APPLICATION OF VR AND AR TECHNOLOGY IN THE DEVELOPMENT OF A GEOGRAPHY COURSE FOR INDIGENOUS HIGH SCHOOLS

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Abstract- Geography is the science of space, and geography courses develop students' ability to transform 2D data they see on teaching materials into 3D concepts, understanding the interactions between human beings and places in 3D space. Students in their first year in senior high school lack this ability, and the most common approach are to let students observe models and geometric objects made by the teacher for students to understand how things operate. However, making teaching materials is very time-consuming, and many teachers thus turned to information technology for teaching courses, using computers and projectors along with external resources, e.g. videos and websites, to help students understand course contents. From their teaching experience they discovered that: a. if a projector is used for teaching in the classroom, there is insufficient light in the classroom and students lose concentration when only the teacher is showing contents, resulting in poor learning outcomes. b. If students are individually using computers in the computer classroom, even though they are able to operate the computer, the layout of the computer classroom prevents group interactions. c. When using tablet PCs for teaching, even though it removes the limitations of the computer classroom to group interactions, the flat panel display of the tablet PC still only provides 2D data, and students still need to convert the data into 3D spatial concepts. This study ascertains the learning outcomes of indigenous students in the secondary education stage after using head-mounted display (HMD) and planar VR and AR devices in a geography course, which combines geographic and historic knowledge, and aims to develop a VR and AR learning system that will allow indigenous students to combine their diverse cultures with school courses, creating a learning spirit that accommodates diverse cultures and is friendly to communities.

Keywords- Virtual Reality, Augmented Reality, Head Mounted Displays, Indigenous Culture