The Application of Augmented Reality Technology in the Teaching of Global Integration of Production Chain

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Abstract. As a branch of virtual reality technology, augmented reality technology has been widely used in aerospace, medical care, education and other fields. This paper analyzes the application of augmented reality technology and its application needs in the teaching of global integration of production chain, carries out the teaching activities of global integration of production chain based on augmented reality technology, and discusses the effect of augmented reality technology applied to the global integration of production chain classroom teaching. The use of augmented reality technology can assist the global integration of production chain classroom teaching, stimulate students' learning experience, and effectively contribute to the improvement of the quality of global integration of production chain classroom teaching.

Keywords: global integration of production chains, augmented reality, classroom teaching

1 Introduction

Augmented reality, also known as mixed reality, enables the deployment of virtual computer images into the real images seen[1]. As a branch of virtual reality technology, augmented reality technology has been used to assist teaching and learning with many successful cases. Some scholars pointed out that the use of augmented reality technology can improve students' enthusiasm for learning, increase participation in the classroom, and can also increase students' classroom performance and improve learning effectiveness. However, at present, the application of augmented reality technology in the field of global integration of production chain education has not been mentioned.

The globalization of the production chain is an important manifestation of economic globalization. This course provides students with the professional knowledge to understand the international division of labor and collaboration in the field of production, and lays the foundation for subsequent professional courses. At the same time, the course places great emphasis on the ability to link theory with practice. Students need to relate the theoretical knowledge they have learned to the things around them, and judge which things are the products of the global integration of the production chain, and the production activities of our country are the link in the world production chain.

Therefore, this study analyzes augmented reality technology and its application needs in the global integration of production chain teaching, and uses augmented reality technology to assist the global integration teaching of production chain, so as to explore the positive effect of the application of augmented reality technology on the global integration of production chain teaching, and explore new teaching methods for improving the quality of ideological and political education.

2   Augmented Reality Technology and Applications

2.1   Introduction to Augmented Reality

Augmented reality technology originated from the virtual reality technology developed and researched by the U.S. military in the 60s of the last century. Augmented reality technology combines the real environment with the virtual reality scene, uses virtual objects or information to combine with the real environment and enhances or expands the scene, presents the user with a new environment with real sensory effects, and makes the user feel convinced that the virtual object is an organic part of the real environment around it. There are two main ways to introduce augmented reality in education – through smart glasses or AR headsets, and through portable devices such as phones, tablets, or laptops. Augmented reality technology has three significant characteristics: the combination of virtual and real, real-time interaction, and three-dimensional registration, and can project some factors that are not easy or can be felt in the real environment into the real environment by supplementing it with the real environment, so as to enhance students' perception of these factors.

2.2   The Application of Augmented Reality Technology in the Classroom Teaching of Global Integration of Production Chain

Technology can change the way students learn, become a powerful motivator, and trigger the learning process[2]. In fact, the globalization of the production chain is a course that combines theory and practice, which is characterized by abstraction and obscurity. With the in-depth development of economic globalization, the world has become more and more interconnected and interdependent as a whole, which is closely related to everyone's production and life. With the development of science and technology, the international division of labor and cooperation in the field of production has been deepened and strengthened, and the production of all countries in the world has cooperated and interconnected, and the production activities of various countries have become a link in the world production chain. Systematic mastery of the production process of the global production chain is essential for us to grasp the rhythm of production and life in our country. However, in the traditional teaching classroom, teachers and students generally pay less attention to the content of the global integration of the production chain, only a few lines of text in the textbook, a few pictures on the Internet or a video can be regarded as understanding the process of the global integration of the production chain, and little is known about its deep operation logic and practical operation system, which leads to students' insufficient understanding of the global market,

limited logical thinking, lack of international vision, and it is difficult for students to understand the necessity and feasibility of   various national policies from the global level.

Augmented reality technology has significant advantages such as virtual and real combination, real-time interaction, three-dimensional registration, etc., which can not only present the process of global integrated production of the global chain in three dimensions, so that students have a good sense of immersion and interaction, but also show the global design, production, sales and recycling process of specific products, and even stimulate students' participation in classroom activities, so that students can establish self-efficacy in the use of augmented reality technology, so as to obtain a better sense of learning experience[3].

3   The Specific Implementation Plan of Augmented Reality Technology in the Teaching of Global Integration of Production Chain

3.1   Preparation Before Class

The global integration of production chain teaching based on augmented reality technology adopts the combination of traditional teaching methods and educational information technology, in which pre-class preparation is a very important work in classroom teaching. First of all, the teacher should publish the learning tasks of the course on the learning software according to the teaching content before class, including the course content, learning objectives, major and difficult points of the course, and thinking questions, so that students can preview the content to be learned in this lesson before class. At the same time, in addition to preparing the traditional teaching content required for this lesson, it is also necessary to select appropriate augmented reality technology development tools, such as Unity, Vuforia, etc., according to the content of the global integration of the production chain, to produce relevant content technology[4], and publish the virtual data information on the project work platform, and make pictures that can be scanned and identified, and students need to prepare electronic terminal devices such as mobile phones or tablets in advance.

3.2   Application of Augmented Reality Technology in Classroom Teaching

First of all, teachers should choose a representative production chain design link as the educational content in the design of teaching content. For example, in the case of "the global journey of an iPhone" or "the global manufacturing process of an American car", it is important to build a 3D model of the original design, raw material procurement, manufacturing, logistics and transportation and global sales of the product through the mobile phone or tablet, and this process must ensure that the content covers the whole picture of the production chain, and at the same time highlight the key links and technologies such as the manufacturing process of each part of the product from different countries and the advantages of each country in the production chain. In terms of

knowledge point combing, the key knowledge points and technical points are sorted out for each link of the production chain, and the benefits of the global allocation of biological factors are highlighted, so as to ensure that students can increase their understanding of international collaborative production through augmented reality technology. At the same time, in the design of the scenario mode, it is necessary to use augmented reality technology to create highly realistic production chain scenarios, including factory environment, equipment operation, personnel interaction, etc., to ensure that learners can be immersed in the virtual environment and get a real learning experience.

Secondly, in the design of technical implementation, students should be involved in it and truly experience the fun of division of labor and cooperation. On the one hand, a variety of interactive functions should be designed according to the needs of educational content, such as gesture recognition, language recognition, object recognition, etc., which can improve learners' engagement and enable them to interact with the virtual environment more naturally. On the other hand, it is necessary to set up different roles for students to participate in them, such as having students act as production workers, managers, researchers, etc. in a virtual environment, which can help students better understand the different roles and responsibilities in the production chain. At the same time, in terms of task and challenge design, a series of tasks and challenges related to the production chain can be designed, and students are encouraged to carry out practical operations and problem solving in a virtual environment, which can improve students' practical ability and innovative thinking. In addition, in user interface design, a concise and clear user interface should be designed, providing easy-to-operate navigation and menus to ensure that students can quickly understand and use augmented reality technology applications, and lower the learning threshold.

Finally, in the design of the platform architecture, in-depth learning and sharing functions should be designed to facilitate students' in-depth learning. In the design of the 3D model of global integration of the production chain, it is necessary to mark the detailed explanation of relevant knowledge points, and even provide the query method of relevant network resources, so that students can conduct in-depth learning of its content in a timely and effective manner. At the same time, in terms of resource sharing and learning achievement display, a resource sharing function can be designed to allow students to upload and share learning materials and cases, so that students can display learning results in the future and promote mutual learning and communication.

3.3   Evaluation and Improvement of Teaching Effectiveness

In order to test whether the use of augmented reality technology can improve the classroom teaching effect of global integration of the production chain, we can collect student feedback and learning data by distributing questionnaires, and analyze these data to evaluate the effectiveness of augmented reality technology in education and provide a basis for improvement. At the same time, we can also make continuous improvements to the AR content and teaching methods based on the assessment results and student feedback, keeping up to date with the production chain technology to

ensure that the educational content is timely and practical. As shown in the figure below:

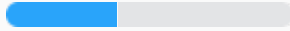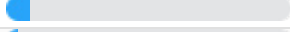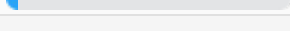**Table 1.** Do you like teachers using augmented reality in their classrooms?

Options	subtotal	proportion	
A. Strongly liked	11		47.83%
B. liked	9		39.13%
C. generally liked	2		8.7%
D. disliked	1		4.35%
The number of people who fill in this question effectively	23		

Table 2. What do you like about the way teachers teach in the classroom?
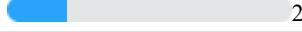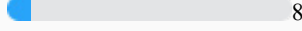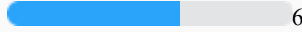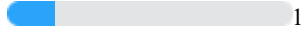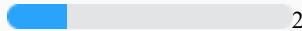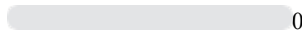
Options	subtotal	proportion	
A. Traditional way of teaching	5		21.74%
B. Only AR technology is borrowed	2		8.7%
C. The way the two are combined	16		69.57%
The number of people who fill in this question effectively	23		

Table 3. What do you think needs to be improved in the application of augmented reality technology to global production integration classroom teaching?

Options	subtotal	proportion	
A. Teachers are not proficient in the use of AR technology	16		69.57%
B. The use of AR technology is too cumbersome	14		60.87%
C. The content presented by AR technology is not of high quality	4		17.39%
D. Teachers lack systematic professional knowledge, which affects the effectiveness of use	5		21.74%
E. It's perfect and doesn't need improvement	0		0%
The number of people who fill in this question effectively	23		

As can be seen from Table 1, most of the students like the teacher's integration of augmented reality technology into the global integrated teaching classroom of the

production chain. However, Table 2 shows that the majority of students prefer the teacher's combination of traditional teaching methods and AR technology in the classroom. In addition, as can be seen from Table 3, more than 90% of the students believe that augmented reality technology has outstanding advantages in improving students' interest in class, expanding their knowledge and increasing students' comprehension ability, but further improvement is needed in improving teachers' technical proficiency and simplifying the application procedures.

4   The Advantages of Augmented Reality Technology in the Teaching of Global Integration of the Industrial Chain

4.1   Visualize the Production Process for Students

One of the benefits of augmented reality in education is the increased understanding of the content after the student's experiential learning[5].Augmented reality technology can provide a virtual operation of the global integrated production of the industrial chain, so that students feel as if they are in the real production chain environment. This immersive learning experience is very useful for classroom teaching with global integration of the production chain, which can present the complex production process in front of students in the form of three-dimensional images, so that students can fully understand the various environments and production processes of the production chain without leaving the classroom, enhance students' positive learning attitude and satisfaction, and help students understand difficult content more easily[6].At the same time, through augmented reality, teachers can practice teaching in a virtual environment without actually investing a lot of resources and costs, which helps reduce the cost of learning and make high-quality teaching resources accessible to more students.

4.2   Improve Students' Teamwork Skills

With the help of augmented reality, students are able to see the processes of various departments and teams in the virtual production chain, and clearly see the manufacturing process of the product. Students can also use the multi-person interaction function of augmented reality technology in the classroom to carry out collaborative learning and complete the global division of labor process of a certain product in the virtual environment, which is not only conducive to improving students' interest and participation in learning, but also conducive to cultivating students' teamwork and communication skills. In addition, augmented reality technology can also create a virtual factory or laboratory that simulates the real working environment and production process, and students can practice in this virtual factory or laboratory to improve their practical ability and operation skills. This kind of simulation is very practical for the teaching of global integration of the production chain, so that students can familiarize themselves with the whole process of production in the classroom.

4.3   Increase Students' Enthusiasm for Classroom Learning

Augmented reality technology is able to combine the real and virtual worlds, helping to study concepts and content that were previously unseen[7].Through augmented reality technology, teachers can accurately and vividly show the operation process of global integration of the production chain in the form of a three-dimensional model, and students can also understand the global configuration process of production factors from multiple angles through mobile phones or tablets, and intuitively split the global design, production, sales and recycling process of specific products, so as to better understand its structure and mobilize the enthusiasm for learning. In addition, some scholars have pointed out that the use of augmented reality technology in teaching can create emotions among students, which can improve their learning[8]. As a result, the introduction of AR technology into everyday classrooms is very useful for students' learning, knowledge acquisition, and end results[9]. In addition, teachers can also add or update the content of the project in a timely manner according to the learning effect and feedback of students, and continuously enrich the teaching content, so as to further stimulate students' interest in learning, and students can choose their own learning path and content according to their own learning progress and ability level, so as to achieve personalized learning and development, and increase their enthusiasm for learning.

5   Conclusion

With the continuous development of digital technology, the depth and breadth of the application of augmented reality technology in the field of education continue to expand, and it has become one of the most popular emerging technologies in the field of education so far[10]. The use of augmented reality technology can profoundly and intuitively display the process of global integrated production of the production chain, promote students' better understanding of global integrated production, improve students' teamwork ability, promote students' interest in learning, and effectively improve the teaching effect. However, technology is always a double-edged sword, and although the use of new technologies can assist in teaching, there are also some potential risks and challenges. For example, students may rely too much on augmented reality and ignore the actual situation and environment in the production chain, lacking an understanding and perception of the real world. In addition, augmented reality technology requires professionals to develop and maintain, which requires the investment of corresponding human and material resources. Therefore, only by perfectly integrating new technologies with traditional teaching methods can the characteristic advantages of new technologies be reflected and better promote the reform and innovation of education and teaching.

In general, the application of augmented reality technology can improve the effect of global integration of production chain classroom teaching, provide students with a better learning experience, and improve students' international vision. However, we need to apply augmented reality with caution and carefully address the potential risks and challenges involved to ensure the effectiveness and sustainability of the teaching effect of global integration of the production chain.

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