

Construction and Application of Scenario-based Intelligent Teaching System

Wenjin Tian

Hubei University of Medicine, Shiyan, Hubei, China

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Abstract: With the continuous development of the times, the mobile internet has quietly integrated into people's daily lives. With the emergence of various new demands for education, a scenario-based education transformation that meets the new needs of mobile internet education is imminent. The development of information technology has provided a foundation for the integration of scenario based teaching and intelligent teaching. Based on this, this article explores the construction and application practice of a scenario-based intelligent teaching system, with the aim of breaking the fixed thinking of traditional teaching models, integrating teaching content into specific knowledge comprehensive application scenarios, and encouraging learners to actively carry out activities through interaction between people or the environment.

1. Introduction

Scenario based intelligent teaching is based on the concept of scenario based education, relying on technologies such as big data, cloud computing, and mobile internet (5G) to build an interconnected online learning space and high-quality educational resources for everyone, thereby achieving a new type of intelligent teaching characterized by “efficient teaching, proactive learning, visible data, and personalized interaction”. Situational wisdom teaching can help teachers to change the teaching mode, pay attention to the guidance and teaching of methods and processes, help students reduce the burden and increase efficiency, and change from passive learning to active learning. Through the technical support of various intelligent devices, teachers and students can also immerse themselves in specific knowledge generation and application scenarios, creating a sense of immersion, allowing them to observe and analyze problems from multiple perspectives and levels.

Compared with general scenario based teaching, intelligent scenario based teaching has the following characteristics. Firstly, more emphasis is placed on customizing teaching methods. Various intelligent data analysis technologies can be utilized to provide teachers and students with teaching plans and personalized customized teaching services that are suitable for their own development, achieving precise teaching and solving the problem of educational fairness caused by uneven teaching resources. Secondly, the teaching effectiveness will be more efficient and effective. Teachers can use data analysis to analyze the learning habits of each student in intelligent teaching scenarios, in order to understand their learning needs, and more effectively implement personalized teaching, fundamentally solving the problem of inefficient classroom teaching. Thirdly, it can promote the comprehensive development of students. Scenario-based intelligent teaching relies on artificial intelligence technology and allows for interactive discussions with students. Face-to-face emotional communication with teachers can greatly stimulate students' interest in learning and willingness to communicate. While improving their learning efficiency, it also exercises their expression ability and promotes the development of students' mental systems. Finally, it helps to cultivate and enhance students' innovative abilities. With the help of various scenarios, knowledge not only has the ability to be explored, but also has the ability to generate and live. Students will actively participate in classroom teaching activities, obtaining more opportunities and space for problem-solving and hands-on practice.

2. The Construction of a Scenario-based Intelligent Teaching System

2.1. Offline Scenario-based Intelligent Classroom Teaching

Firstly, intelligent teaching equipment. Scenario-based intelligent teaching should start with the optimization design of the classroom teaching environment, which includes wireless sound reinforcement system, multimedia system, mobile teaching system, classroom video direct recording and broadcasting system, interactive classroom system, central control system, etc. The design of a intelligent classroom teaching environment provides various efficient interactive teaching equipment and technologies for teachers and students. Teachers can use the intelligent remote control to achieve functions such as sound reinforcement, recording, and interaction, making teaching instruments more flexible and convenient to operate. At the same time, the intelligent classroom teaching environment also provides learners with more humanized learning facilities and space. Students can reorganize the environment according to the needs of teaching activities, forming learning groups to facilitate communication between students.

Secondly, visualization of teaching resources. Scenario-based intelligent teaching is mainly achieved through the support of cloud platform data collection systems and classroom direct recording and broadcasting systems. The cloud platform data collection system can integrate and transmit national cloud teaching resources, regional cloud teaching resources, and school-based cloud teaching resources, constructing a intelligent teaching cloud resource loop (including micro course videos from famous teachers and universities, classroom records, lesson plans, guidance videos, and assignments), enabling various high-quality cloud teaching resources to return to classroom teaching, effectively supporting teachers and students in obtaining, processing, and presenting learning resources. At the same time, it can also break through time and space limitations, change the previous state of separation between the classroom and teachers, narrow the teaching distance and emotional communication gap between teachers and students, and achieve the co construction and sharing of high-quality educational resources between urban schools and remote schools.

Thirdly, immerse the teaching scene. Immersive scenes are often composed of 3D surround sound system (Dolby sound effect), IOT central control system, intelligent teaching system, virtual reality technology equipment, etc. Its layout mainly adjusts adaptively based on the real-time progress of classroom teaching needs, including light, temperature, environmental music, background music, air quality, and other aspects. By completing real-time changes or simulations of the environment, various types of educational scenarios such as era style, story background, and plot direction that are in line with the knowledge taught in the classroom are constructed.

Fourthly, the teaching method should be intelligent. Interactive teaching is one of the core development trends in the future reform of teaching methods, and scenario-based intelligent classrooms will be the mainstream of classroom construction in the future. The use of modern intelligent technology can provide friendly, intuitive and natural interactive operation for teachers and students, promote the communication between teachers and students and the exchange and discussion between students, and realize the diversified and three-dimensional in-depth learning of information and resources. In scenario-based intelligent classroom teaching, students use mobile devices to interact with teacher terminals in real-time, and various learning states and process information of students can be presented to teachers in real-time. Teachers and students can implement teaching activities more intelligently, efficiently, and scientifically in a relaxed, enjoyable, and interactive teaching environment, making the entire education process more personalized and humane.

2.2. Online Scenario-based Intelligent Teaching Activities

Firstly, online teacher teaching community. With the support of national cloud resources, regional cloud resources, and school-based cloud resources, teachers can easily have the opportunity to learn or observe from renowned teachers in prestigious schools. At the same time, by watching one's own classroom teaching videos, one can understand students' knowledge blind spots, analyze various problems in the classroom, form effective teaching reflection, and thus complete

closed-loop management of teaching before, during, and after class. Teachers can use the platform to exchange and exchange professional knowledge, teaching skills, and other aspects. Their teaching experience, teaching methods, and insights on how to handle relationships with students can also be shared with others through the platform. This can effectively change the original teaching strategy and continuously improve teaching quality and professional literacy. In short, by building an online “teaching and research community”, good partnerships can be established among teachers, promoting mutual support and common progress among them.

Secondly, adaptive support for online student learning. In scenario based intelligent teaching activities, meeting the personalized needs of learners has become the core value pursuit of adaptive learning. The embedded learning adaptive system on the student end can adjust the difficulty of learning content, accurately match learning materials, and provide personalized evaluation of learning based on the differences in the learning process of learners. Adaptive systems can guide students to adopt learning that is most suitable for their own development, and push learning content and activities that match and adapt to them. In addition, the adaptation of learning evaluation mainly focuses on data analysis and evaluation of learners’ online learning. By tracking learners’ learning dynamics, learning trajectories, and corresponding learning behaviors, personalized evaluation of learners is conducted comprehensively, comprehensively, and visually.

Thirdly, the implementation of online home school communication. Parents can follow the latest news of the school through mobile app, official account and WeChat applet, and communicate effectively with the school or teachers. At the same time, online open classes for parents are offered, with limited parental supervision, enabling parents to experience or perceive the classroom teaching environment and course quality from the perspective of their children, and achieving positive supervision of teaching by social forces. In short, it closely combines teachers, students, and parents to form an educational community with a shared future, achieving mutual assistance and communication without obstacles, and jointly promoting the comprehensive development of students.

3. Application of Scenario-based Intelligent Teaching System

3.1. Virtual Situational Teaching

The virtual situational teaching application system mainly includes functions such as 4K high-definition display, 4D body feeling experience, AI intelligent dialogue, etc. It uses virtual reality technology to digitize the synthesis of characters and virtual 3D scene images in real time, enabling synchronous changes between characters and virtual backgrounds, achieving seamless integration of the two. It provides training 3D scenes and micro lesson 3D scenes, forming a “theory+practice” teaching mode of “teacher recording micro lessons+student training exercises” (Figure 1). Students can interact with digital content by wearing Google glasses, virtual reality helmets, augmented reality display devices, etc., and interact with holographic images in the surrounding real environment, providing learners with a sense of realism and experience that ordinary teaching cannot provide.



Figure 1 University Virtual Reality Laboratory

3.2. Embedded Situational Teaching

The embedded situational teaching application system is mainly applied to small-scale precision teaching activities. Its equipment is compact, lightweight, and high-performance, with the functions of situational teaching and micro course recording. It can be operated with a mouse and directly touched on the display screen to select corresponding scenes for teaching. Students can play fairy tales, experience campus environments, or cultivate art and culture under the guidance of teachers. In addition, it is also possible to immerse oneself in the long river of history through devices such as virtual reality tactile transmission and augmented reality simulation transmission. In an open virtual world, students can immerse themselves in it, develop their own storyline through their own understanding of history, and ultimately gain a unique understanding and reconstruction of knowledge. In the process of situational simulation teaching, learners will gain an immersive experience, understand and construct knowledge from multiple perspectives and roles, and achieve the fusion of knowledge and emotions through the collision of character emotions in the storyline, thereby improving the sense of historical experience, strengthening the understanding of history, and making teaching more effective.

3.3. Immersive Intelligent Teaching

The immersive intelligent teaching system reshapes the traditional classroom environment through artificial intelligence technology, creating a new intelligent education ecosystem suitable for students' learning and teachers' teaching. The immersive intelligent teaching system adopts advanced acoustic, optical, and multimedia technology to create a virtual three-dimensional immersive situational classroom from a classroom. The scene of the classroom can be switched based on the fusion projection, which can be a street or scenic area, a kitchen or bedroom, a natural forest or a colorful underwater world. The experimenter can immerse themselves in it and engage in various virtual simulation interactive experiences. The biggest highlight of immersive intelligent teaching enabled by technologies such as holographic spatial imaging and hybrid reality lies in the interactive, experiential, and interactive learning process, creating an immersive and interactive learning and teaching environment for students and teachers, and constructing and applying the "digital twin teacher". The "digital twin teacher" can be transmitted to classrooms in remote mountainous areas to teach students there, allowing students in mountainous areas to receive high-quality education similar to those in big cities. Students who are unable to attend school for some reason can also use hybrid reality glasses and body sensing devices at home to join the immersive remote interactive classroom deployed with an ultra-high definition live streaming system. Like other students sitting in the classroom, they can interact with the "digital twin teacher" and experience the feeling or atmosphere of a real teacher classroom (Figure 2).



Figure 2 Immersive teaching classroom

4. Conclusion

In summary, with the rapid development of mobile communication technology, network technology, and artificial intelligence technology, the deep integration of scenario-based education theory and intelligent teaching technology will be more conducive to building new education and teaching models based on different knowledge application scenarios and building higher quality effective teaching systems. This system can not only comprehensively improve the efficiency and

effectiveness of existing education and teaching, but also more effectively promote the comprehensive, coordinated and sustainable development of education, and achieve innovative, composite, and personalized comprehensive practical talent cultivation.

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