Integration and Service Strategy of VR/AR in Practical Teaching

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Abstract. Starting from the educational and technical perspectives, analyzed the support of different education theories on VR/AR, and clarified the orientation and service path of VR/AR education application; on the basis, discussed in detail and importantly on technological orientation, effectiveness, recognition and challenges of VR/AR. It is pointed out that the development and application of VR/AR should be focused on the maximum integration with teaching content, students and teachers, so as to improve the teaching effect more effectively.

1. Introduction

The development of educational informatization is towards virtualization and intelligence. In "horizon report" released by the New Media Consortium in recent years, AR is listed as one of the six most promising technologies over the next few years [1]. It is worth noting that the report puts forward VR and AR together in 2016, which indicates that VR and AR technologies will be integrated into each other to apply in the field of education [2].

VR/AR, as a new technology, will promote significant changes in education form, education environment, teaching process and mutual relations, and form a new structure for the relationships among teachers, students and media in the teaching process, which is an effective way to improve educational performance and has practical significance for promoting educational modernization [3]. However, there are some problems in the development stages of CAI, CAL and IITC, as well as in the research and practice of the development modes of E-learning, B-learning, VLE and MOOC. Educational technicians have designed and reformed a variety of teaching modes for the emergence of new technologies. However, as always forgetting the essence of technology education service, they tend to adopt the technology- centered design orientation unconsciously, in practice teaching, which not only fails to achieve good positive effects, but also brings many negative effects [4].

Starting comprehensively from the educational and technological perspectives, focusing on the essence of VR/AR service teaching, this paper studies the service strategies and implementation paths of VR/AR in practical teaching, so as to avoid the negative effects caused by excessive and inappropriate use; discusses the challenges of VR/AR, and the integration of VR/AR, students and teachers is realized to the maximum extent, so as to improve the teaching effect practically.

2. VR/AR and Educational Theory

In order to fully apply VR/AR technology to educational practice, appropriate theoretical analysis is conducive to clarify the orientation and implementation path of VR/AR educational application. In this paper, VR/AR education is discussed from different angles and education theories at different levels to maximize the organic combination of VR/AR and education [5].

2.1. VR/AR and Cognitivism

The basic view of cognitive learning theory is that people's cognition is not directly given by external stimulus, but the result of the interaction between external stimulus and the internal psychological process of the cognitive subject. According to this view, VR/AR service teaching strategies should be focused on:

- From the learner's cognitive psychology, the construction of virtual environment firstly stimulating students' learning interest and learning motivation.
- To pay attention to student's original cognitive structure (the past knowledge and experience), being conducive to link the transition between the old and new, to build a new cognitive structure.

2.2. VR/AR and Behaviorism Theory

Behaviorism learning theory pays attention to the influence of external factors such as environment on learning, and emphasizes the use of emotional materials provided by media to impart knowledge. Although behaviourism emphasizes external behaviour and motivation and ignores the influence of learners themselves, its reinforcement theory plays an important guiding role in VR/AR teaching design. The service strategies are reflected in:

- The virtual object is built by VR/AR, which can highly stimulate learning interests, arouse enthusiasm, and promote the transformation of external motivation into internal motivation.
- Providing theoretical guidance on real-time interaction and feedback design of virtual environment, on the one hand is advantageous to the rendering of virtual object's contents and the change of evaluation approaches, on the other hand can strengthen exercise of operational knowledge.

2.3. VR/AR and Constructivism

Constructivism emphasizes that learning is an experience of a real situation. VR/AR technology is a major breakthrough and the highest state of constructivism in modern educational technology, and its implementation paths are as follows:

- VR/AR technology with immersion, interaction and imagination, can make learners be immersed in the virtual environment, be free of interaction and transcend reality.
- VR/AR technology can effectively realize the scene, collaboration, session and meaning construction in the learning environment of constructivism.

2.4. VR/AR and Humanism

The connotation of humanistic learning theory is embodied in the teaching theory, that is, students are the centre and paying attention to emotional education, encouraging students to learn actively and exploring their creative potential. The teaching strategies and implementation paths of VR/AR services are as follows:

- Interaction built by VR/AR, helps students to participate in the learning process, and to realize the highly participatory of learning.
- A good learning environment built by VR/AR, promotes the transformation of the external motive to internal motive, and improves the learning autonomy.
- The real-time feedback built by VR/AR, makes learning to have a self-evaluation, and can achieve good effect of self-assessment.

3. VR/AR and Teaching Integration

VR/AR makes use of the advanced technology to reintegrate learning resources and present them in a variety of appropriate ways, which change the teaching form [6]. His fundamental aim is to improve the teaching effect and promote the better development of learners. However, from the previous teaching experience, people find that the teaching model supported by many advanced concepts is confronted with practical problems in practice, which is difficult to achieve the expected effect.

Therefore, it is very important to study VR/AR and teaching integration, service teaching and implementation path.

3.1. Technical Orientation

VR/AR is firstly a technology in the form of software. However, when software is applied to practical teaching, it must be closely related to relevant environment, people and other factors, which determine whether the system can be integrated from simple software form to practical teaching. Compared with other industries, VR/AR teaching system is a more complex system engineering. Many problems in educational field are ill-structured ones, which cannot be solved simply by normalization, and their demand analysis is very difficult.

From the perspective of technology, VR/AR teaching system should also be positioned as man-machine relationship, and its essence is the application of technology in practical teaching. However, more and more education technologists tend to regard VR/AR teaching system as artificial information system for research and interpretation. When VR/AR teaching system is simply regarded as an information system, the design and development of the system will unconsciously lean towards the technical level, which is deeply marked by industrialization and fluidization. In extreme cases, it will enter the alley of technological determinism.

From the perspective of teaching, the most obvious change of VR/AR to education is the addition of VR/AR learning environment. VR/AR technology introduces education, which is by no means a simple addition of education content and tools. VR/AR has become a way of learning and thinking. This part focuses on exploring the influence of changes in VR/AR educational learning environment on teaching participants, teaching process and teaching methods [7].

3.2. Efficiency Analysis

The idea of effective teaching originates from the movement of scientific teaching in the first half of the 20th century. The core problem is the teaching effect, that is, what kind of teaching is effective. Effective teaching is not a strict academic term, which is relative to inefficient learning and ineffective learning [8]. Therefore, this paper defines it as whether learners accomplish learning tasks and achieve learning goals in the expected time, and defines the key factors of learners and learning materials.

Studies in cognitive psychology have shown that redundant learning content and complex forms of expression can reduce their learning efficiency. In practical application, evaluation of VR/AR teaching often emphasizes the integrity of content, diversity of media forms, and interestingness of presentation forms, while ignoring the necessity and adaptability of VR/AR design. VR/AR, teaching integration and service strategies are as follows:

- Essential content: whether VR/AR teaching content the student is interested in or solve practical problems;
- Moderate difficulty: whether it meets the starting point of students' learning; Whether it exceeds the cognitive load of individual students;
- Essential media: whether the media's design is appropriate; Whether to try to replace the real environment with activities in the virtual environment, so as to ignore the fact that the essence of technology lies in the correlation between technology and the world of life, confuses the technology and the world of life, in extreme cases with designs for design and technology for technology, and forget that the purpose of technology is to promote better learning.
- Clear navigation: whether the navigation layout and interaction design are clear, which will not lost the path.

3.3. Identity Analysis

Whenever a new education technology is introduced, it is advocated to replace the process of thought exchange with the interaction between human and technology. However, education involves dialogue and active participation of teachers and students, which is the basis of education process and should be considered in the design of any new educational tool (Andrew Feenberg) [9].VR/AR enters education with a new human-computer interaction technology. The first thing to consider is the human-computer

relationship based on VR/AR.A virtual environment itself is uncertain, and teaching can only be completed through the activities of teachers and students in this environment.

Technology Acceptance Model proposed by Davis explains the decisive factors affecting the use of technology [10], as shown in figure 1. According to TAM analysis, perceptive usability and perceptive accessibility are two factors that determine the user's attitude towards the use of technology. Perceptive usefulness and attitude together determine users' behavioral intention and ultimately affect the practical use of VR/AR teaching.
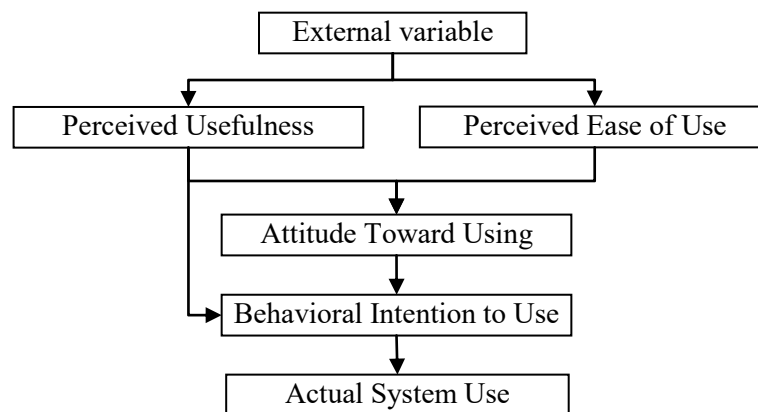

Figure 1. Technology Acceptance Model.

From the perspective of teachers, what teachers need is not an educational automatic tool, but the VR/AR design that gets along well with teachers and truly promotes teaching effectively. VR/AR integration and service strategies are mainly reflected in:

- Being highly coupled with the process of teaching, and helping teachers to improve teaching effect.
- Facing service, solving practical problems, and reducing the strength of teachers' work.
- The data is true and reliable, and teachers trust them.

From the perspective of students, the contemporary college students' growth environment is in the era of rapid information development, and the cognitive way has changed greatly [11]. The relevant investigation shows that the contemporary students' single value orientation has been completely changed, their independent consciousness has been significantly enhanced, and their learning objectives and methods have been diversified. VR/AR resonates with students in terms of psychology, emotion, cognition, concept, culture, custom and so on, so as to enhance students' experience feeling and improve their initiative and participation. The main influencing factors include:

- Individual achievement: students can get answers of questions in VR/AR teaching and get feedback in time.
- Emotional identity: students acquire identity emotionally on VR/AR, and in VR/AR environment perform active, conscious, positive psychological experience.
- Group belonging: VR/AR integrates the forms of various senses such as touch, vision, hearing, and establishes the interactivity, immersion, and information awareness [12].But at the same time, it will also bring various kinds of psychological oppression, affecting students' sense of belonging.

4. Challenges Faced by VR/AR in Educational Applications

4.1. Technical Challenges
Besides the technology of VR/AR itself, the design of VR/AR teaching environment is a very important challenge. The design involves the programming and development, interaction design, interface design, teaching content design, scene modeling and other different fields' knowledge and

skills, which means that the design and creation of VR/AR environment not only requires substantial capital, time and manpower, also requests researchers from different areas such as pedagogy, computer science psychology to cooperate.

4.2. Psychological Challenges of Teachers and Students
While VR/AR brings great development to education, there are also some potential challenges. There is reason to fear that its wider use may lead to a variety of psychological repression between teachers and students. Therefore, it is necessary to in depth study on this challenge and to minimize its negative effects. Here is a brief summary of potential and current problems:

- Anxiety: common anxiety are that teachers or students dare not face the changes of VR/AR in the way of teaching, worry or fear of having their own stupid and incompetent performance.
- Alienation: there is a huge gap between immersion and interactivity of virtual environment for VR/AR and human interaction in reality, which can lead to alienation between people over time.
- Forgotten feeling: for teachers, under VR/AR environment the teachers' role changes, and a part is replaced; for students, the disadvantaged group will be at a greater disadvantage. This situation will be particularly prominent with the combination of Internet + with VR/AR.

5. Conclusion
Currently, the application of VR/AR in education is still in the initial stage, and there are still many parts that need to be developed urgently for the technical attribute, empirical research and value orientation research of VR/AR. From the general rule of technology development, the extensive application of VR/AR in education is the inevitable trend of educational technology development. The key is how to make full use of the advantages of VR/AR while minimizing its negative impact. Therefore, in the future education, we should deeply explore the rules of education, build a new teaching mode supported by the technology platform with the help of VR/AR learning environment, and explore the integration of VR/AR learning environment with learning and teaching, so as to improve the teaching effect.

6. Acknowledgments

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