The Application of Educational Games in Teaching IT Programming in Elementary School

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Abstract

With the continuous development of information technology, information technology courses are incorporated into China's basic education as compulsory courses. In the traditional IT classroom, teachers mostly adopt the demonstration-operation teaching mode, and it is difficult for primary school students to improve their learning effect under such a teaching mode for a long time. Therefore, how to provide students with a colorful IT classroom and improve their independent learning and innovation ability has become a problem that every teacher needs to pay attention to in their education and teaching research. And in the IT curriculum, for programming teaching, which is an important and difficult content, combining educational games with programming teaching and carrying out game teaching in the classroom is an efficient teaching method, which not only makes the classroom atmosphere more active, but also allows students to learn relevant knowledge in a subtle way. This paper will discuss the application strategies of educational games in programming teaching, trying to provide effective teaching methods for front-line teachers.

Keywords

Educational Games; IT; Programming.

1. Introduction

In 2017, the Development Plan of New Generation of Artificial Intelligence promulgated by the Ministry of National Education mentioned that artificial intelligence-related courses are set at the primary and secondary school levels, programming education is gradually promoted, and social forces are encouraged to participate in the development and promotion of educational software and games for teaching and learning programming [1]. In 2018, the 2018 Work Highlights of the Education Equipment Research and Development Center of the Ministry of Education mentioned that in-depth research on information technology era background, the curriculum-based educational equipment equipping program and comprehensive teaching environment construction of primary and secondary school laboratories, functional classrooms, and maker spaces featuring interdisciplinary integration [2]. 2020 Horizon Report 2020 (Teaching and Learning Edition), published by the American Association for Information Technology in Higher Education, points out that games and gamification can have a significant impact on students' learning experience [3]. In the teaching and learning of information technology in elementary school, quality education is an important part of the domestic educational work, which needs to be integrated in terms of teaching content, teaching mode and application practices with a view to improving the quality of curriculum instruction. In the actual organization of elementary school classroom teaching, students' psychological development, interests and personality characteristics generally need to be taken into account, and if an overly theoretical or simple demonstration-practice approach is used, students' classroom attention will be reduced to a certain extent. Therefore, teaching at the elementary school level needs to be optimized and innovated in various aspects, such as the design of

teaching methods, the design of classroom teaching models, and the application of educational resources. Combining educational games with programming teaching in elementary school information technology is, firstly, closer to the psychological development characteristics and interests of elementary school students, and secondly, it can combine fun with teaching, so that they can learn in the game and learn in the game, and elementary school students can pay more attention in the classroom and learn in a more happy way.

2. Relevant Concepts

2.1. Educational Games

There are different definitions of educational games and it is difficult to distinguish educational games from non-educational games, some of which have some educational significance, but it is not specifically designed for education. At present, there are usually two statements about the understanding of educational games [4]. The former one believes that games are the essence of educational games, which guide students' learning in the design of the game and the process of the game, and students focus their attention to participate in the game during the game. The latter believes that the essence of educational games is a means of education, which only changes the way of teaching, and its purpose is to let students learn in a different atmosphere from traditional learning, so that students can learn in a pleasant and relaxed state, so that students can learn more actively and improve the quality of teaching. Educational game industry research reports define educational games as computer game software that can develop the knowledge, skills, intelligence, emotions, attitudes, and values of game users and have certain educational significance [5]. All these scholars' definitions and views on educational games can help us better understand and view educational games, regardless of their nature and the form they are presented in, they all serve the same goal - to allow students to learn in a more relaxed and efficient way.

2.2. Children's Game Progranming Education

Instead of simply writing code and programming applications like traditional adult programming, children's programming education cultivates students' computational thinking and innovative abilities through programming game initiation and visual graphic programming courses. Generally speaking, children's programming education is mainly aimed at children and teenagers aged 6-18 years old, thus children's programming education is often characterized by programming basics, low age, and young children. Programming for kids allows children to master programming thinking and unleash their creative abilities in the process of learning programming, and programming courses are comprehensive and applied subjects with interdisciplinary teaching characteristics, which highlight the characteristics of quality education more than traditional subjects.

3. Deficiencies in the Teaching of Information Technology

Most elementary schools start their IT courses in the third grade. Third graders have unstable attention spans that are not easily sustained, and their intentional attention is developed but unstable. In the Chuan Education version of the IT textbook, the first book of the third grade includes the content of children's programming. Most teachers use the traditional demonstration-practice teaching model in this module, that is, the teacher first demonstrates what needs to be done, and then the students do it with some guidance from the teacher. Such a teaching mode is easy for elementary school students to lose interest, which is not only not conducive to the main role of students, but also leads to students' rejection of learning. Moreover, the attention span of elementary school students is not very long, and they can only

concentrate on learning for a short period of time when the teacher explains the knowledge points and demonstrates the operation steps in the classroom.

4. Application of Educational Games in Teaching IT Programming

4.1. The Significance of Educational Games Applied to Teaching IT Programming

In the information technology course, most of them are operational contents, and if they only stay at the level of learning theoretical knowledge in the textbook in the classroom, it will have certain influence on the teaching effect and increase the difficulty of classroom teaching. The significance of educational games in IT programming teaching is mainly reflected in: firstly, it can enhance students' enthusiasm for learning to a certain extent. The application of educational games can integrate game activities into the programming content of information technology courses, combining the knowledge of learning and the fun of games, students can have a better learning environment, so it can largely enhance students' interest in programming learning, so that students become passive to active, active knowledge exploration. Moreover, the educational games themselves have features that allow students to enter self-learning in a smoother state and thus perceive the fun of learning. Secondly, it can promote innovative teaching methods to a certain extent. Primary school students usually have strong curiosity and interest in learning new things, and they also have a strong spirit of exploration. In traditional IT teaching, the teaching method of demonstration-lecture is generally adopted, which is more similar to mechanical knowledge instillation and is not conducive to teachers' classroom teaching. The application of educational games to the teaching of programming content can provide teachers with new teaching tools, change the traditional IT classroom, make students learn more easily, further promote the reform and innovation of curriculum teaching, and meet the requirements of education reform. Finally, it can improve teaching quality to a certain extent. Generally speaking, the modification of teaching methods is to improve the quality of teaching, and the integration of educational games in the information technology curriculum can improve the teaching effect, transform the traditional teaching of the teacher's classroom into a classroom created by the joint growth of teachers and students, give play to the subjective initiative of students, reflect the role of the teacher's guidance, so that the teaching efficiency is improved, thus obtaining good teaching results.

4.2. Analysis of the Countermeasures of Educational Games Applied to the Teaching of Information Technology Programming in Primary Schools

First, create a lively and interesting classroom atmosphere. The classroom atmosphere of implementing game-based teaching will not be conducive to teaching if it is rigid. In a relaxed and pleasant atmosphere, students can enter the learning state faster and the learning atmosphere of the whole class group will be stronger, which is also the premise of successfully combining educational games with curriculum teaching.

Secondly, the rules of the game should be as clear and explicit as possible. When teachers carry out game-based teaching, they must first make the rules of the game and task requirements clear to students, who cannot enter the game-based learning state quickly without understanding the task requirements, which will also cause students to be addicted to the game and unable to learn, and adversely affect the teaching effect. In addition, teachers need to give timely guidance to students who do not enter the learning state, so as to ensure the best effect of gamification teaching.

Third, the amount of tasks required for gamification should be appropriate. Generally speaking, a class lasts 40 minutes, and teachers need to grasp the rhythm of the class, and the task

breakout session should be in the right amount, and students are more likely to accept and understand the knowledge.

Fourth, teachers need to arrange certain group activities. Students cooperate within groups and compete between groups. In the intergroup cooperation, students can exchange and discuss with each other and share their views; in the intergroup competition, the learning interest of each group is stimulated, so that the gamification teaching can be carried out more smoothly.

Fifth, evaluation and summary should be timely. Teachers need to evaluate students' learning performance in task breaking and cooperative competition in time, such as praising and rewarding students who have completed the task well, and affirming students' performance to improve their self-confidence and interest in learning; in addition, teachers should guide the summary in time when the game activity is carried out to a certain stage, and return to the goal of gamification teaching to achieve the ultimate purpose of teaching.

5. Conclusion

In the current elementary school IT teaching, games can enhance classroom tension, innovative classroom expression, and attract students' active participation, which has positive significance. As teachers in the new era, they should pay attention to the game teaching method, study the teaching materials carefully, understand the learning situation deeply, be close to the actual life of students, use educational games flexibly to improve students' interest in IT learning, and be able to participate in designing efficient educational games to achieve an efficient IT classroom.

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