Project Title :	Applying Virtual Reality Technology for building students' risk awareness and knowledge of environmental hazards
Leading University :	The Education University of Hong Kong
Participating UGC-funded University(ies) :	Hong Kong Baptist University, The Chinese University of Hong Kong, The University of Hong Kong
Project Leader(s) :	Dr Lewis CHEUNG Ting-on, Assistant Professor, Department of Social Sciences, The Education University of Hong Kong

Summary of Proposal

Despite that in-situ experience in real environments is important for fieldwork learning of environment hazards among social sciences and environmental studies, availability of suitable outdoor field study sites, access to places having hazards, constraints in curriculum time, uncontrollable weather conditions and financial support to needy students will limit the utilization of outdoor and overseas learning opportunities to enhance student's knowledge of environmental hazards and their associated risks in local and neighbouring regions. This project aims to incorporate Virtual Reality (VR) technologies into the university curriculum in order to develop locally-specific and tailor-made curriculum modules about natural hazards and risk awareness benefiting different student cohorts and university teachers. The pedagogical VR technologies covered in this project include photos and videos capturing 360° space together with VR viewers. The team will develop a series of curriculum modules of six natural-induced and human-induced environmental hazards, with an integration with the named VR innovations utilizing Hong Kong and overseas contents into the teaching and learning among local university students. Apart from the development of the curriculum modules, training workshops for both university teachers and students will be organized. University teachers could gain from the training workshops the skill in adopting VR technology for teaching and learning. Whereas, university students could experience the new pedagogy for learning environmental hazards and thus enhance their preparedness to the present and future risks. The objectives of this proposed project are (1) to design curriculum modules using the VR technology for teaching environment

hazards in Environmental Studies, Geography, Liberal Studies and General Studies as well as General Education curriculum in universities; (2) to build resilience (preparedness, response and recovery) among university students through VR experiences of environmental hazards and their impacts on community to prepare themselves for adaptation in an increasingly hazard-prone world; (3) to enhance regional, global and environmental awareness of university students especially those who lack financial means for in-situ overseas experiential learning opportunities; and (4) to utilize the VR technology to lessen limitations of time management and resources on field-based learning experience.

Summary of Final Report

This project aims to incorporate Virtual Reality (VR) technologies into the university curriculum in order to develop locally specific and tailormade curriculum modules about natural hazards and risk awareness benefiting different student cohorts and university teachers. Thus, VR technology is particularly useful for students to learn about the environmental problems as they could be placed into the real environments virtually which are inaccessible for students to have a direct experience of environmental problems.

The curriculum for teaching natural-induced hazards and human-induced hazards have been completed. It developed a series of curriculum modules of six natural-induced and human-induced environmental hazards, with an integration with the named VR innovations utilizing Hong Kong and overseas contents into the teaching and learning among local university students. Moreover, the manual has been composed to introduce to the teachers on basic techniques of developing virtual fieldwork resources via the use of VR in the teaching and learning of the topics in relation to environmental hazards.

The training workshops have been conducted for university instructors to share their view. Both quantitative and quality responses from the workshops for university instructors claimed that the workshops have shaped their skill in adopting VR technology for teaching and learning. On the other hand, the pre- and post-test approach on student participants proved that the knowledge has enhanced after the workshop. That means the new pedagogy for the teaching and learning enhance student preparedness to the present and future risks.

To conclude, integration of VR technology and the outdoor field studies could serve this purpose well through bringing the outside world with different types of natural and

human risks into the classroom, even though the students are distant from the sites where hazards happen. The pedagogical VR technologies covered in this project include photos and videos capturing 360° space, and interactive educational cardboards. The Team developed a series of curriculum modules about Environmental hazards, with an integration with the named VR innovations utilizing Hong Kong and overseas contents into the teaching and learning of environmental hazards and environmental literacy among local university students.