While climate change is transforming our global temperature, it is also having a less well-known impact on our oceans. Here, Kean explores how interactive art can engage us to consider how we address one of the greatest challenges of our time

A GAME YOU DON'T WANT TO PLAY – TRANSFORMING PERCEPTIONS OF INTERACTION

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Figure 1 - Ocean Art

Does human interaction have an effect on our environments? How might we interact less? Ocean acidification is the ongoing decrease in the pH of the Earth's oceans, caused by the ocean's uptake of carbon dioxide (CO_2) from the atmosphere. Increasing acidity is predicted to have a range of potentially harmful consequences for marine organisms. Ocean acidification is evidence of climate change, just like the more commonly known global warming.

Recent studies suggest that ocean acidification will impact marine plankton communities in a number of ways, potentially causing great harm to plankton populations and therefore also to animals higher up the food chain.

In a 2018 artwork project, I collaborated with Morgan Meyers, a PhD candidate at the University of Otago's Departments of Botany and Marine Science. Morgan is completing her doctorate on trophic processes and distribution patterns of New Zealand zooplankton through the lens of climate change. She and I worked together to problem-solve an interactive artwork based on copepods – a group of small crustaceans found in the sea and nearly every freshwater habitat. The results exhibited were an interactive screen work and a watercolour painting in as part of the Art + Oceans Project, shown in the HD Skinner Annex, Otago Museum, 23 July–5 August 2018, in association with the Sustainable Seas National Science Challenge.

Morgan wanted to incorporate references to ocean acidification in the artwork. We discussed the idea, wondering if copepods could be the visual focus of the work, while phytoplankton might be represented as a cloud of small particles surrounding the copepods. The work would be interactive for the audience, with the interaction communicating ocean acidification through personal gesture. Initially, we considered a watercolour visual style for either the entire screen projection or just to represent the copepods. Utilising the game development tools within Unreal Engine, plus the Kinect for Xbox Windows adapter kit, I prototyped an interactive game space that mimicked a hypothetical situation where an underwater game player would increase acidity in the water by 'generating' harmful CO_2. When exhibition visitors move their hands in front of the artwork, carbon dioxide 'darkens' the surrounding water, 'reducing' copepod and phytoplankton numbers, and generally making the game environment appear 'unliveable.' It is only when visitors to the artwork do not engage with the work that pH levels 'normalise;' the 'water' within the game environment clears, and healthy copepods, phytoplankton and fish can be seen 'swimming' within the projection.

Visitors interacting (and not interacting) with the artwork are encouraged to consider how their own actions impact on marine life, and subsequently how reductions in some human activities can be effective. As my collaborator Morgan Meyers states, "reducing carbon dioxide levels released in the water thereby reduces ocean acidification. This in turn reduces stress on marine life and helps keep our seas healthy" (Meyers, 2018).

In 1987 Hines, Hungerford and Tomera proposed a model of responsible environmental behaviour (REB). Following an in-depth analysis of pro-environmental behaviour research studies, they found that some aspects of such behaviour, including "control" and "attitude," depended on engagement and action (Hines, Hungerford & Tomera, 1987). In particular, the idea of "locus of control … represents an individual's perception of whether he or she has the ability to bring about change through his or her own behaviour. People with a strong internal locus of control believe that their actions can bring about change. People with an external locus of control, on the other hand, feel that their actions are insignificant, and feel that change can only be brought about by powerful others." This sparked my interest in the idea that lack of control, or lack of interaction, could effect change by allowing an environment to self-normalise.

Morgan and I were looking for an elegant solution that allowed for interaction and yet didn't look or work like a screen-based game. We struck on the concept of non-interaction as a way in which visitors could discover that they should be hands-off with the oceans, because constant and increasing human activity is predicted to drive up acidity levels in the seas. So, if a visitor to the artwork feels drawn to engage with the screen, the moment they start waving their arms around the waters darken and the copepods and phytoplankton are visibly affected. If observers do nothing, the water clears.

This interactive element communicates a positive message about how human behaviour can help mediate or slow down the harmful effects of ocean acidification (instead of focusing on the negative emotion tied to how humans caused the problem in the first place). During the 'game state,' the condition of the copepods and the water changes, demonstrating the effects of ocean acidification. Avoiding this outcome requires the player or players to avoid interacting, not to play the game, and thereby model a reversal of the ocean acidification process.

Link to video of the installation: https://vimeo.com/287367269

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