

Designing sustainable sanitation: Involving design in innovative, transdisciplinary research

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This paper introduces an innovative pilot project where an alternative system of sanitation to capture, treat and reuse urine in agricultural trials is being undertaken in a university setting. The paper outlines the emerging theory and practise of Transition Management (TM) and identifies a lack of attention to the end-user in transition experiments to date. This project situates design as a core component in the social process of transitioning to a novel system of sanitation. Students across two design schools developed visual prototypes to introduce the project to the target audiences, which were tested during a pre-pilot installation. Initial results support the guiding hypothesis that design has a critical role to play in facilitating social learning in system innovation. Crown Copyright © 2011 Published by Elsevier Ltd. All rights reserved.

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The biophysical, socio-cultural and technological problems that design needs to perceive, engage with and respond to, are growing in complexity and scope. In Australia, water, energy and now food security are significant and emotive issues in the public imagination with complex environmental, political and social dimensions. At the same time, unsustainable resource use and waste generation is embedded in everyday habits, which remain relatively undisturbed. Ulrich Beck (1995) has argued that environmental threats disenfranchise the senses. While big stories (and their empirical symptoms) enter our lives at an abstract level, nothing has really changed for the senses in everyday life. These insights help to delineate an ambitious agenda for design research that: discerns problems where none might be perceived; generates criteria in response to these problems; designs options in response to criteria; and tests options via social engagement and participation. This paper tells the story of an innovative, transdisciplinary pilot project that adopts this agenda to explore the agency of design in supporting the transition to sustainable sanitation.

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The Transitioning to Sustainable Sanitation Futures project (aka the ‘Funny Dunny’ project)¹ is a two-year action research project involving the installation of an alternative system of sanitation to collect and treat urine at the University of Technology in Sydney (UTS), and reuse it in agricultural trials at the University of Western Sydney (UWS). The project is premised on the potential value of urine as a substitute for phosphate rock, the primary component of chemical fertilisers used in agricultural food production. Mined phosphate rock is a rapidly depleting, finite mineral resource that underpins global food security (Cordell, Drangert, & White, 2009). At the same time, phosphorus is widely understood as an environmental pollutant, which is costly to manage and treat. The key aim of the project is treat urine as a resource by undertaking a trial to reuse urine in food production and subsequently close the phosphorus loop locally. Yet to capture, value and reuse urine in this way requires a significant transformation in how we think about sewage, as a resource rather than waste product. So while the project presents many technical and regulatory challenges in implementing sustainable innovation, it also presents social and cultural challenges where embedded perceptions of sewage as a waste product, become difficult to transform. From its inception, the ‘Funny Dunny’ project employed design as a core component in facilitating the socio-cultural process of transitioning to a new and unfamiliar system of sanitation. The project was attuned to a lacuna in research regarding the social experience of technical change as researchers found there has been limited user participation in experiments trialing alternative sanitation options to date. This provided a rich point of entry for design, which was perceived as an important enabler of this missing participation. Visual communication design concepts were generated that dealt precisely with human touch points in the new system, and were selected for installation during the trial by a transdisciplinary research team. Design’s generative impulse was thereby a key enabler of progress regarding the collection of social data in the project, and contributed significantly to its experimental intent. This raises intriguing questions about the role that design could play in transdisciplinary research oriented towards complex system innovation more broadly.

The problem space of the project can be defined using Geels (2002) multi-level perspective on technological transitions. At the level of the ‘landscape’ is the threat of climate change on water and food security and the emerging story of Peak Phosphorus (Cordell et al., 2009). These macro level issues bring into sharper relief the irrationality of centralised, water-based sanitation. The ‘socio-technical regime’ (Geels, 2002) of sanitation at the meso level is characterised by a complex ‘patchwork’ of technologies, institutions, infrastructures and social conventions of practise that have evolved over the last century into a highly path dependant system (Fam, Lopes, Mitchell, & Willetts, 2009). This project is driven by the motivation to trial radical innovation at the ‘niche’ level in anticipation of a landscape shift and in the understanding that new landscape pressures can create openings for innovation at

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