachers structure, make the teaching objectives, teaching ideas, teaching behavior and teaching process to change to take the student as the core ideas and track, combine with local economic and social development, cultivating application and technical talents, strengthen the cultivation of students' innovation and employment ability. On the basis of the successful experience of the pilot universities, promote computer education games to the whole nation colleges and universities.

5.4 Establish a Scientific Accreditation System of Learning Achievement

Establish the system of college teaching, curriculum arrangement, and student status management, which allows students to obtain credits through classroom learning, online learning and computer education games learning. Determine the proportion of the course content of the computer education game in the content of the entire curriculum syllabus; as long as the students can pass some levels of the computer education game, they can get the corresponding learning achievements. Should affirm the students' getting learning achievements in the process of playing computer educational games; promote the enthusiasm of students and teachers to use computer educational games for teaching.

5.5 Strengthen the Guidance and Control to Avoid Students Addicted to Computer Education Games.

In order to avoid student addiction on computer educational games, can design the corresponding parameter control module in the game. For the qualified students, can set the parameters that do not allow them to play. If the student wants to play, to submit the application, after the teacher review it, if they need further learn the relevant teaching contents, teachers approved the audit, and re-determine the game-time parameter. In this way, the time for playing games can be effectively controlled, and ensures that the students can make good use of computer education games to complete teaching tasks.

6. Summary

The computer education game is the most sufficient test field for the integration of information technology and education. It can not only give full play to the advanced computer technology, but also bring positive effects to the reform of higher education. Predictably, with the strong support of the state, the computer educational games can achieve greater development, and play an active and effective role in improving the teaching quality in colleges and universities.

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8. References


