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Motivating Ethnic Minority Students in Hong Kong to Learn Chinese Culture with EduVenture VR

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Abstract: This paper presents our initiative for leveraging SV-IVR (spherical video-based immersive virtual reality) to give Hong Kong ethnic minority students exposure to local Chinese culture via EduVenture VR—an interactive learner-immersed virtual interactive learning application. The work was conducted in the COVID-19 pandemic context; outdoor fieldwork-based learning was not recommended in the circumstance. The research participants were 63 ethnic minority students (from Grade 7 to Grade 9) from a Hong Kong secondary school. The ARCS model of instructional motivation was employed to evaluate the motivational effectiveness of the Chinese culture learning activity supported by EduVenture VR. In the study, we obtained positive results in terms of the 4 motivational dimensions: "Attention," "Relevance," "Confidence' and "Satisfaction."

Keywords: Spherical video-based immersive virtual reality (SV-IVR), chinese culture, ethnic minority students, ARCS, EduVenture VR

1. Ethnic Minority (EM) Students in Hong Kong

Hong Kong is a special administrative region (SAR) of China; Chinese is the first language for over 90% of the population in this region. In the facet of education, there are about 33,000 ethnic minority (EM) students attending local kindergartens and K-12 schools (Legislative Council Secretariat, 2020). They belong to the EM groups including Indian, Pakistani, Nepalese, Filipino, etc. EM students' incompetence of understanding Chinese language and Chinese culture largely hinder their personal growth and social engagement in Hong Kong, such as pursuing higher education, participating in local communities, career development, etc. (Equal Opportunities Commission, 2020).

2. EduVenture VR

SV-IVR (spherical video-based immersive virtual reality) provides educators with an economical and user-friendly way to effectively situate learners centrally in a 360-degree human-recorded real-world environment (e.g., Bower et al., 2020; Chang et al., 2020; Chen et al., 2021; Chien et al., 2020; Geng et al., 2019; Lin et al., 2019; Wu et al., 2021). We proposed a pedagogical framework, namely LIVIE (Learner-Immersed Virtual Interactive Expedition), which harnesses SV-IVR to support learners in carrying out immersive and interactive virtual fieldwork underpinning to Pedaste et al.'s (2015) enquiry-based learning model. EduVenture VR is an integrated SV-IVR learning application (http://vr.ev-cuhk.net/) that we developed to technically implement LIVIE in practice. The full descriptions of LIVIE and EduVenture VR were documented in our previous publication (Jong et al., 2019). The pedagogical use of EduVenture VR in geography education was positively proved (Jong et al., 2020), but not in the context of Chinese culture learning nor involving EM students.

3. ARCS Model of Instructional Motivation

"How to promote students' motivation to learn" is always an important consideration in any kinds of educational activities (Jong et al., 2006, 2008, 2010). From the perspective of instructional sciences, Keller (2008, 2010) developed a theoretical model, as well as a questionnaire-based instrument, that conceptualises motivation of learning into 4 dimensions, namely *Attention*, *Relevance*, *Confidence* and *Satisfaction*. Attention is about how well students' interest and their attentiveness can be catered in the instructional process. Relevance is about how well students' learning need and experience can be addressed and authentically situated in the instructional process. Confidence is about how well students' belief about their ability to accomplish the learning task can be upheld in the instructional process. Satisfaction is about how well students' recognition of the learning rewards and their sense of achievement can be nurtured in the instructional process. Grounding on Keller's ARCS model and referencing his instrument, Jong (2020) developed a 20-item ARCS questionnaire for measuring students' learning motivation in the context of fieldwork-based learning. In Jong's questionnaire, every 5 items contribute to an ARCS dimension. Its overall reliability estimate (Cronbach's alpha) is 0.91; the 4 dimensions' reliability estimates range from 0.78 and 0.87.

4. Method

This pilot work was conducted in the COVID-19 pandemic context; outdoor fieldwork-based learning was not recommended in the circumstance. The study aimed to harness EduVenture VR to give EM students exposure to local Chinese culture in Hong Kong. The research participants were 63 ethnic minority students (from Grade 7 to Grade 9) from a Hong Kong secondary school. Their participation was voluntary. The procedures of the study were as follows:

1. The research team gave the participants a briefing on the learning task and a demonstration of how to operate EduVenture VR on a tablet.
2. The participants pursued the Chinese culture learning activity with the SV-IVR learning material through EduVenture VR. The context and content of the material pivoted on a traditional Chinese temple in Hong Kong, namely Man Mo Temple (see Figure 1). Learning scaffolds aligning the pedagogical paradigm of LIVIE (Jong et al., 2020) were embedded in the material.
3. The team carried out the paper-based survey with the 20-item ARCS questionnaire which was customised from Jong's (2020) work. The customisation was based on the tool (i.e., EduVenture VR) and the learning context and content (i.e., the local Chinese culture in Hong Kong) involved in the learning activity. Each item of the questionnaire was placed along with a 5-point Likert scale from "1: Strongly Disagree" to "5: Strongly Agree."

Figure 1. SV-IVR Learning Material used in this Pilot Study: Man Mo Temple.

5. Results

A total of 58 completed and valid questionnaires (out of 63) were received. To observe the page limit (3 pages), we only focus on presenting the findings based on the data gathered through the ARCS survey in this paper.

The overall reliability estimate (Cronbach's α) of the customized ARCS questionnaire based on the data collected in this study is 0.87; the reliability estimates of the 4 ARCS dimensions range satisfactorily between 0.75 and 0.80. Table 1 shows the descriptive statistics of the participants' ratings on the instructional motivation of the Chinese culture learning activity with EduVenture VR in accordance with the 4 dimensions. In other words, the EM students who participated in the study were instructionally motivated to learn the local Chinese culture in Hong Kong with the use of EduVenture VR, in terms of "Attention," "Relevance," "Confidence," and "Satisfaction."

Table 1. *Descriptive Statistics the Participants' ratings on the Chinese Culture Learning Activity*

	Mean	Standard Deviation
A—Attention	3.87	0.84
R—Relevance	3.89	0.78
C—Confidence	3.80	0.80
S—Satisfaction	3.85	0.88

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