Conclusions

Virtual reality and enhanced reality technology can set up virtual learning situation for learners and help them understand learning content from various aspects. They can combine educational entertainment factors with intelligent technology factors to enhance the enjoyment of application and make it not only a tool for exhibition, observation and experience, but also a study application to help learners have a deep understanding and practice of learning content. The utilization of virtual reality and enhanced reality technology enables students to interact with the environment through bodies. “According to pedagogy including constructive learning and game-based learning, children can have best learning when they conduct it personally." Corbett said. The ability to teach experimental knowledge without leaving the classroom gives the educational experience an unparalleled value. Instead of listening to teachers, students follow the annotation with the help of headgear to get the real experience. The virtual reality education expert, Inge Knudsen, constructed a virtual building site with many safety problems. Students can walk back and forth in the virtual environment to take photos of unsafe places. Such case cannot be realized in real life, so it is especially suitable for the virtual world to make it happen. The imitation scenes enable students to experience any kind of work and life in various fields. As for the drawbacks and constraints in real-life education, they are solved and improved through virtual reality technology, so as to make the educational process interesting and attractive. In addition, the participation degree generated by virtual reality will help students’ desire of exploration to turn from entertainment at first to study and reflection in the end. As the general secretary of MissionV, Corbett, has said, “Motivation and participation are key elements of game-based learning and virtual reality uplifts the two elements to a new level.”

The combination of virtual reality and enhanced reality education will improve the teaching efficiency of future classes. The traditional teaching mode is organized by teachers to impart knowledge to students without difference, while the utilization of virtual reality technology makes personal, independent and experience-oriented teaching possible. Through individualized teaching, every student can listen to personalized teaching from teachers in the virtual environment and interact with teachers. In the traditional class, all the students listen to the same teacher, while every student has own teacher in the virtual reality class. In addition, enhanced reality technology can make static characters and pictures three-dimensional to increase the interaction, entertainment and realistic of reading and set up the real situation. Through the 3D model, the abstract learning content becomes visualized and the micro-content can be seen. The simplification of complicated learning content helps students to understand and remember abstract conceptions. When virtual reality and enhanced reality technology are applied in class as educational tools, they can present for students a communicative virtual world, where students’ sense of experience and curiosity are fulfilled and knowledge can be imparted in an innovative way. In this way, the teaching efficiency of teachers can be greatly improved, students’ learning interest will be intrigued and their learning efficiency can be enhanced.

As shown by VR and AR application cases introduced in the previous section and the latest world-famous AR game Pokemon Go, AR is more easily commercialized than VR.

There are 3 educational application cases of virtual reality technology in the foregoing chapters. In view of disciplines including design basis, education, geology and preschool education, and the result of evaluation, if the virtual reality technology is applied in the school education, the previous investment of infrastructure may be huge. However, students can have better study experience and ideal educational outcomes can basically be achieved. The virtual reality hardware devices, such as Oculus HMD, still have technical problems and there is no breakthrough. For example, vertigo can be easily caused by long term use and the hardware device of gesture recognition Leapmotion, which can interact more naturally, needs to be improved and elevated in terms of accuracy and sensibility, so as to provide sustained and lasting sense of immersion for students. Besides, according to evaluation results, we can see that, compared with virtual reality devices such as Oculus HMD, there is no need to wear heavy headgear to enhance real environment. We do not need to place special locators or define specific activity range to capture the location of users. All we need is a tablet or a mobile phone with a camera, so that we can integrate and interact in the real environment with virtual objects. As a result, the learning environment with relatively low requirement for hardware is more easily realized at school. Although it can be realized technically, the way of its combination with specific educational content needs to be designed with more efforts and time.

Compared with the study of other more mature technologies in the education, the study of application of virtual reality and enhanced reality technology in education is still at the simple and preliminary stage without deep interaction. Only a small number of cases have relatively deep interactive means. Some designs are relatively simple with a short research cycle. The sample number of quantitative research tends to be small, while qualitative research depends on the usability of learners’ self-declaration, preference and efficiency to evaluate learning outcomes. Moreover, the methods adopted is mainly based on the design study, case study and a small number of quasi-experimental research. We can see from the cases of independent research and development that most students react positively towards the virtual reality teaching tools and environment, which conforms to the research outcomes of Nunez, Quiros, Nunez, Carda and Camahort [69]. In order to provide more evidence with educational significance about AR and VR, we should control and evaluate comprehensively the study, including the collection and analysis of more samples and valuable devices. Effective after-school activities and technical characteristics should be defined in the future study of AR and VR educational application. What’s more, a set of teaching mode and the design principle of AR and VR environment should be created synthetically. In this way, guidance can be offered to problems involved with the new virtual reality learning environment.