Virtual Reality and Language Learning

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Although VR technology can provide an ideal learning and application environment for learners' language skill acquisition, the learning performance of different types of learners in virtual environments and differences in their knowledge transfer ability from the virtual to the real environment still need further discussion. In addition, the cognitive style and test environment have an impact on the effect of VR-based oral learning.

virtual reality VR-based training and testing system cognitive style learning achievement

1. Introduction

Education is the central element of sustainable development, along with other relevant indicators within the Sustainable Development Goals. In a global community with more than 6000 languages, one of the impediments to a unified education for sustainable development is a lack of communication across linguistic and cultural boundaries [1]. Some scientists and educationalists in the area of language teaching think that the universities should integrate foreign language education into their curriculum in order to enable future professionals to cope with issues of sustainable development in their work and to reinforce the sustainability competencies of students [2]. Therefore, if we want to realize the sustainable development of individuals and even society, we must focus on language education. Language learning is a complex subject focusing on real application. Learners need to go through a long and complex learning process, especially for spoken English learning. Language learning is not a cognitive activity that is isolated from context and language use, but is more of a social interaction activity which takes place in real social language situations. The linguist Atkinson (2002) believed that the social attribute of language in language learning is reflected in the practicality of language [3]. People can convey, construct and express their thoughts, feelings, behaviors, identity and other information and states via language, and language communication and expression must also be based on a certain social environment. Krashen (1982) stressed that context can promote the acquisition of comprehensible input for language learners and can influence learners' language learning, and has a great influence on language learning effects [4]. Therefore, the influence of context on language learning has become a hot issue in the field. However, previous language learning environments were usually located in the classroom and were based on text and audio materials, which failed to bring the learners a more realistic and intuitive learning experience. Today, the application of technology can break down the barriers of the classroom, thus providing learners with a more diverse and richer application environment. Virtual reality technology is a three-dimensional simulation technology used to create a virtual learning environment and promote learners' skill acquisition. It can provide learners with a more diversified and rich language application environment.

Since the 1980s, technology has been developing continuously towards the direction of informatization, and fields such as computer-assisted language learning (CALL) and mobile-assisted language learning (MALL) have gradually become the focus of studies on language learning around the world. Language learning has begun to break through theoretical discussion and embark on the stage of the practical application of technology. It has become normal for learners to engage in interactions in order to promote their language learning via computer networks and mobile devices. For example, in the work of Hung, Young and Lin (2015), compared with the traditional classroom environment, the game-based teaching environment that they created with mobile devices achieved better teaching effects [5]. Besides, students not only maintained relative independence during the process of learning, but they also fully reflected on their cooperation. Evseeva and Solozhenko (2015) proposed that students could study in e-learning and classroom environments and could be the subject of learning [6]. In the learning process, students' autonomy is improved and, finally, good learning results are achieved. Although these technologies have created good learning conditions for language learning, in the long run, there are still some problems, such as the single activity form, insufficient restoration of the environment and situation, and insufficient application of strategies. Therefore, we should not only provide a platform for communication, cooperation, recording and analysis, but also provide learners with a real social environment experience, so as to give full play to language learning. Virtual reality (VR) technology can break the limitations of traditional technology and create a more ideal language learning environment, which mainly benefits from immersion and the presence of the VR technology.

Some studies have found that good outcomes can be achieved by using technology to create virtual environments which promote language learning. For example, Ebert, Gupta and Makedon (2016) explored the possibility of realizing language acquisition by constructing Ogma's VR system, and found that VR technology has a potential promoting effect on language acquisition in comparison with traditional learning methods [7]. By using interactive VR tools to support Chinese learners' language learning, scholars found that the virtual environment not only provided real situations for learners, but also stimulated learners' interest in the target culture, which was conducive to promoting the language learners' cross-cultural communication [8][9]. Although VR technology can provide the necessary social context for language learning, the influence of social culture and background on the practical application of language cannot be ignored. The ultimate goal for learners lies in the practical application of language, but most studies have aimed at verifying whether VR can promote language learning, while ignoring whether learners' learning outcomes can achieve a smooth transfer from virtual learning to real application and the factors affecting such a transfer. From the perspective of learners' cognitive style, this study explores the internal characteristic factors that influence learners' learning outcomes, and significantly focuses on the application effect of language learners transferring virtual language learning outcomes to reality.

2. Language Learning Supported by Virtual Reality

It is normal that the development of information technology delivers benefits to education and learning activities. The development and creation of context and interaction are the key elements of the development of technology-supported language learning. With the continuous update of various technologies, mobile learning and VR

technologies stand out from many information technologies and have become important technical and research tools for language learning [9][10]. However, some researchers have suggested that the convenience of digital devices not only helps learners to achieve the goal of “studying in any place and at any time,” but also leads to the risk that learners may become addicted to social media and digital devices [11]. In addition, relevant research has shown that language learners can have higher learning motivation in a familiar and real environment [12]. As a result, VR technology provides an effective way for language learners to experience richer and more realistic language scenes, especially for spoken language learners from non-English-speaking countries. Language learners need to conduct training in and application of the target language environment, and use their experience to master spoken English language skills. The interactivity and immersion provided by VR technology to virtual situations can meet the environmental and situational needs of language learning [13][14]. With the support of high-performance computers, it can generate a simulated three-dimensional environment and bring learners multi-channel sensory stimuli, such as the visual sense, auditory sense and the sense of touch, and realize natural interaction modes, such as voice interaction, tactile interaction, gesture interaction and multi-channel interaction. It can realize interaction, cooperation, creation and immersion, and enhance learners’ perceptions of the environment [15]. Therefore, it has great potential and value in the field of education, which is conducive to creating a more ideal learning environment for language learning. According to the level of immersion, virtual reality can be divided into three types. Among them, desktop VR technology is the most widely used in language learning research, which is called non-immersive VR. Many studies have proved the effectiveness of desktop VR in language learning, showing that it can improve learning motivation and achievement [16], develop cognitive abilities [17] and facilitate completion of complicated foreign language learning goals in collaboration [18]. In contrast, researchers have rarely used immersive VR. Regarding CAVE-style VR, one example is the study of Urun, Aksoy and Comez (2017) [19], which used a large interactive display screen and a Kinect device to build a CAVE-like VR environment, and achieved the goal of learning words through game-based learning. Regarding headset VR, a typical case is a study which confirmed that the Oculus Rift can provide the most ideal interaction experience, generate a sense of real existence and contribute more to the development of language learning in comparison with a desktop VR system [20].

Although the promoting effect of VR technology on language learning has been confirmed by relevant studies, researchers believe that in language learning, immersive VR has more advantages than desktop VR, which can provide more channels of sensory stimulation and create a more realistic and ideal learning environment [21]. In addition, headset VR can also provide multi-channel interaction, which can make the presentation of non-verbal information more expressive [22]. However, the application of immersive VR technology in language learning has just been launched and there is still a great deal of room for further research. The language learning activities of the current research were carried out with the support of headset VR technology. On the one hand, it pays attention to the importance of scene construction; on the other, it also explores the learning effect of learners’ language skill training.

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