

## RESEARCH AND DISCUSSION ON «3D DIGITAL» IN DISTANCE LEARNING

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The corona-virus epidemic broke out in the world in 2021. During the epidemic period, distance learning was widely adopted by schools, which promoted the development of distance learning. However, there is a significant gap between the effect of distance learning and offline learning. The reason for the development of distance learning is the rapid development of network and electronic technology products. In 2021, the number of global Internet users reached 4.66 billion, accounting for 66.6 % of the world's total population in the same time respectively. 3D digital has brought strong visual experience to the audience with high-definition images, realistic colors and strong three-dimensional sense. It has been widely used in many industries such as film, exhibition, education and so on.

**Keywords:** distance learning; 3D digital; research; education development; experience.

## ИССЛЕДОВАНИЕ И ОБСУЖДЕНИЕ ЦИФРОВЫХ 3D ТЕХНОЛОГИЙ В ДИСТАНЦИОННОМ ОБУЧЕНИИ

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Эпидемия коронавируса разразилась в мире в 2021 году. В период эпидемии дистанционное обучение получило широкое распространение в школах, что способствовало развитию дистанционного обучения. Однако существует значительный разрыв между эффектом дистанционного обучения и офлайн-обучения. Причиной развития дистанционного обучения является бурное развитие продуктов сетевых и электронных технологий. В 2021 году количество пользователей Интернета во всем мире достигло 4,66 миллиарда человек, что составляет 66,6 % от общей численности населения мира за то же время соответственно. Цифровые 3D технологии принесли зрителям сильное визуальное впечатление благодаря изображениям высокой четкости, реалистичным цветам и сильному трехмерному восприятию. Он широко используется во многих отраслях, таких как кино, выставки, образование и так далее.

**Ключевые слова:** дистанционное обучение; цифровое 3D; исследования; развитие образования; опыт.

With the advent of the information age, 3D digital has entered our world and affected our lives. The application of 3D digital involves many industries, such as film and television, transportation, medical treatment, education, military and other fields. 3D digital technology includes Augmented Reality (AR) technology and Virtual Reality (VR) technology. Virtual reality technology is a computer simulation system [1, p. 1906]. VR technology completely immerses a user inside a synthetic environment. While immersed, the user cannot see the surrounding real world [2, p. 80]. Augmented reality technology is developed from virtual reality technology. With the help of computer vision technology, it can cover simulated objects in the actual scene to build a fusion effect of virtual and reality. 3D digital technology makes the image no longer confined to the plane, but converts the image from plane to three-dimensional, giving people a real feeling.

After the development of distance learning, students who accept distance learning mainly have lessons through video. Can only listen to the teacher, can not achieve interaction, and can not feel the feeling of the teacher's presence at the scene. Therefore, there is a big difference between the effect of distance learning and traditional learning. Especially when teachers have the «display» link, because they can only watch through video, it is difficult for students to have a real sense of experience, which affects the learning efficiency of distance classroom. However, with the help of 3D digital, students can experience the on-site learning experience of teachers. With the help of 3D digital, the teacher's figure will be projected on the screening, so that students have the feeling that the teacher is teaching nearby. 3D digital makes distance learning more realistic.

3D digital can also be applied in practical operation courses. In many practical classes, students can only understand the specific practice through video or on-site observation most of the time. However, the video belongs to two-dimensional space and lacks a strong three-dimensional sense, which can not accurately guide students to practice. 3D digital can create a three-dimensional learning environment for students. Students can practice at will in this environment. The pictures seen by teachers and students are synchronous, which can realize good interaction between teachers and students. Actually, in 2012, Billingham and others of Canterbury University developed an augmented reality system that can assist teaching, «three dimensional teaching materials» [3, p. 57].

There are still some deficiencies in 3D digital in distance learning, but these limitations also provide us with the direction to improve the application of 3D digital in learning. The application of 3D digital in learning has high requirements for the use site, and the equipment configuration cost of software and hardware is high. Only some schools are able to set up relatively complete 3D digital courses, which does not meet the needs of balanced development of learning. The standard of 3D digital learning industry is not standardized, so that the quality of 3D digital resources in the market is not good, coupled with the shortage of professionals, which leads to the lack of guarantee of 3D digital learning quality and learning safety.

The application of 3D digital in distance learning plays a great role in breaking the limitations of traditional learning and improving teachers' teaching ability and students' thinking ability. At the same time, it is also conducive to the exertion of students' subjective initiative and promote the effective interaction between teachers and students.

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