

Research Design Plan

ARDN800

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Working Title: Promoting lingering through tangible interaction in residual urban spaces

Keywords: interactive installations, tangible interaction, residual urban space, lingering, sense of place, place-based research, multisensory experiences

Research Question: How can *tangible interactive technologies* be used to transform *residual urban space* to support *lingering* as a form of engagement with such space?

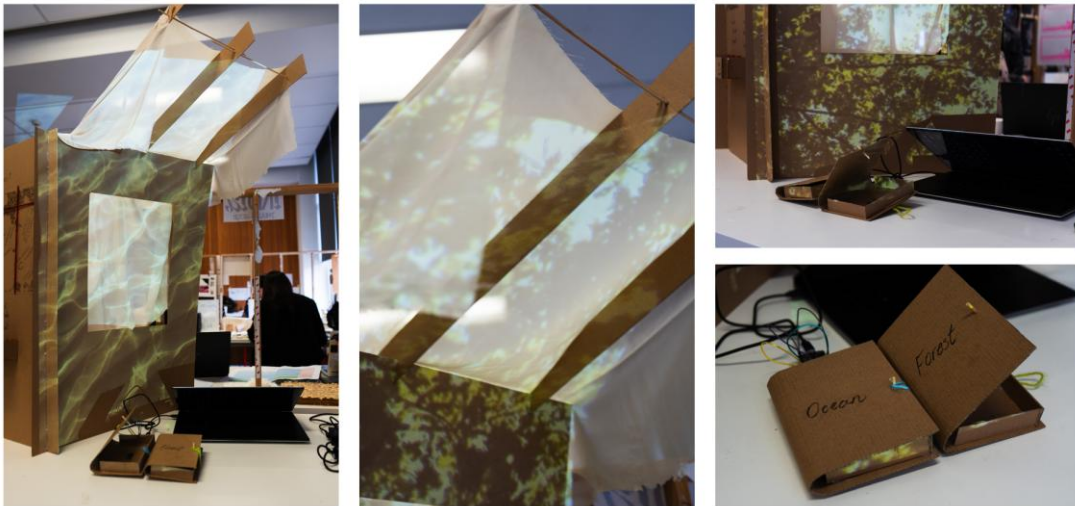
Aims, curiosities and motivations:

This research aims to investigate how tangible interaction, as enabled by the synergistic use of physical and digital technologies, can be used to transform residual or leftover urban spaces such that users are encouraged to linger and thereby engage with those spaces. The project will involve developing a 1:1 scale installation for a chosen site (to be determined), either locating the installation within this site or presenting it as a representative gallery installation. The chosen site will influence the nature of engagement being promoted, such as physically interacting with the space's materiality, embodied exploration of the space (i.e. moving around within it), or engaging with a cultural, historical and/or environmental narrative connected to the site.

A key hypothesis driving this research is that tangible interaction, or interaction involving the physical realm (e.g. involving the multidimensionality or materiality of objects) promotes engagement with broad audiences more effectively in a spatial context compared to conventional technologies such as touchscreens, computer screens, Virtual Reality (VR) or Augmented Reality (AR). This hypothesis is backed by studies of different technologies employed in interactive museum exhibits (Hornecker & Stifter, 2006) and in exploring historic spaces (Beale et al., 2022), which found that users preferred tangible, "hands-on" technologies concealed in familiar, non-digital forms through how they immersively blended the digital and physical realms, promoted exploration of space, and provided a lower barrier for use without requiring formal training. The broader area of tangible interaction draws from the works of Hiroshi Ishii (1997), Paul Dourish (2001) and Eva Hornecker (2006) which also discuss the implications of employing tangible interaction in spatial contexts to promote spatial and social engagement. Finally, this hypothesis has been explored in DESN800: Design Practice I through experimenting with tangible interaction using proximity sensors hidden in book forms to trigger digital changes in the environment (Figure 1).

Figure 1

DESN800 Week 4 Output: Exploring Tangible Interaction and Atmospheric Architecture



Note: Photographs by Sophia Schulz, 2026.

The project's focus on residual urban spaces and lingering as a form of engagement draws from studies such as Arianna Salazar-Miranda's analysis of urban space use in American cities from 1980 to 2010, which found that "the time spent lingering in these spaces has halved across all locations ... the frequency of group encounters declined, indicating fewer interactions in public spaces. This shift suggests that urban residents are using streets as thoroughfares rather than as social spaces" (2025). Residual or leftover spaces, a product of the architectural Modern Movement in the 20th century which prioritised individual buildings over cohesive urban landscapes and left behind under-utilised, awkward spaces (Trancik, 1986), offer a unique opportunity to improve lingering in public space and contribute to a more welcoming urban environment for its residents and visitors. The concept of lingering also draws from phenomenological approaches to architecture (Pallasmaa, 2014) which tie in multisensory experiences, particularly tangible and embodied experiences, to establish a sense of place in users and encourage lingering and engagement.

This project will employ site analysis and site-specific research approaches incorporating elements of place-based education (Wally Penetito, 2009), William Whyte's observational work through timelapse photography in public space (1980), and LiDAR mapping techniques. Such methods will be used to evaluate urban sites, including how they are currently used, their historic, cultural and/or environmental characteristics, and ethical considerations of the impact of implementing design interventions there. Gathered information will inform the selection of, and design for, the final site.

Other methods to be employed include rapid prototyping using physical and digital technologies, especially to experiment with inputs and outputs of tangibly interactive systems. Prototype works and the final installation will be user-tested through ethics-approved ethnographic observation of users' interactions to both quantitatively and qualitatively analyse lingering in the space, targeting users that represent the demographic of adults situated around the chosen site. Quantitative analysis will involve measuring the time spent in the space, while qualitative analysis will examine the nature of this time spent (e.g. engaging with the installation itself, socialising with others in the space, learning about a historical narrative connected to the site, etc.). This analysis will employ similar methods used to evaluate the chosen site, such as observation through timelapse photography, with the goal of identifying how effective the installation is in transforming the chosen site using tangible interaction to support lingering as engagement.

Rapid prototyping has been exemplified through creative practice in DESN800 such as tests with tangible conductive and non-conductive materials (Figure 2), exploration of residual urban spaces (Figure 3) and environmental characteristics of chosen sites, and blending the physical and digital realms through projection mapping and sensors embedded in familiar forms and materials (Figure 4; video demonstration can be found at https://youtu.be/4_EpG8qdgyl). Overall, this research draws on methodologies of phenomenology, implicit knowledge and embodied knowledge, exploring how individuals learn and experience the world through intuitive engagement of multiple senses and the body.

Figure 2

DESN800 Week 1 Output: Exploring Tangible Communication and Conductive Interfaces



Note: Photographs by Sophia Schulz, 2026.

Figure 3

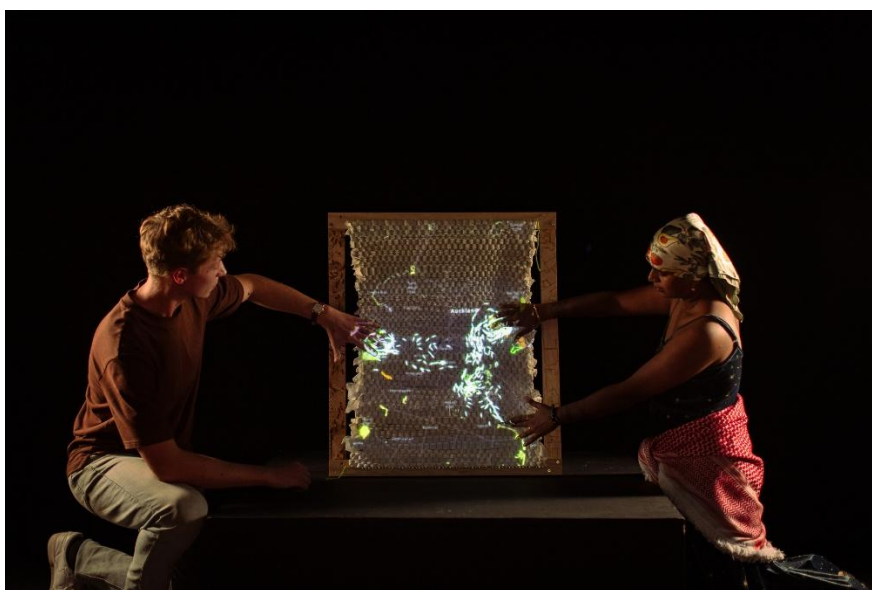
DESN800 Week 2 Output: Photo Walk and Annotations of Residual Spaces in Auckland CBD



Note: Photograph by Sophia Schulz, 2026.

Figure 4

DESN800 Week 3 Output: Place-Based Tangible Interaction Embedded in Weaving



Note: Photograph by Sophia Schulz, 2026.

Academic, social and cultural field(s) of inquiry:

- Academic fields of inquiry:
 - Tangible interaction (Hornecker, 2006)
 - Embodied interaction (Dourish, 2001)
 - Tangible user interfaces and ambient media (Ishii, 1997)
 - Affordance theory (Norman, 2013)
- Social fields of inquiry:
 - Residual urban spaces (Trancik, 1986)
 - Urbanism, particularly the social use of urban spaces (Whyte, 1980; Franck & Stevens, 2006)
 - Phenomenology and its applications in architecture (Pallasmaa, 2014)
- Cultural fields of inquiry:
 - Place-based education (Penetito, 2009)
 - Embodied knowledge (Johnstone, 2026)

Reflection on insights from Te Ao Mahora Wānanga:

Te Ao Mahora Wānanga symposium featured key insights, particularly from Karl Johnstone and Sione Faletau, relevant to this research project. These insights especially relate to the field of tangible and embodied interaction and its use in promoting engagement and connection from users. For example, Johnstone's comments (2026) about not relying solely on cognitive power or external knowledge, and instead valuing intrinsic and embodied knowledge, proves the value of incorporating implicit and embodied knowledge in interaction design to ensure such interactions and experiences are more accessible and don't require excessive external knowledge (such as knowledge of how specific technologies work). Additionally, both Johnstone and Faletau's insights regarding sensory experiences (2026) are relevant to this research, such as the Tongan concept of "Ongo" that incorporates both sound and feeling, and how important experiences are stored in our senses. These comments emphasise the importance of multisensory experiences in engaging audiences. An example of this in practice is the installation "Waimahara" located in the Myers Park underpass in Auckland which builds on the idea of "whakarongo" or "awakening the senses" (Tipene, 2024) and engages the senses of sight and sound to encourage passersby to linger amongst the installation and learn about the site's cultural and environmental history.

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