# Virtual reality and nature based tourism: an opportunity for operators and visitors

# Virtual Reality and Nature Based Tourism: An opportunity for operators and visitors

**Leigh Ellen Potter**
Idea Lab, Griffith University
Kessels Rd, Nathan, 4111
L.Potter@griffith.edu.au

**Lewis Carter**
Idea Lab, Griffith University
Kessels Rd, Nathan, 4111
L.Carter@griffith.edu.au

**Alexandra Coghlan**
Griffith University
Kessels Rd, Nathan, 4111
A.Coghlan@griffith.edu.au

## ABSTRACT
Nature based tourism is a growing segment of the tourism industry, and tourism operators are facing growing challenges to the quality of their visitor experiences. We explored the application of virtual reality (VR) in this sector, and asked whether it can be successfully used in a natural setting. We found that there is great potential for the use of VR in nature based tourism for the provision of both information and education, with many application opportunities identified.

### Author Keywords
Virtual reality, tourism, interaction, education.

### ACM Classification Keywords
Human-centered computing → Virtual Reality.

## INTRODUCTION
Nature based tourism in Queensland is a major industry. Tourism operators face challenges due to the variable nature of environment-based trips: inclement weather has been demonstrated to negatively influence visitor satisfaction (Coghlan, 2012). A nature based trip may represent a significant investment in time and money for a visitor, with many trips taking a full day including transport from a major centre to the location. Tourism operators must also address matters of visitor safety.

Tourism companies use a range of approaches to entertain and educate visitors. Technology may provide an opportunity to deliver this safety and environmental information in a more engaging and targeted fashion. Emerging technology such as virtual reality (VR) presents an opportunity for interactive experiences that could support both operators and tourists. In this paper we present our initial findings from a site visit to a nature based tourism destination to support the development of a VR application. We are seeking to determine if there is an opportunity for such an application to provide benefit to tourism operators and visitors, and to see whether a VR device could be successfully used in transit on a vehicle.


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## OPPORTUNITIES FOR VR IN TOURISM
VR can be defined as a computer-generated simulation delivered using technology (Krueger, 1991) which may include audio, tactile and visual input delivered through artificial means (Boas, 2013). We are specifically interested in the more recent head mounted display (HMD) VR for this tourism setting.

Tourism operators offer a range of visit options for nature based Tourism. The quality of customer services provided by operators has been found to impact on visitor satisfaction, with the quality of the entertainment and information provided, and the knowledge levels of staff providing specific opportunity to delight visitors (Coghlan, 2012). The quality of the services supplied by operators influences visitor recommendations of the experience (Baker & Crompton, 2000; Coghlan, 2012).

The nature based tourism experience itself presents several challenges to the delivery of high quality interpretive services. Destinations are often isolated, presenting a remote environmental context that is unfamiliar to many tourists, potentially requiring specialist equipment and safety briefings. Unfamiliar equipment and environments and potential restrictions during transit may restrict communication, and on-site activities themselves can be hampered by environmental challenges and, in some visitors' minds, potentially dangerous animals that can also overwhelm the senses (Coghlan & Kim, 2012). The combination of these factors requires new ways of providing interpretive experiences that can add to the tourist experience before visitors arrive at their natural destination, in a way that captures their attention. HMD VR is an option to consider for this.

## THE PROJECT
In order to explore the application of HMD VR technology in a nature based environment, we have undertaken an initial study with an industry partner. A four person research team including a domain expert (tourism), a user experience consultant, an interaction designer, and a virtual reality developer conducted an analysis of the environment and situation in situ. We worked in conjunction with a leading tourism operator, in a commercial-in-confidence arrangement that requires we keep their identity and business anonymous.

We conducted a site visit with the operator to a nature based tourism destination and trialed a generic VR application to evaluate the practicalities of deploying HMD VR in this natural environment. The VR trial consisted of five minute sessions using the Google Cardboard and the Google Cardboard app installed on a

Samsung Note 2 and an iPhone 6, with participants able to complete multiple sessions. The aim of these sessions was to gauge interest, enjoyment, and suitability of VR and the Cardboard device for the physical environment of the tourism vehicle. Sessions were user driven, with the participants encouraged to explore aspects of the app that were of interest. A total of sixteen people from the crew and passengers on the day interacted with the VR HMD.

## FINDINGS AND RECOMMENDATIONS

Reactions to the VR experience were positive, with statements including "That is cool", That is brilliant", "Oh my god, this is amazing", and "Can I just get my other friend?" A common observation was the expression of delight that was common to most participants. Participants described their delight as stemming in part from the unexpected nature of the application (3D, and immersive), and from the capabilities of VR itself.

### Opportunities for HMD VR in nature based tourism

**Provision of information to visitors:** Both static and interactive activities for safety and general information for visitors were provided on the trip we observed, however visitor attention levels appeared to decline as the trip progressed. Visitors spoke amongst themselves, and after hearing several audio promotions for paid add-ons to their trip many visitors appeared to 'switch off' and did not listen to the more important safety messages that followed. HMD VR applications may provide an opportunity to more directly provide information. This would align with the interpretive layering approach advocated by Coghlan and Kim (2012) as being most effective for visitor understanding in this type of complex and challenging setting, through provision of multiple channels (personal and impersonal) and opportunities to engage with interpretive materials.

**Site enrichment:** A HMD VR application could support interpretive information about the wildlife that may be found at the destination, allowing visitors to identify the wildlife they will see and enable recognition onsite.

**Entertainment:** There were no activities provided on the return trip from the site visit. The provision of a HMD VR application would enable an additional interactive option for visitors, providing added value to their trip and the opportunity for visitors to look for the wildlife they may have seen, and discover more information.

### Factors to consider

**Physical setting for the device:** Many HMD VR apps require the user to rotate their head or body in order to make selections from the app menus or to interact with the virtual environment. The seating configuration on the vehicle made body rotation difficult which then impeded certain elements of the experience.

**Device sharing:** Our participants wanted to share the experience and pass the HMD between themselves. When a cardboard application is launched, the orientation of the mobile device that is used in the Cardboard will determine the 'front' view. However, if the Cardboard is passed to a second person sitting opposite, the view orientation will remain, meaning that the second person is presented with a 'rear' view and need to either turn their body and head around, which was difficult with the seating arrangement on the vehicle, or restart the application to switch the view to a forward view.

**Support:** HMD VR interaction techniques differ from other mobile apps in that direct screen contact is not possible when the mobile device is in the Cardboard. In most cases, interaction is supported by a button placed externally on the Cardboard or by tilting the device. Participants in this case needed some instruction in relation to the button interaction when they first used the cardboard. All participants realised they could look around the VR scene by moving their heads without formal instruction. One identified the tilting interaction mechanism after tipping the Cardboard to look at an external component of the device and then realising that it had triggered an interaction. This may indicate that some support around the use of the HMD VR device may be required for a full deployment. This is a practical consideration for a tourism operator when their crew are already very busy with normal operating procedures.

**Logistics:** Our partner is one of the largest tourism operators in their area, carrying large numbers of visitors on their vehicles. This raises issues of practicality in terms of equipping a vehicle or vehicles with an appropriate number of HMD VR viewers. Operators also offer trips of different lengths and tailored to different markets (e.g. short vs long stays, family trips, or adventure trips), and each trip would need to be considered individually to determine if a VR application would be deemed a benefit for visitors.

**Knowledge and background:** Nature tourism in Australia attracts a diverse group of visitors, domestic and international and of all age ranges, demographics, and technical abilities. Any application for this market would require flexibility in terms of languages chosen for the interface, and it would need to cater to different levels of knowledge about the environment.

**Motion Sickness:** VR has a reputation for causing motion sickness, and we were concerned that the HMD VR device would increase nausea when used on a moving vehicle, however this did not occur. No one who tried the device and VR application exhibited nausea during the visit, either when the vehicle was moving or while stationery at our destination. The forward facing seating arrangements may also present an opportunity, as maintaining a stable body position relative to the vehicle may positively influence motion sickness.

Based on our site visit there appears to be potential for the application of HMD VR technology for tourism operators and for deployment within a moving environment while transiting to a natural destination. It could provide an opportunity for a tourism operator to give information more directly to visitors, and may increase engagement with the material and allow visitors to more easily identify critical safety information. It would provide a value add activity through the provision of an engaging and interactive experience, and entertainment during those portions of the trip to and from a destination.

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