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Connected Through Awe

Can Interactive Virtual Reality Elicit Awe for Improved Well-Being?



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Research Questions

Can interactive virtual reality elicit awe for improved well-being?

And, what are the design considerations for successful awe-inspiring VR systems?

Motivation

Awe has wellness and educational benefits

Characteristics include feelings of social interconnectivity [1], shifts in perspective [2], and increased life satisfaction [3]

- Awe is a rare experience in our busy everyday lives, and rarer in a lab setting [4]
- Awe experiences have specific markers, such as physiologic goose bumps (quantitative) [5,6] and themes of awe descriptions (qualitative) [7]
- Interactive Virtual Reality (VR) could help make immersive, awe-inspiring experiences accessible to people [8].

Methods and Materials

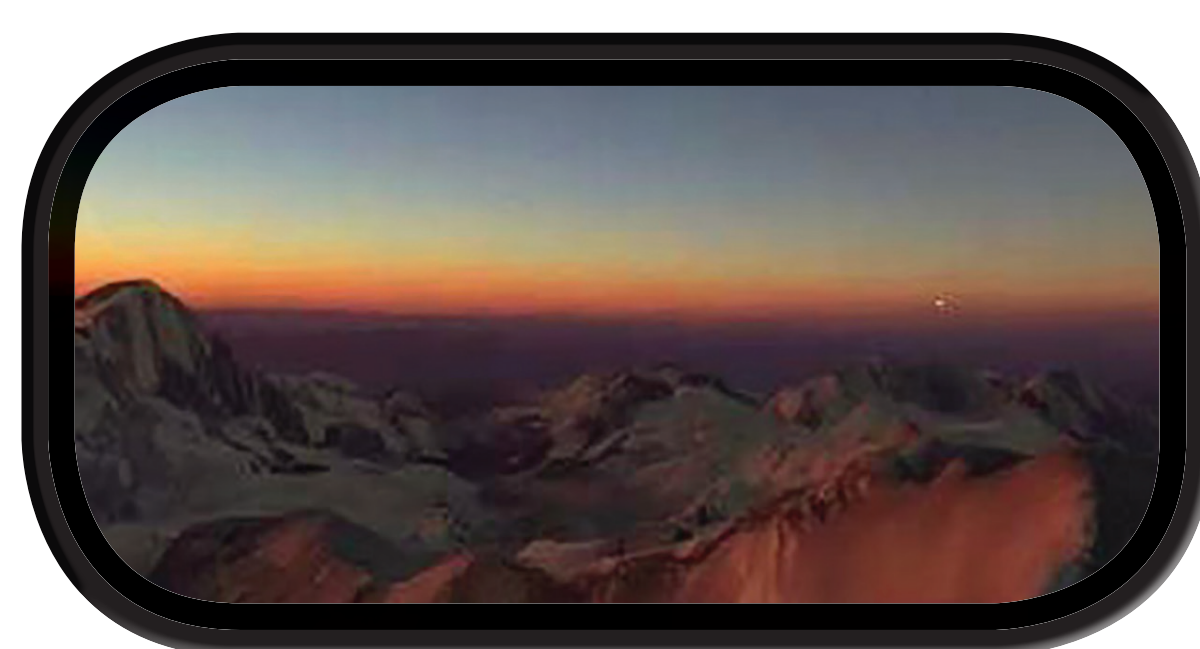
16 participants spent 20 minutes interacting with VR to travel, visit natural wonders, and orbit Earth through Google Earth VR using a HTC Vive headset and hand controller interactive interface.

Three datasets collected: Physiological goose bumps, introspective survey ratings, and interviews.

- Goose bumps were recorded on the skin with a video camera
- Surveys included ratings on the reported level of awe
- Semi-structured, open ended interviews provided further insight into the phenomenon



Goose bumps visible on arm



A bird's eye view, Mount Everest in Google Earth VR

Phase 1: instructed participants to travel to the experimenter-selected locations (a city and a natural wonder); Phase 2: personalization that allowed participants to travel to any place of their choosing.

Quantitative Results

Participants rated awe 79.7 (out of 100); 43.8% of participants experienced goose bumps

- Most goose bumps were seen in Phase 2, personalization phase (60% of goose bump occurrences)
- Participants who had goose bumps showed significantly higher ratings of awe than those who did not: $t(14) = 2.82, p = .014, r = .36$

	Goose bump experiencers	Goose bump non-experiencers
Awe Rating (0 - 100)	90.9	70.9

Qualitative Results

- Verbal indications of **awe** were made by all participants
- Those who experienced awe revealed feeling **calmed** by the experience ($N=7$), and increased **curiosity** ($N=9$)
- Profound **social connection** with their home, friends, and families ($N=11$), mainly during the personalization phase
- 10 of 16 struggled with the controllers (interaction interface); despite a 360 degree environment, looking around was not intuitive and many relied on controllers to manipulate the environment (a possible artefact of face-forward, seated gaming expertise)
- Participants who struggled with the interaction interface reported **distraction** from the virtual environment, which could impede awe

Conclusion and Next Steps

Interactive VR has a powerful capacity to elicit awe, especially within personalized environments. Physiological goose bumps provide reliable, non-intrusive indications of awe, and introspective data can provide valuable insights into the VR system qualities and the experience of awe so we can design effective awe-inspiring experiences. Care must be taken to design interaction interfaces that do not impede awe.

Future work involves testing the effectiveness of our new, custom VR system designed to elicit awe. We aim to use additional physiological sensors to complement goose bumps and introspective data collection.

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