



Thesis Defense

Computer Science Master's Program

“Efficacy of Immersive Virtual Reality Gameplay in Environmental Attitude Change: The Case of Abandoned Offshore Oil Platforms in Santa Barbara”

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Abstract:

Public perception plays an important role in shaping conservation policies and decisions, especially in contested environmental spaces. Offshore oil platforms, historically viewed as environmental hazards, have been found to serve as marine habitats that support diverse marine life. However, public perception remains largely negative, influenced by concerns over pollution from past oil spill accidents. Traditional environmental education methods, such as lectures and documentaries, often fail to engage audiences effectively or shift entrenched opinions. This study explores the efficacy of immersive Virtual Reality (VR) gameplay in changing environmental attitudes, specifically in the context of abandoned offshore oil platforms in Santa Barbara, California, one of the largest artificial reef ecosystems in the world. A gameplay-driven, interactive VR application was developed to immerse participants in a simulated underwater ecosystem, where they explored marine biodiversity near the oil platforms. Through three mini-games, participants engaged in activities designed to highlight the ecological role of offshore platforms in supporting marine life. Additionally, this VR experience also tested the use of AI-generated voice narration as a cost-effective alternative to traditional narration. A quasi-experimental study was conducted with human subject testing, utilizing pre- and post-experiment questionnaires to measure changes in participants' awareness, perceptions, and empathy toward marine conservation. Statistical analysis using the Wilcoxon Signed-Rank Test was performed to determine whether the VR intervention produced a significant shift in public perception, particularly in transforming negative opinions into more informed and positive perspectives. This study contributes to the fields of immersive technology and environmental communication by evaluating whether game-based VR experiences can reshape perceptions of historically contested environmental issues. The findings have broader implications for educators, policymakers, and conservation organizations, demonstrating how immersive VR experiences can be leveraged to promote awareness, influence public opinion, and foster deeper engagement in marine conservation efforts.

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