# How Effective Is Your Virtual Reality Experience?

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Although virtual reality (VR) is most commonly associated with gaming, it is being used in many more capacities. In fact, VR technology is currently being used for education and training purposes, healthcare applications, automotive, aviation simulations, advertising, and tourism. Taking into account these facts, we wondered if the GoogleCardboard could be a simple and effective way to immerse into the virtual world. As a result, we designed an experiment that tests the effectiveness of the platform by measuring the degree of change in three physiological responses as participants were viewing different virtual reality environments. The effectiveness of the was determined based on any measurable change in heart rate, oxygen saturation level, and skin temperature between the control and experimental values. Thirty test subjects watched a fifteen minute video using GoogleCardboard that displayed three-minute segments of a beach sunrise, a non-graphic horror scene and a surprise party simulation. The control was a three-minute black screen. Each test subject was measured using a Nonin GO2 Achieve Oximeter and a Non-Touch Thermometer. During immersion it was found that the subjects heart rate ranged from -2.12 (bpm) to +1.93 (bpm), giving us a range of 4.05 (bpm) . The SpO2 level measured a 3% increase during the beach sunrise environment. It was also found that skin temperature registered a value of +.19 °C, with a range that included the control, being the min, and the range was from 35.48 °C - 35.86 °C, with a range of +.38°C. Our observations and data indicate that Google Cardboard® is effective and the quality of the virtual experience elicits measurable changes in heart rate, oxygen saturation level, and skin temperature between the control and experimental values.

**Awards Won:**

Air Force Research Laboratory on behalf of the United States Air Force: First Award of $750 in each Intel ISEF Category