Teachers' Conceptions and Uses of Interactive Spherical Video-based Virtual Reality in Teaching Chinese Writing

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Abstract: This study integrates interactive spherical video-based virtual reality (ISV-VR) into Chinese descriptive composition education. This paper reports teachers' conceptions of teaching with regards to the use of interactive spherical video-based virtual reality (ISV-VR) in Chinese descriptive composition writing. The findings may provide researchers and practitioners with novel insight into the teaching of composition writing in the contexts of first language acquisition supported by virtual reality technology.

Keywords: Virtual Reality; writing education; teacher conception; phenomenographic method

1. Introduction

1.1 Research background

Innovative technologies are changing not only the way of living and working but also the way of teaching and learning (Jong, Shang, F. L. Lee, & J. H. M. Lee, 2008, 2010). Technology-enhanced learning (TEL) considers "the use of information communication and technology (ICT) in its widest sense to support and improve the learning experience" (Gordon, 2014). Spherical videos can offer users an all-round view of places at the same time (Chang, Hsu, & Jong, 2020). Interactive spherical video-based virtual reality (ISV-VR) is regarded as one of the new useful tools for supporting learning and teaching activities in which "students' observation" is an important pedagogic component (Chien, Hwang, & Jong, 2020; Geng, Chai, Jong & Luk, 2019).

Writing education is one possible area that may benefit from ISV-VR technology. According to the recent reports of the Hong Kong Diploma of Secondary Education Examination (e.g., Hong Kong Examination and Assessment Authority, 2018), the major problems with students' Chinese composition writing include the lack of detailed description, the monotonous expression, and the affectionless writing. The report conjectured that this problem could be due to students' lack of observations about daily-life and their lack of in-depth understanding of the communities. The report alluded that students may lack observation in daily life and they may lack understanding of people, communities, and society. Therefore, improvements in Chinese writing education by facilitating students' observation and understanding of people, communities, and society is needed.

ISV-VR is not constrained by time and space (Jong, Tsai, Xie, & Wong, 2020). It provides students with alternative opportunities and perspectives for observing places and the people therein (Chang, Hsu, Kuo, & Jong, 2020). By adjusting their viewing angles, students can explore and observe elements in the scene more closely, which can better stimulate their thoughts (Lin, Yu, Sun, & Jong, 2019). Moreover, students can observe their communities more comprehensively with ISV-VR, which can foster them to better understand the context of communities and make reflections on their life.

Accordingly, this study leverages on the ISV-VR technology to transform the writing pedagogy for descriptive writing. As teachers are the key agents in all education reform, this study examines the teachers' conceptions and uses of ISV-VR in the context of teaching Chinese descriptive composition.

1.2 Preliminary research questions

Research question: How do secondary school teachers conceptualize VR and its uses in teaching Chinese descriptive composition?
Sub research questions:
  a) What are the variations in teachers' conceptions of VRDW?
  b) How are the conceptions of each teacher distributed?
  c) What are the typical cases in the teacher's conception of VR and its uses?
  d) How to interpret teachers' conceptions of VRDW from the lens of TPACK?

2. Literature review

VR enables students to immerse themselves in a virtual environment comparable to the authentic world (Lin & Lan, 2015; Mantziou, Papachristos, & Mikropoulos, 2018). It provides a safe and self-directed environment that enables students to observe places at length, with or without their teachers' guidance in the classroom.

Literature from immersive language learning approaches highlights the need for a rich and authentic environment to provide the socio-cultural context for learners to develop nuanced understandings of language in use (Cummins, 2000; Marsh, Hau, & Kong 2000; Swain & Lapkin, 2005). Research in embodied cognitive science also attests that situated immersive learning can stimulate students' learning motivation, enhance the learning experience, and encourage knowledge transfer (Marsh et al., 2000; Swain & Lapkin, 2005; Wilson, 2002). The technical skills of producing ISV-VR content is easy to master, therefore, most school teachers can develop courseware according to their own teaching needs (Chen et al., 2019; Chien et al., 2020). However, little attention was given to the teachers' conceptions of adopting VR technology for first language learning according to the literature review.

ISV-VR is a new educational tool that supports learning and teaching activities in which "students' observation" is an important pedagogical component (e.g., Chang et al., 2020; Chen et al., 2019; Chien et al., 2020; Geng et al., 2019; Jong et al., 2020; Lin et al., 2019). Given the affordances of ISV-VR that may address the pedagogical challenge of fostering descriptive writing, an ISV-VR supported Chinese writing learning program is designed; and this study looks into the teachers' conceptions of using ISV-VR to teach descriptive writing.

3. Proposed methods

The purpose of this study is to explore teachers' conceptions and uses of ISV-VR supported Chinese writing learning and to find variations in their experience. To this end, the phenomenographic approach (Marton, 2005) was employed. The data collection for this study has been completed. The data were collected from teacher interviews, class observation, and other supplementary materials (student interviews, teachers' reflection notes, and document data). Twenty-one grade 7-9 secondary Chinese teachers from a school in Hong Kong participated in the current study. In the design VR curriculum, there were five stages in each teaching cycle: 1) basic Chinese knowledge learning, 2) reading passages learning, 3) observing the landscape with ISV-VR, 4) writing descriptive compositions on related topics, and 5) evaluation and feedback. The interviews were conducted after each teaching cycle.

Data were collected through semi-structured interviews. In other words, a list of predetermined open questions that focused on the teachers' ideas and experiences about ISV-VR supported Chinese writing learning was used to prompt teachers' reflection on Chinese writing instruction. Additionally, follow-up questions such as "Could you give me an example?" and "What do you mean by that?" were used to invite teachers to elaborate on their ideas. Teachers were interviewed in Mandarin Chinese or Cantonese by a trained researcher. The interview time ranged from approximately 40 to 60 minutes. All the interviews were audio-recorded and transcribed word for word.

Regarding the designed VR curriculum, the teaching plan of each unit was worked by some core teachers through joint lesson preparation. When implementing the teaching plan, each teacher designed different teaching activities and procedures according to the academic level and prior

knowledge of students. Therefore, in order to have a more accurate, comprehensive, and detailed understanding of teachers' VR teaching experience, before the interview, the researcher also observed each teacher's reading classes and VR writing classes. The researcher used record sheets to record the activities of teachers and students, as well as the interactions between teachers and students. After class observation, the researcher communicated with the teacher about the pedagogical design or the teaching objectives of the teaching activities. Through classroom observation, the researcher had an initial understanding of the different pedagogical designs of each teacher, which provided a basis for follow-up interview questions.

The transcripts will be analyzed iteratively. The data analysis process will start with reading through the transcripts as a whole for several times to gain familiarity with the students' ideas. Next, the key meanings expressed in the transcripts will be highlighted and marked with some keywords that best describe the teachers' views regarding Chinese writing and using the ISV-VR to teach Chinese writing. The key meanings will be then compared and contrasted to identify similarities and differences between them. Then, structural relationships that related or distinguished the key meanings will be examined.

4. Implications of expected results

This study will contribute to the current literature by describing a range of conceptions of teaching that may empower or limit teachers' use of VR technology for the teaching of composition writing. Teachers' conceptions of VR will influence their use of this technology (Lin, 2016; Kong, 2018; Wang & Matsumura, 2019). Knowledge of teachers' conceptions may also provide workable insight for teacher trainers and policymakers to enhance educational practices (Kelly & Beth, 2017).

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