THE NEXT GENERATION OF TEACHING: BRIDGING THE GAP USING VIRTUAL REALITY

Background

Learning can be defined as a psychological process involving a change in the way a person responds to a situation based on experience (Pithers, 1998a). This change might be reflected in the person's behaviour, for instance the development of decision making skills or problem solving. It might also result in knowledge acquisition and attitude formation (Dewey and Boydston, 1985). Ideally, these changes should be long-lasting in order to be recalled whenever a relevant situation arises. Therefore, effective learning is not only about the mere acquisition of knowledge or skills, but it lies also in the ability to transfer them into real-life situations that can be associated to the initial training context (Pithers, 1998). Computer-aided training, from online course to immersive simulation, has the potential to contribute to this demand. The use of computer simulations as learning environments has progressively embraced technological innovations from chart-based interfaces to fully immersive environments (Bell et al., 1990, Jou and Wang, 2012) also known as technology mediated approach.

Technology-mediated learning has been defined as learning environment in which learners' interaction with others, objects or instructor is mediated through information technology (Alavi and Leidner, 2001). The use of VR-based training environments assumes that Human-Machine interaction stimulates learning processes through better experiencing and improved memorization, leading to a more effective transfer of the learning outcomes into workplace environments (Chen et al., 2009). As stated by Meadows (2001): "When I hear, I forget; when I see, I remember; when I do, I understand".

What is Kolb?

Kolb is a software application that provides experiential learning scenarios delivered in virtual reality. Each scenario is extracurricular and mapped to the (Department of Education) High School curriculum. This new approach is able to engage students through gamification and the use of emerging technologies. The technology is delivered by the Devika team, who build experiences using emerging technology. The software application is named after Harvard University Professor David Kolb, who was the founder and educational theorist whose interests and publications focus on experiential learning.

The main objective is to further facilitate the Department of Education curriculum learning through emerging technology that students are excited to use. Also, given the expected growth in STEM careers, our objective is to encourage young Australians to be technologically empowered, even in fields that traditionally have not needed technology. The aim is to combine VR with Kolb's method of experiential learning to achieve the best results for students. It is expected to gain higher

retention rates of knowledge among participants. This will be achieved by encouraging active thinking and learning through gamification.

Antarctica case study

Technology-in-use

Kolb is currently being delivered with the Microsoft Mixed Reality heat-sets run by a powerful laptop.

Scenario:

First scene will be an Antarctic experience which will allow students to put on the virtual reality headset and enter the world of the Antarctic. The scenario begins where scientist will introduce the topic and explain the reasoning for their presence, their significance with the ecology, and what are some of the activities that take place. She will then tell you to take a photo of a penguin for research purposes. There will be different resources given to the student staggered throughout the experience to see their intuitiveness of the setting and their grasping of the resources regarding problem-solving. The introduction will be a blend of science and geography, and the experience will allow the students to get a first-hand feel into a day in the life of an Antarctic scientist.

Expected Outcome:

- Enhancing students' awareness and understanding of Antarctica.
- Increasing sense of responsibility and awareness in students by drawing their attention to the fact that their actions have impact on climate change.
- Increasing their retention of learnings relating to science and geography by delivering interactive content from the department of education curriculum.
- Enhancing students' dispositions for learning such as curiosity, cooperation, creativity, enthusiasm, persistence, imagination and reflexivity on the interactions with the scenario.

Data collection

Data will be collected before, during and after the training session in VR.

- **Pre training**: Before students begin the experience in VR, pre-training questionnaire (10-likert scale) will be distributed to measure their state of mind (positive and negative).

- **During training:** The first Kolb scenario will introduce students to Antartica. We will use experiential learning to teach students about Antarctica by placing them in a VR experience that requires them to listen to a scientific in Antartic. This is done by having the students complete a series of tasks such as photographing penguins with the aid of a narrator. This is important as it is not about giving the students a tutorial for taking the photos but rather about positioning the narrator as a guide who provides encouragement, so the student must work out the tasks for themselves in an active and engaging manner.

- **Post training:** after training in VR post-training questionnaires will be distributed (10-likert scale), to measure students experience in VR in order to assess their learning process and measure their learning outcome. Also, Test of Problem Solving (NTPS) will be used to measure students' problem solving skills (Chan & Wu, 2007). The test consists of three subscales: finding causes, finding solutions, and avoiding problems, for a total of 15 questions.

Outcome of research

Finally, after collecting data and conducting analysis, a report will be prepared to reflect on students "learning process" and "outcome". This report will provide evidence for school in order to decide on their future strategy in using technology, such as VR, as a method to complement traditional class room training and laboratory/field trip training approaches.