



**Project Title: Development of real-time cooperative VR multi-CAVE systems for collaborative and team learning**

**研究項目: 開發及推行用於協作和團隊學習的實時協作複合性虛擬實境系統**

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### Abstract

Upon the successful development and implementation of Virtual Reality (VR) Cave Automated Virtual Environment (CAVE) systems in the Hang Seng University of Hong Kong (HSUHK), Chu Hai College of Higher Education (CHCHE) and HKU School of Professional and Continuing Education (HKU Space), over thousands of students and guests have experienced the CAVE systems. Various academic modules have adopted VR in assisting teaching and learning in a more immersive, interactive and effective way when covering complex contents or encountering difficulties in on-site field learning. With these systems, the institutions have sustained and achieved excellence in teaching and learning. However, more sophisticated training contexts that require collaborative and team learning, for example, air cargo building and screening, warehouse automated storage and retrieval systems, news reporting in a disaster environment, quay crane operations in container terminals, and cultural heritage evaluation and design, require the need of real-time synchronised cooperative and distributive multiple CAVE systems in achieving these objectives. Currently, multi-CAVEs interaction and communication are not possible, and multi-Head-mounted devices (HMDs) are also not available, hindering the pedagogical learning development of students in universities and industries. This project will develop and enhance the current VR CAVE systems by solving this problem and enhancing the current teaching and learning environment with the new advanced multi-CAVEs collaborative learning and practicing through interacting in multiple environments. VR scenes on warehouse operations, e.g. automated warehouse systems, journal earthquake news reporting and engineering and architecture design, which requires cooperative and collaborative learning will be developed.

The popularisation of VR training depends on various factors, including the availability of teaching content and user acceptance and attitude to technology-support learning platform. The valuable content developed in the HSUHK, HKU Space and CHCHE have been increasing. A knowledge-based sharing and learning VR platform aims to share the developed VR content will be developed in facilitating instructors to drag and drop content in CAVE and HMD for efficient teaching and learning. Designated CAVE systems and HMD devices can retrieve the content through the platform. In evaluating the user acceptance, attitude and learning effectiveness to the advanced VR CAVE technology, a comprehensive study with survey and analysis will be conducted to facilitate further enhancement of the teaching and learning platform. The first-ever multi-CAVE systems in facilitating the learning in supply chain, journalism and transportation will be the best practice in achieving teaching excellence and learning experience in the universities as well as the industry.