

Virtual reality water safety education through Google Expeditions

Background

education in the classroom. The specific objectives were to measure:

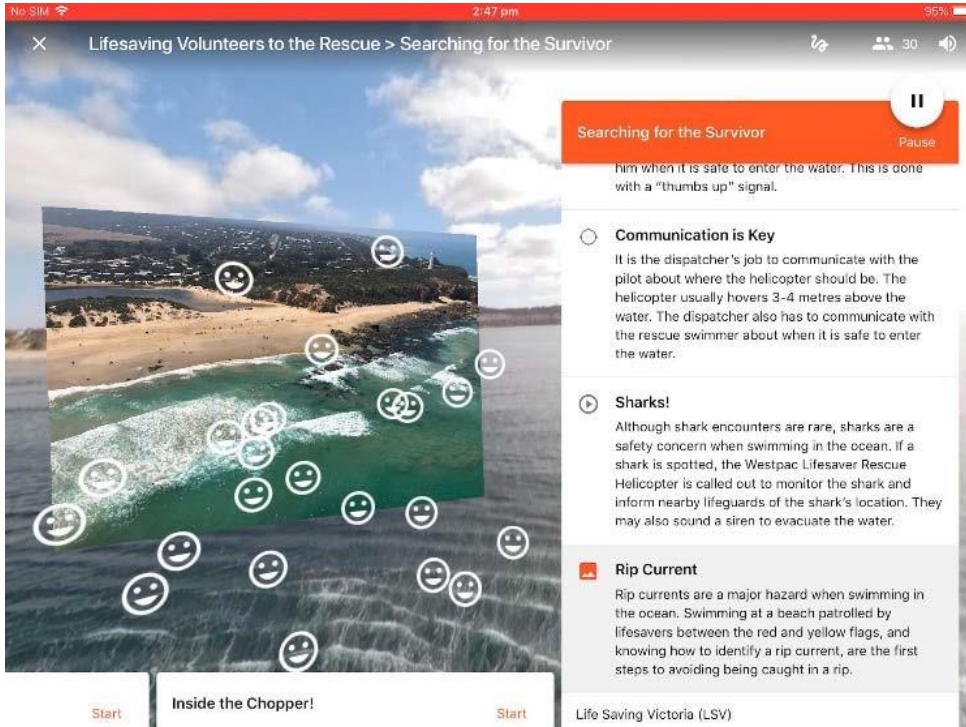


Figure 1 a screenshot of the Google Expedition recording, from the guide's tablet. Each face represents one active headset; this highlights the attention of students focused on the rip current pop-up.

Life Saving Victoria (LSV) undertook a pilot study for the delivery of virtual reality (VR) water safety education using Google Expeditions in the classroom. The project provided an exciting opportunity to utilise online platforms to deliver safety education to Victorian school students. Built for the classroom and small group use (up to 30 participants), LSV used Google Expeditions, a digital platform, that allows a teacher acting as a 'guide', to lead classroom-sized groups of 'explorers' through collections of 360° panoramas, while highlighting points of interest along the way and facilitating discussion through asking a range of beginner, intermediate and advanced questions.

Research into VR has demonstrated its ability to create immersive learning experiences that can motivate, engage and educate students, and has the potential to do so more effectively than traditional classroom activities (O'Connor & Domingo, 2017; Wrzesien & Alcañiz Raya, 2010).

LSV trialled one such expedition, 'Lifesaving Volunteers to the Rescue', in the classroom with students at a Victorian primary school.

Project aim and objectives

The project aim was to evaluate the impact of using VR through Google Expeditions to deliver water safety

- 1) The feasibility of delivering school education using Google Expeditions.
- 2) The level of engagement by students participating in a Google Expedition.
- 3) The effectiveness of using Google Expeditions to increase student safety awareness.

Method

The project consisted of the delivery of the 'Lifesaving Volunteers to the Rescue' expedition in the classroom with an evaluation component conducted by LSV's Risk and Research team.

Participants

- 23 students (52% female) in Year 5 and 6 and their teacher at a school in Melbourne's inner north.
- A trained instructor from LSV's Education team to guide the expedition.

Program Structure

The expedition was conducted within a one-hour lesson and included: 10 minutes set-up (headset set-up and motion sickness briefing); 25 minutes for the guided expedition; 10 minutes for the survey; and 15 minutes for student debriefing (led by their classroom teacher).

Program Content

The 'Lifesaving Volunteers to the Rescue' Google Expedition showed Hayden, a volunteer lifesaver and rescue swimmer for the Westpac Lifesaver Rescue Helicopter Service, during a rescue mission. Students followed Hayden to various locations throughout the rescue, including preparation from the helicopter base, to the helicopter in mid-rescue, before returning to the beach and base for debriefing.

Equipment

LSV provided a Google Expedition kit, which included a class set of VR headsets, phones and a tablet; a wireless router and modem; and survey materials.

Evaluation

The guide's tablet recorded the expedition using in-built screen technology, to measure student engagement. Following the expedition, participants completed a brief questionnaire, which evaluated the expedition in terms of the project objectives. LSV's Risk and Research team conducted semi-structured, one-on-one interviews with the guide (5 minutes) and classroom teacher (15 minutes), to gain their feedback on the expedition.

Findings

1) Feasibility

Classroom teacher and guide feedback

- LSV should “*absolutely*” continue exploring Google Expeditions and VR, because as noted by the classroom teacher “*it provides opportunities to explore technology and content which sit outside the current classroom norm*”, whilst removing traditional barriers for all agencies, such as “*cost, time and travel*”.
- It was “*absolutely easy*” for the guide to run the expedition, their only challenge was modifying the prompted questions in-lesson, to suit student needs. However, it was noted by the guide that “*with more training and repetition it would become second nature*”.
- Combined with traditional teaching styles, VR education through Google Expeditions can be an effective, immersive learning tool, with “*not many barriers* [for schools]”. The classroom teacher noted that “*Teachers might be uncomfortable using the technology, which is only a barrier when it becomes fiddly or troublesome.*” If outsourced to LSV, any potential discomfort would be removed.
- If they had the opportunity for a run-through prior to lesson commencement, the teacher would feel “*totally comfortable*” running a Google Expedition on their own. However, they believe schools would prefer to outsource the expeditions to LSV, rather than hiring the kit and running it themselves. Teachers can then be immersed in the experience with their class, without having to worry about setup and technology, or could use the time to complete

other tasks. Post-expedition, the teacher could conduct follow-up classroom activities, and further test student learnings.

- It would still be simple for a teacher to hire the kit and run the expedition, provided a teacher's guide is created, detailing technological considerations, risk mitigation briefing for students (e.g. motion sickness) and other key information.
- LSV Education could integrate Google Expeditions with existing programs e.g. the emergency response in the Open Water Learning Experience. Sport, Training and Life Saving Clubs could also benefit by incorporating scenarios like conducting rescues, and operational procedures. “*We're moving to more technology-based learning in society, so you could use it [expeditions] for so many things*”.

2) Student engagement

- Based on researcher observations, feedback from both interviews and survey results, students appeared to readily engage with and explore the content, for the majority of the expedition (it was noted that two students lost focus or were overstimulated in the final five minutes of wearing the headset).
- Suitable prompt questions invited students to actively consider the scenario elements, rather than just listen to the guide or only look at one image. They demonstrated keen interest by providing thoughtful answers throughout the expedition.
- Below are the questions provided by the guide and selected representative responses from the students. You should always swim between the flags because “*the lifesavers are looking there.*” Rock fishing is dangerous because “*the tide could change, there could be big waves.*” To call for help “*clench a fist, wave it and yell 'help!'*” “*He's [Hayden] got the rescue strop on his back.*” “*You have to put the equipment back the right way in case you need to use it again in an emergency.*” Debriefing is required because “*if something went wrong they can do it better next time.*”
- The headsets enabled individual-focused learning (Figure 1), minimising external sensory distractions (e.g. from peers). The teacher suggested a twominute, mid-expedition 'headset break', where students could remove their goggles and briefly reconnect, to discuss aspects of the scenario by answering questions, such as ‘What do you think Hayden is feeling right now?’, and ‘What might Hayden and the rest of the crew do to stay calm in these emergency situations?’.

3) Student safety awareness

- Exploration of supplementary key water safety messages, like swim between the flags and how to identify and respond to rip currents, was wellreceived by the guide and teacher. “*Really, really good content, appropriate questions for their current and prior knowledge...students were very engaged, it*

[the expedition] *held their attention.*" [Classroom teacher]

In the survey, students were asked to briefly write about the main thing they learnt about lifesaving volunteers and the work they do. Three key themes arose from analysis:

- Lifesaving volunteers work hard to save lives;
- Lifesaving volunteers do not get paid – they do it because they want to help others; and
- There are many steps in the rescue process, from working inside the helicopter, to the team debrief.

Students then wrote down the main thing they learnt about water safety from the expedition. Key learnings included:

- How to spot and escape rip currents (e.g. no waves

by highlighting key coastal hazards, including rip currents.

Recommendations

- 1) LSV should continue exploring and evaluating Google Expeditions and other VR technology for a range of groups and settings, particularly secondary and tertiary students.
- 2) Evaluate the feasibility and effectiveness of conducting Google Expeditions and other VR without a tablet and headsets (i.e. just on a projector screen), as it gives the opportunity to conduct a more cost-effective lesson that is easier to implement.

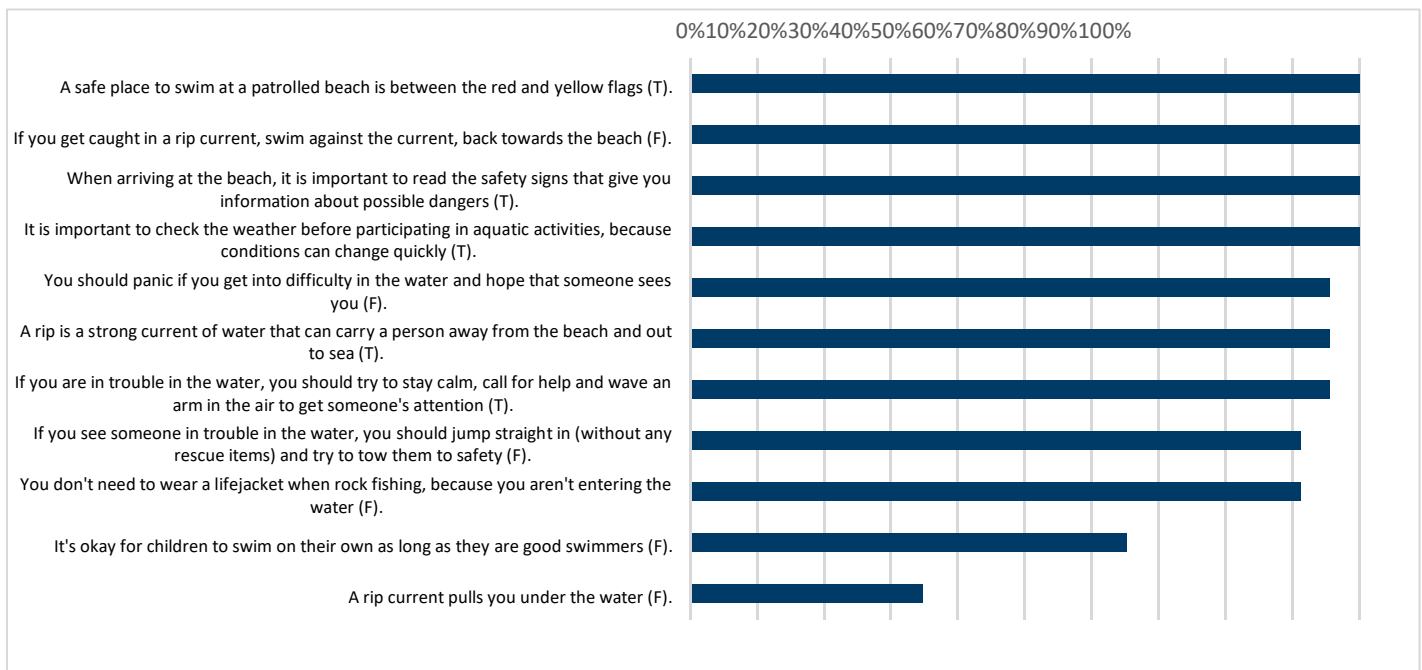


Figure 2 Proportion of correct responses given for each true or false statement in the student survey

could mean there's a rip; if caught in a rip, try swimming parallel to shore, put your arm in the air and yell 'help!');

- Check for and be aware of water dangers (e.g. rip currents, water depth, sharks and rocks); and Always swim between the flags.

The final part of the survey had students select true-orfalse to statements that tested their water safety knowledge. Students scored an average of 88%; the proportion of correct responses by statement is shown in Figure 2.

What this means

VR water safety education through the 'Lifesaving Volunteers to the Rescue' Google Expedition is a feasible teaching and learning tool, which showcases the valuable contribution that volunteers make to society, while also providing water safety awareness,

- 3) Consider developing additional resources for teachers, so the expeditions can be tied with relevance to broader class topics, such as community belonging, health and wellbeing, and emergency service provision. Similarly, explore development of complementary resources for LSV's various education programs.

- 4) Consider including a mid-expedition screen pop-up that reminds students that they can remove their headset at any time for a break, and/ or consider including a brief, headset-free peer discussion as part of the expedition.

- 5) Continual headset wear should be kept to a maximum of 20 minutes duration for primary school students, as they may start to feel overwhelmed or lose focus beyond this.

References

- O'Connor, E. A., & Domingo, J. (2017). A Practical Guide, With Theoretical Underpinnings, for Creating Effective Virtual Reality Learning Environments. *Journal of Educational Technology Systems, 45*(3), 343-364.
- Wrzesien, M., & Alcañiz Raya, M. (2010). Learning in serious virtual worlds: Evaluation of learning effectiveness and appeal to students in the EJunior project. *Computers & Education, 55*(1), 178-187.

“It was a really positive and creative way to bring in content that is very specific, but crosses over to many other aspects of learning; they [students] loved it. It’s a really engaging way to hold a lesson – they’ve been on the edge of that helicopter today and they’ve been on that beach with the lifesavers, so it is the closest way to experience it.”

– Classroom teacher