

Interactive Digital Art as Didactic Agents in Space: The art of eco-nudging

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Extended Abstract

As the impact of human activity has begun to outpace the ‘natural’ environment’s systems and processes, humans have, accordingly, begun searching for innovative ways to address this imbalance (Steffen et al., 2007). Given that 70% of the world’s population is projected to be living in cities by 2050, specific attention is being placed on how urbanization can happen in a way that provides quality of life to all (Orr, 2002, McLennan, 2004, Buchanan, 2005, Fisher, 2008, Fry, 2009).

Cucuzzella claims that, “As we increasingly embrace technology as the solution to our problems—pollution in the air, soil, and water, increasing CO2 emissions, resource depletion, loss of biodiversity—we may be turning the design of our cities into a sort of managerial science of risk.” (Cucuzzella, 2021, p. 2). Eco-efficiency as an overarching design strategy leaves the individual powerless against the ubiquitous damages of current development practices (Cucuzzella and De Coninck, 2008b, a, Cucuzzella and De Blois, 2010, Cucuzzella, 2011a). Furthermore, many scholars question the assumptions embedded in incremental technologies with the drive for “accurate” measurements and propose a shift to embrace more-than-human ecological values and bring people and their ecosystem on par with each other (Rossi, 2004, Cucuzzella and De Coninck, 2008a, c, Cucuzzella, 2011b, a, 2013, Loh et al., 2020).

In the age of the Anthropocene, information about the earth's degradation is omnipresent, yet significantly less is available on what the individual can do to change unsustainable habits (Demos, 2017). Even though humans are aware of the damage they cause, they also know that much of it is beyond their personal control, rooted in the prevailing socio-economic mode of operation (Ellis, 2018).

Visual imagery has been central to the process of conceptualizing and confronting environmental degradation caused by human activity. The problem is that much of this imagery rarely contributes to educating the audience for which it is intended. Many of these images have held to the visual language of the techno scientific. And while eco-art's public enlightenment strategy may be a promising way for raising climate awareness, concrete improvements can only occur through change in the way things are done.

This study explores how art can be used to bridge the gap between simple eco-awareness and the more complex notion of eco-action. It proposes a form of interactive eco-art that aims to empower users to modify their behaviour and make changes in their environment by providing specific feedback that overrides other contextual, physiological and comfort triggers (O'Brien and Gunay, 2014). In this study, we use digital art and design to nudge participants to change and optimize the environmental settings (heating, ventilation and lighting levels) of a space, within a range where they are already comfortable. We draw on the fieldwork from an experiment conducted within an exhibition space that took place in Montreal during the Fall of 2019. We designed, built, and deployed a system that produced a series of complex experiences informed by both energy-use and the (inter)actions of people. Our participants were aware of the experimental nature of the scenario. More specifically, the experiment that we present explores how interactive digital art can become a means of, what we term, 'eco-nudging.' Eco-nudging can be described as a method that uses slight sensory interventions to help people make changes in their environments, as a direct result of users' reactions to the 'eco-nudge' request. The premise is that sensorial experience produced by technological interfaces is a promising venue for enabling choices.

This type of design moves beyond informing, and into overtly asking participants to act to make a change even if one is not necessarily needed. The spatial setting of this interactive installation has already been elaborated in Goubran et al. (2021), where it was observed that "ambient, abstract, and artistic real-time goal-driven feedback is effective in influencing immediate actions".

In this paper, we theorize further on the findings by asking the following key question: *Is this mode of digital interaction with interior controls empowering for users? Does this experiment show that a teaching companion through a digital object can influence specific action and choices for interior environmental settings?*

In order to address the critiques on existing norms and standards of eco-efficiency as the main way forward, we approach the questions of sustainability through the lens of sustainable actions for daily habits by designing ways to enable optimized choices and actions. We adopt the theoretical approach of design as means for raising awareness and engaging action. Cucuzzella developed the term, eco-didacticism for the design of spatial experiences that convey eco-lessons. Additionally, we propose that the integration of digital technology may enable behavior shifts through a post-anthropocentric lens.

The experiment attempted to move away from prevailing models to explore the potential of new types of interfaces, which solicit action with no reward systems. In general, we observed that users were inclined to interact with the visual interface and get to the suggested targets, even if they didn't agree with the settings. All participants wanted to understand and 'satisfy' the digital interactive artwork – a new abstract 'being' in their makeshift living room (the exhibit space). We found that both our practice and results intersected with recently emerging theories of eco-didacticism. Septically, the experiment and human-digital-art interactions could be clearly mapped against the three axes proposed by (Cucuzzella, 2019, Cucuzzella et al., 2020): where the *cognitive experience*, tended towards the *desire to inform*, the *formal qualities*, lean towards the 'invisible' side by avoiding green clichés and the *communicative approach* depend on agreement as method.

If one of eco-art's aims is to enable specific actions, then it should not be limited to eco-messages that focus on overly general information, since this has shown to leave most people powerless on how to act. We are claiming that new forms of eco-artwork are needed to help deliver clear messages and empower sustainable actions. These new forms should target focused interaction and aim to proactively mediate our complex relationship with nature. Specifically, it was clear that the experiment included other vectors beyond those already proposed by (Cucuzzella, 2019, Cucuzzella et al., 2020) namely companionship and mobilizing action toward the Anthropocentric crisis.

In previous human energy behaviour research, it was always assumed that rewards (with monetary or social value) are required for motivating people to take eco-actions – as seen in the work of (Eichler et al., 2017). However, we saw that in our experiment people were still willing to engage and continue to engage with the interface even if there was no clear or direct reward system for their actions. This proposes a shift from focusing on short-term rewards mechanisms towards sustaining long-term relationships with space users – that could inform both their immediate actions and their long-term behaviours. In our experiment, we also do not highlight to the user the emissions or environmental health consequences of their energy actions. Instead, their actions become a decisive factor for the health of a digital being that they see, try to understand, and even relate to. This approach abstracts the energy-environment link and scales it down to

an emotionally digestible experience for users. Suddenly, we can see that the digital art agent acts as a proactive intermediary between the human and the planet; a type mediated space where emotional connections to nature could grow (Kroll, 2015).

The study we present here contributes to the theory and practice of eco-art as means to enable eco-action in interior spaces – especially regarding building energy behaviours. Our main contribution is to offer a playful, visual, and didactic experience that aims to empower users to take specific energy-efficient actions based on indoor activities that affect the settings of their interior devices. The experiment positions itself not only as a way of response to the calls for alternative futures in human-building interactions (Day et al., 2020), but also as an exploration of how such interactive-visual experiences can add an important layer of influence to the other factors that are contributing to behaviour in interior spaces. The experiment also highlighted the significance of the notion of companionship as a future research axis for informing human behaviour in spaces. The study intersected with theoretical work on how artists try to tackle the Anthropocene, while showing a clear divergence from truly conceptual contemporary eco-art works.

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