Boredom in Transit

Create a Positive Waiting Experience for Solo Travellers at Public Transport Hubs

A thesis presented in partial fulfilment of the requirements for a Master in Design at Massey University, Wellington, New Zealand

Weiwei Cai

2024

Abstract

Waiting at public transport hubs can be the least exciting part of a journey, especially for solo travellers. The extended waiting time at these hubs is often described as boring. While modern technology offers numerous entertainment options to alleviate boredom, its ideal use goes beyond temporary distractions to provide means to experience the immediate surroundings and find deeper appreciation and connection. This project looks into the phenomenon of boredom and explores how personal devices can transform tedious experiences and perceptions of public transport hubs, using Wellington Railway Station as a design case.

The design development starts with exploratory research, including site visits, observation, and gathering anecdotal information, followed by identifying common themes in initial findings and sourcing relevant literature to support emerging ideas. It explores values beyond functionality in transient spaces, highlights the importance of distinctive features and landmarks, analyses travellers' shifting motivational states, and examines the use of technology in shaping interactions within public spaces. These insights, along with an iterative design process, have led to the design of *Hubble*, a mobile app concept that aims to create a positive waiting experience for solo travellers at public transport hubs. *Hubble* encourages active engagement with the traveller's surroundings through augmented reality explorations, location-based social interactions and personalised suggestions. It introduces an innovative way of using technology to experience and invigorate public spaces, potentially turning waiting times into moments of delight and leading to a more fulfilling journey.

Keywords: boredom, waiting, transport hubs, personal devices, app design, user experience, public spaces

Acknowledgements

Thank you to my supervisors, Andre Mūrnieks and Klaus Kremer, for your guidance and support. Your wisdom and all the interesting sources you shared have enlightened me at every step. Thank you to our MDes coordinator Deb Cumming, you have inspired me to converge my early ideas towards a clear direction. Thank you to all the critics at my Arohaehae for your feedback and input. Thanks to my MDes cohort and friends for shaping the creative environment for this journey.

Table of Contents

1.0 Introduction

1.1 Background

The journey of this project begins with my long international trip across continents, initially planned as a 24-hour trip with multiple connecting flights from Xiamen, China, to Wellington, New Zealand. However, the severe weather event Cyclone Gabrielle unexpectedly turned it into a 62-hour odyssey with significant delays and interminable waits through five transport hubs. The experience of profound boredom during these waiting hours inspired the initial idea of *Hubble*. Wellington Railway Station, the final hub of the trip and the primary design case in this project, is also where I spent the most time waiting throughout the year. These countless hours of waiting present opportunities for observation and experience, transforming what was once tedious and unproductive time into the inspiration behind *Hubble* — a response to the boredom of waiting and a quest for meaning within the transient spaces of travel.

In *The Fundamental Concepts of Metaphysics*, Martin Heidegger illustrates a scenario where one waits alone in an uninspiring train station, unable to engage with anything and constantly focused on the passing of time. The desire to pass the time is essentially a desire to escape from boredom. Heidegger suggests that the feeling of emptiness and the dragging of time in such moments place us in a state of limbo, as the train station does not fulfil its purpose until the train arrives (93). Transport hubs have traditionally been seen as purely functional, much like Heidegger's depiction. Marc Augé terms such spaces as "non-places" from an anthropological standpoint. They are formed for specific purposes, characterised by transient and detached nature, where individuals' paths cross without meaningful interaction. In contrast to anthropological places, which foster organic social connections, non-places build more isolated, contractual relationships (94). As they cannot be defined as "relational, historical and concerned with identity" they do not hold enough anthropological meaning to be seen as "place" (Augé 77).

However, opposing views argue that transit spaces acquire meanings over time through continuous placemaking, with place and mobility not in opposition but mutually shaping one another (Eldelin and Nyblom 49). In other words, these spaces develop characteristics and significance through ongoing human activities, where the concept of the place and the movement of people reciprocally influence each other as time progresses.

Contemporary trends in train station design are evolving, shifting from a focus on functional and technical aspects to a more human-centric approach that emphasises the passenger experience. This shift was highlighted by Julian Robinson, the former head of architecture at Crossrail. He emphasises the importance of designing spaces that are not only efficient but also comfortable and accommodating for a diverse range of users (Allan). Integrating art into station design for aesthetic and community engagement is becoming increasingly prevalent. Recent examples include the Crossrail Art Programme in London, which features major public artworks by nine artists across seven new Elizabeth line stations ("Crossrail Art Programme") (Fig. 1), and the Moynihan Train Hall in New York, which blends art into its architectural design (Fig. 2). These artworks are designed to foster a sense of communal belonging and collective pride, adding a cultural dimension to the train hall ("Public Art Program"). Similarly, airports act as gateways, welcoming and bidding farewell to the local community, local artworks exhibited in the terminals are not only a calming intervention for

Fig.1. Conrad Shawcross, Example of Integrating Art into Station Design: *Manifold (Major Third) 5:4*, 2023, Liverpool Street station (Elizabeth line). Commissioned as part of The Crossrail Art Programme, 2018. © Conrad Shawcross. Courtesy of the artist and Victoria Miro. Photo by GG Archard, 2023. https://art.tfl.gov.uk/projects/manifoldmajorthird54/

stressed travellers but also offer a glimpse into the culture awaiting outside the arrival gates (Koglmeier).

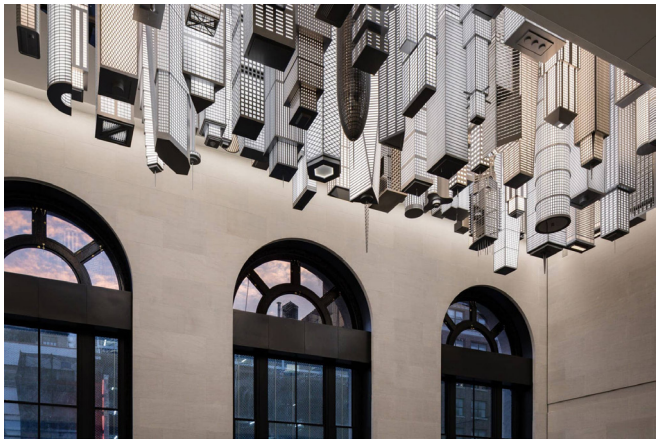


Fig.2. Elmgreen & Dragset, Example of Integrating Art into Station Design: *The Hive*, 2020, Moynihan Train Hall. Commissioned by Empire State Development in partnership with Public Art Fund. Photo by Nicholas Knight, courtesy of Empire State Development and Public Art Fund, NY. https://moynihantrainhall.nyc/elmgreen-dragset/

As values beyond functionality begin to gain recognition, researchers have also explored the experiences within these spaces. Alexander and Hamilton's research investigates how local communities reclaim a sense of place and improve the hedonic value of the railway stations of Scotland (67). Cascetta and Cartenì suggest that hedonic value is closely linked to the aesthetic and architectural quality of environments, which represent the delightful experience travellers derive from visually pleasing elements (50). Hagen and Galetzka's findings explain how environmental stimuli influence the waiting experience, and apply the reversal theory to analyse passengers' shifting motivational states between goal-oriented and activity-oriented (41). Insights from previous studies indicate that boredom tends to occur when a traveller is in an activity-oriented state and the waiting environment lacks stimulation, thereby highlighting the design opportunities in such scenarios. As personal devices continue to reshape the ways public spaces are used and experienced, the integration of digital placemaking holds the potential

to further enhance the sense of place for travellers within the transport hub environment.

In this modern digital age, travellers have diverse entertainment choices for temporary distraction. Digital maps have simplified navigation to the point where we no longer need to memorise routes. While smartphones have made travel easier, they often divert our attention away from the tangible world. Despite technology offering numerous ways to eliminate boredom, the constant stimulation it provides can still result in boredom. However, boredom is not exclusively a negative feeling, it presents an opportunity to think anew. When boredom occurs, our attention is no longer engaged. The challenge is to find a way to re-engage with the world, and creativity arises as we navigate the process of reconnection (Ringmar 112). Thus, the goal is not merely to alleviate boredom but also to explore the opportunities boredom presents. While taking advantage of the convenience technology offers, design could encourage users to maintain an authentic interaction with the real-world environment and discover creativity in the process.

1.2 Research Aim & Objectives

1.2.1 Research Aim

Discover and apply methods to enhance the waiting experience for solo travellers at public transport hubs, exploring the potential opportunities presented by boredom in various scenarios.

1.2.2 Research Objectives

1. To examine the common perception of boredom experienced by individual travellers waiting at public transport hubs.
2. To explore values beyond functionality in transient spaces and how people interact within these environments in the modern digital age.
3. To analyse travellers' needs in waiting scenarios by understanding the dynamic nature of human motivation.
4. To develop a mobile app concept that applies research findings to create a positive waiting experience in public transport hubs by encouraging active engagement with travellers' surroundings.

2.0 Context Review

2.1 Waiting and Boredom

Waiting is a common experience in everyday life. Although the time spent waiting is often considered wasted and unproductive, it can also serve as a break between activities. Waiting and travel are not exclusively utilitarian or means to an end, people sometimes seek intrinsic pleasure and appreciate the recreational qualities of the process. For example, in activities such as fishing and stargazing, people often spend hours waiting in anticipation, where the pleasure derived from such activities often lies in the experience — engaging with nature and living in the moment. Similarly, travel does not always serve the purpose of reaching a destination, it can be an end in itself. Activities such as undirected walking, jogging, or taking leisurely drives through scenic routes are pursued for enjoyment, rather than to reach a specific place (De Vos et al. 806). Therefore, the value of waiting can go beyond tedious pauses in a journey to moments of engagement and reflection. The experiences during these moments can influence one's perception of time, an important factor in the experience of boredom.

Boredom often occurs in waiting situations, commonly perceived as unpleasant, with one becoming more aware of the passing of time and leading to an overestimation of time durations (Witowska et al. 1). The ubiquity of personal devices has transformed waiting in public spaces into opportunities for media consumption, which often leads to what might be considered a meaningless, vacuous distraction, thereby contributing to the near elimination of boredom. Moments of boredom have been historically seen as chances for the mind to wander and engage in creative thoughts; with the digital world offering quick escapes from such moments, concerns are raised about the potential loss of self-reflection in modern times (Buchanan 282). These concerns may relate to Heidegger's theory, which distinguishes between "superficial boredom" and "profound boredom", using a train station scenario as an example (93). While superficial boredom

arises from being bored by the situation, profound boredom reveals human existence through a direct experience of time, emerging when external distractions are absent and triggering a renewed search for meaning. The pursuit of meaning diverges into either seeking temporary distractions that simply occupy time, or questing for authentic connections with the world and oneself (Horan). Therefore, boredom is not inherently negative, it can potentially inspire creativity as one explores new ways of re-engagement.

While technology has transformed traditional downtime, it is worth considering how these advancements can be designed to enrich users' engagement with the world. This may present new pathways for creativity and reflection that augment the introspective quality of boredom. A recent study examines boredom as a social phenomenon that became especially noticeable during the pandemic lockdowns, indicating that boredom can be a shared state influenced by common circumstances and technology use. While personal devices often contribute to a widespread sense of superficial boredom, they can also foster communal reflection and discovery of shared interests, potentially leading to stronger social connections and even inspiring joint entrepreneurial efforts (Murphy et al. 289). Waiting for transportation is a common scenario where the shared experience of boredom happens. Travellers immersed in their devices are part of a collective narrative. These moments of waiting create a shared space where technology can either isolate or connect people. When technology is employed to facilitate a collective exploration, it has the potential to redefine tedious waiting into enriching encounters that complement the journey.

2.2 Transient Spaces

In the prologue of *Non-Places: Introduction to an Anthropology of Supermodernity*, Augé depicts the scene at an airport, a typical example of transient space:

> "He was enjoying the feeling of freedom imparted by having got rid of his luggage and at the same time, more intimately, by the certainty that, now that he was 'sorted out', his identity registered, his boarding pass in his pocket, he had nothing to do but wait for the sequence of events." (Augé 2)

The narrative captures a sense of freedom after checking in the luggage and with one's identity confirmed through the boarding pass. The traveller moves through the airport with a sense of detachment, noticing the luxury items and briefly visiting a bookstore. The airport is portrayed as a space where individual itineraries intersect momentarily. People pass through it as part of their journey, but their interactions are mostly with systems and processes designed for efficiency and order. The airport epitomises the characteristics of "non-places", where passengers' presence is purely functional, serving the purpose of travel and transit without creating significant personal or emotional engagement with the space. These spaces represent a kind of homogenised and depersonalised environment where human connections are fleeting or superficial. The rational nature of transport hubs might contribute to the negative feelings commonly experienced during extended waiting hours. However, the anonymity in non-places can also be liberating, as travellers can temporarily be defined by their roles as passengers or customers, while the environment of the moment distances them from their usual identity and concerns (Augé 103). This detachment makes the traveller's experience in these transient spaces a compelling subject for exploration.

Contrary to Augé's conception, cultural geographers and mobilities scholars argue that transient spaces are dynamic and capable of fostering

a sense of belonging and identity (Eldelin and Nyblom 49). Recent studies have challenged the concept of non-places, emphasising values beyond functionality and highlighting the role of placemaking in transforming transport station environments. The architectural and aesthetic qualities of a transport hub can contribute to the hedonic value, which may manifest as the enjoyment that travellers experience in aesthetically pleasing and engaging environments and can also be enhanced by interactive features, social spaces, and the integration of soundscapes. Research shows that passengers are willing to extend their wait times and travel longer distances to use a station with better aesthetic quality (Cascetta and Cartenì 50). Phillips et al.'s study suggests that encouraging curiosity in everyday places can enhance both individual and collective wellbeing, as places are more than physical locations, they are relational concepts where wellbeing is embedded in the relationships between individuals and their environments (2340). "Place" is distinguished from mere location by its unique history and meaning, incarnating people's experiences and aspirations. A "sense of place" arises from emotional connections tied to a place, shaped by human experiences and often remembered through stories (Basaraba 1472). Airports and train stations are significant in a traveller's journey, not only for their role in transportation but also for the diverse experiences and opportunities that enrich the narrative of those journeying through them.

Personal devices are transforming how people use and experience public spaces in this digital age, leading to an evolving concept of digital placemaking. "Digital placemaking" describes the use of digital technology to foster a sense of place. It presents innovative ways to interact with physical spaces and enables users to create narratives that reflect their connection to a location (Halegoua and Polson 575). Ito et al.'s research examines the use of portable information devices and objects in shaping individuals' interactions with urban spaces, and identifies three forms of presence in public settings, "cocooning, camping and footprinting" (73). These three strategies also contribute to the process of "mobile placemaking", which means that as travellers interact with their surroundings while on the move,

they get familiar with the area and assign meanings to the space with personal interpretation (Jirón et al. 604). “Cocooning” refers to using devices like mobile phones, headphones or books to form a “cocoon”, creating a private space that insulates one from their immediate surroundings and other people. The study found that “cocooning” is the most common form that occurs in public transportation. “Camping” involves setting up temporary personal workspaces with devices like laptops in public places. Unlike cocoons, where individuals are disinterested in their surroundings, “camping” involves choosing locations with personal affinity (Ito et al. 74). “Footprinting”, to adapt to the transport hub context, is leaving traces.

Traces form invisible but recognisable marks that signify where specific events occur. There are three types of traces. “Fleeting traces” are formed from brief, pattern-forming encounters that instil a sense of recognition in an environment. Examples include estimating wait times based on crowd size (Fig. 3) or identifying potential threats like pick pockets through warning glances. “Sporadic traces” arise from irregular yet memorable events that add enjoyment and a personal touch to travel spaces. For instance, interactions with street performers (Fig. 4) and encounters with amusing or unexpected situations. “Permanent traces” are created by consistent practices that give specific spaces unique meanings (Fig. 5). For example, certain areas in stations or airports become spots for intimate encounters, intense farewells, or warm welcomes, which leave invisible traces that imbue the space with personal and emotional significance (Jirón et al. 605). These insights drive the project to explore diverse uses of space, such as offering a platform for users to interact with their surroundings while remaining in a “cocoon”, and for others, finding, leaving or even exchanging “traces”.

Fig. 3. *Example of Fleeting Trace: Big Crowd Indicating Long Waits*, photograph by author, 9 Apr 2023.

Fig. 4. Monique Ford, Example of Sporadic Trace: *Interaction with Leafy Wellington Street Performer "Tree"*, photograph, STUFF, https://www.stuff.co.nz/entertainment/arts/130612203/my-wellington-how-a-saxophoneplaying-tree-entertains-the-capital

Fig. 5. Rob Allen, Example of Potential Permanent Trace: *An Area for Goodbyes at Schiphol Airport*, 2013, photograph, Flicker, https://www.flickr.com/photos/akrabat/9741370611

2.3 Motivation in Motion

Exploring the dynamic nature of human motivation can help in gaining a better understanding of travellers' needs. Apter's reversal theory provides insightful perspectives for analysing travellers' experiences. The theory suggests that people can reverse between two motivational modes, including goal-oriented "telic" mode and activity-oriented "paratelic" mode. In the telic mode, people are serious and planning ahead, experiencing satisfaction from achieving goals. In contrast, the paratelic mode is characterised by playfulness, spontaneity, and pleasure derived from the activity itself. The concept of "metamotivational modes" explores different ways people experience and interpret the world, and demonstrates that the perception of boredom can vary based on one's current motivational state. Boredom in a goal-oriented state is often perceived as negative because it is considered a barrier to achieving goals. Conversely, boredom in an activity-oriented state can be neutral or even positive, presenting opportunities for relaxation, reflection, or a chance to engage in spontaneous activities (Apter 268).

Building upon the concept of reversal theory, Hagen and Galetzka's study focuses on how environmental factors influence passengers' perception of waiting time in the railway station setting. The research categorised passengers into "must" and "lust" groups, aligning with the telic and paratelic modes of reversal theory. "Must" passengers are goal-oriented and in a hurry (Fig. 6), they focus on information processing and time management, and often prefer a calm environment. "Lust" passengers are activity-oriented and usually on recreational journeys, they seek pleasure and stimulation, thus being more receptive to environmental stimuli and less focused on time (Fig. 7). Their findings indicate that strategically designed environments can transform the common negative perceptions associated with waiting, such as boredom and frustration, into positive experiences of excitement or relaxation, particularly when the design choices are tailored to the motivational states of passengers. This also requires a "protective frame" where one can be absorbed in the moment without concern about being late (52). While these studies primarily focus on the design of the physical

environment, they establish a foundation for analysing waiting experiences, and offer insights into identifying the potential target audience of this project as solo travellers waiting in an activity-oriented state.

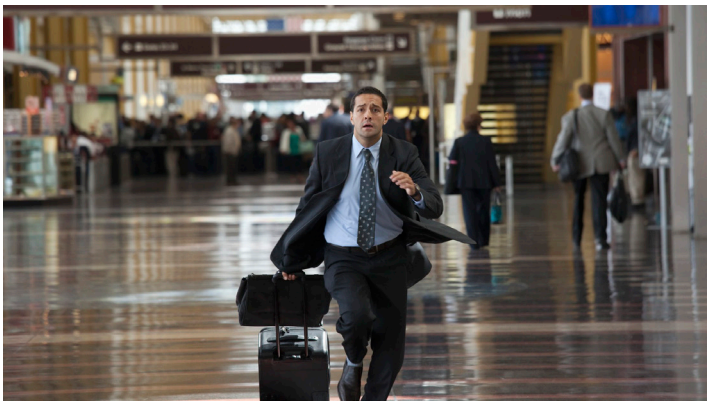


Fig. 6. Ariel Skelley, Example of a Traveller in Goal-Oriented Mode, 2019, https://www.theatlantic.com/health/archive/2019/05/psychological-reason-people-are-late-airport/590500/

Fig. 7. *Example of a Traveller in Activity-Oriented Mode*, photograph by author, 9 Apr 2023.

Travellers' motivational states are not static, they can change back and forth depending on the context and environment (Apter 272). For instance, a business traveller, commonly prioritising efficiency and often in a goal-oriented state, may switch to a more relaxed and playful mindset during delays. Leisure travellers, mostly in an activity-oriented state, are more likely to experience boredom, especially when encountering a low-arousal environment with insufficient stimulation. Unlike their intended destinations, transport hubs are usually not exciting places to spend time. However, these parts of the journey can still present opportunities for unique encounters and insights into the local atmosphere. Embracing these moments to connect with the surroundings can shift potential boredom into exploratory opportunities, fulfilling their intrinsic need for stimulation. The dynamic nature of human motivation highlights the value of context-aware potential in mobile devices, which can recognise and use contextual information to tailor experiences that adapt to traveller's changing needs.

2.4 The Extended Mind

2.4.1 Cognitive Extension

In *The Extended Mind*, Clark and Chalmers introduce the idea of "extended cognition", suggesting that cognitive processes can extend beyond the individual's mind, integrating external elements such as tools, devices and environments into one's cognitive system (7). The concept resonates in today's digital age, where smartphones have become deeply embedded in people's lives. Park and Kaye's research identifies three types of self-extension via smartphones: functional, anthropomorphic, and ontological. "Functional extension" refers to the enhancement of daily tasks, "anthropomorphic extension" involves attributing human-like qualities and personal characteristics to smartphones, and "ontological extension" blurs the boundaries between the human self and their smartphones, reflecting a profound integration of technology into personal identity (217). In the context of solo travel, personal devices are not just functional tools but can also act as virtual companions, playing a crucial role in shaping the traveller's experience.

2.4.2 Augmented Reality

Traditional mobile travel applications tend to focus on creating a simulated digital environment for users to obtain information, which can sometimes divert users' attention from their physical surroundings. Conversely, mobile augmented reality aims to shift users' attention back to the real world rather than its digital incarnation. Augmented Reality (AR) introduces novel interaction affordances to enrich the user experience by superimposing digital elements and information onto the real-world environment. Recognised for its potential in the tourism industry, AR technology can be effective in crafting immersive and interactive design solutions to provide information while travellers are constantly on the move. By offering task-relevant content and building semantic connections, it simplifies interactions and helps users stay aware of their physical surroundings (Kourouthanassis et al. 72). As AR extends the design canvas to include the real-world

environment, it serves as a tool for fostering interaction between travellers and spaces in this project. By integrating the concept of geocaching, a worldwide outdoor activity where participants use GPS technology for hiding and seeking containers known as “geocaches” (Cord et al. 151), *Hubble* enables travellers to collect and leave location-based virtual souvenirs around feature zones at transport hubs, thus creating a layered experience of places through shared moments and memories.

2.4.3 Context Awareness

Context-aware systems in mobile technology have the capability to adapt functionality based on the user’s context. These systems use a wide range of data sources, including location data from GPS, motion data from accelerometers, environmental data from physical sensors, as well as social media activity and direct user input. By analysing the data, they can provide services tailored to users’ needs and preferences based on their specific contextual information (Rivero-Rodriguez et al. 3). To apply context-aware systems in this project, *Hubble* can deliver personalised suggestions based on the user’s location, waiting time and walking speed, providing suitable time duration-based suggestions, while considering current weather conditions and time of day. The interpretation of motion and location data could offer insights into the user’s motivational states during travel. For example, rapid walking might indicate that the user is in a hurry, while a lack of movement might suggest tiredness. User feedback should be integrated to enhance the system’s accuracy and adaptability, offering automated and personalised suggestions while remaining customisable to each user’s preferences and circumstances.

2.4.4 Rethinking Navigation

Wayfinding is also an essential experience in transport hubs. GPS-based navigation apps today have largely replaced traditional methods like paper maps, public signage and local guidance, reducing the time and effort travellers need to use for navigation. However, the reliance on digital maps has led to new issues, leading researchers to reevaluate navigation

methods (Krukar et al. 151). Studies suggest that dependence on GPS may weaken spatial memory (Yan et al. 2). When using mainstream navigation systems, the attention required for distance-based and turn-by-turn instructions can increase cognitive load, users often lack environmental interaction, leading to difficulties in recalling routes they travelled (Wang et al. 180). Effective navigation systems must align with the user's natural cognitive strategies and be relevant to the specific context and tasks. Existing studies explore diverse methods to examine natural wayfinding behaviours and spatial cognition, along with the learning processes aided by wayfinding tools (Krukar et al. 152). Credé and Fabrikant highlight the importance of landmarks in navigation and contribute insights into designing digital navigation aids that support spatial cognition (165). Ooms and Van De Weghe's study emphasises the need for the navigation system to align with users' cognitive maps and intuitive understanding of space (171). Wang et al. investigate indoor wayfinding aids that are often overlooked in the instructions of personal devices, and propose integrating existing signage into digital navigation services (188).

Landmarks are integral to spatial orientation and the representation of spatial knowledge. The term "landmark" has been defined variably. A minimal definition considers landmarks as any distinct objects or features in space that are noticed and remembered, serving as points of reference in spatial cognition (Presson and Montello 378). Beyond their functional roles, landmarks also contribute to the sense of place and hedonic value in transient spaces. This project is therefore motivated to pay attention to such distinctive elements within transport hub environments, recognising that every feature around waiting areas, from iconic landmarks to smaller, unique finds, can potentially be tiny attractions that delight the experience.

2.5 Precedents

2.5.1 Google Maps

Google Maps is a versatile navigation tool that provides detailed geographic information, directions, and location-based services. Its everyday use goes beyond navigational guidance, influencing the creation and perception of urban spaces (Noone). In the context of transport hubs, a relevant feature is “search for nearby places & explore the area”, which enables users to explore their surroundings by searching for points of interest. The feature provides a curated list of nearby locations with user ratings and detailed descriptions. The local search results prioritise relevance, proximity and significance to deliver the most suitable options (Google). While this feature offers diverse choices to occupy time during waits, some of its monetisation strategies, such as promoted pins and sponsored listings (Schaal), can potentially shift waiting time into an opportunity for consumption rather than experience. However, the extensive real-world knowledge Google Maps offers is valuable. Through the Google Maps API, the “Application Programming Interface”, developers can access Google Maps data and functionality for their own projects. These include the Maps Static API for embedding Google Maps, the Maps JavaScript API for interactive and customisable maps, the Places API for information on points of interest, and the Directions API for routes to locations, among others (Juviler). Integrating this data could provide essential mapping information for this project.

2.5.2 Virtual Assistants

Virtual assistants such as Amazon’s Alexa, Apple’s Siri, and Google Assistant integrate natural language processing and artificial intelligence to perform tasks and answer queries. Jiménez-Barreto et al.’s research suggests that these virtual assistants with smart speakers are not only practical and entertaining for travel-related purposes, but also contribute a sense of modern elegance that is described as “high-tech sensuality” (749). Take Google Assistant as an example, it enables conversational engagement, offering both functional features like getting local information

and entertaining interactions such as trivia games and telling jokes. When asked for things to do in the transport hub context, it generates extensive lists from search results. Insights from virtual assistants guide this project in considering both functional and entertainment aspects, and in simplifying the suggestions into personalised, single recommendations each time.

2.5.3 Pokémon GO

Pokémon GO is a location-based AR game frequently referenced in tourism studies. The game uses GPS and mobile technologies to overlay the real world with in-game objects, and players must physically present at specific locations to interact with these virtual elements. It has demonstrated a unique capacity to alter the perception and popularity of landmarks, with formerly unnoticed sites gaining attention as key points called “PokéStops” and “Gyms” in the game. Such a development suggests opportunities for tourism authorities and businesses to create customised mobile AR apps as innovative travel guides (Aluri 65). Research also shows that applications like Pokémon GO, through its AR, gamification and social components, can be employed by policymakers to influence different aspects of travel behaviour (Guo et al. 395). Frequent players of Pokémon GO generally possess more knowledge about their city and local attractions, as the game draws players into various locations, often beyond their usual travel routes (Williams and Slak-Valek 516).

While the game does lead players to tourist spots and historical points of interest, these visits are incidental to the game and not its primary purpose. During gameplay, users often focus intensely on the Pokémons displayed on their screens, leading to a reduced awareness of their immediate surroundings. The concept of integrating distinct sites as interactive spots offers insights for this project. By emphasising unique features around waiting areas in transport hubs, *Hubble* encourages travellers to discover and appreciate unnoticed aspects of their surroundings. Drawing inspiration from Pokémon GO’s wayspot eligibility criteria (Niantic), which chooses places that are ideal for exploration, exercise and social interaction, this

project uses a similar yet adapted set of criteria to identify unique feature zones within transport hub environments.

3.0 Methods & Design Process

3.1 Double Diamond

The Double Diamond is a visualised model that communicates design process to a diverse audience in a simple way. It illustrates the method of broadly and deeply examining an issue using divergent thinking, followed by implementing focused action through convergent thinking (Design Council). While the UK Design Council popularised the Double Diamond, the framework has roots in the contribution of pioneers in problem-solving theories and design practice (Eisermann). Dewey advocated for combining experience with inquiry, suggesting that encountering new and unfamiliar situations through experiences leads to problems that stimulate thinking, and that overcoming these challenges drives intellectual growth (79). Alex Osborn and Sid Parnes developed the “Osborn-Parnes Creative Problem Solving Process”, the classic five-stage model includes fact-finding, problem-finding, idea-finding, solution-finding and acceptance-finding. Osborn recognised that his models could not perfectly capture the complex and often chaotic nature of creativity, noting that creative problem-solving does not follow a linear path; it involves moving back and forth between stages, such as starting with guesses, revisiting facts after incubation, and refining ideas consistently (qtd. in Guren).

Bánáthy illustrates the dynamics of design that involve the interaction of divergence and convergence (Fig. 8). In the exploratory phase, there is a divergence where various boundaries, options, values and ideas are considered, followed by a convergence phase of narrowing down choices to form a future system. This pattern repeats across different aspects of design, where multiple options are considered and then refined to select the most suitable solution (Bánáthy 73). The Double Diamond distils foundational theories and practices into a visual framework, comprising four main phases: Discover, Define, Develop and Deliver. Among various iterative design models, it emphasises the importance of the Discover phase. This

initial stage in the innovation process often involves forming ideas in an unstructured manner (Joore and Brezet 95). Divergent thinking in this phase aligns with this project's initial stages, which began with "profound boredom" that led to creativity through thinking anew. The Double Diamond model effectively encapsulates this development journey from ideation to realisation (Fig. 9). Additionally, other similar cyclic iterative design approaches offer a nuanced perspective to complement the method.

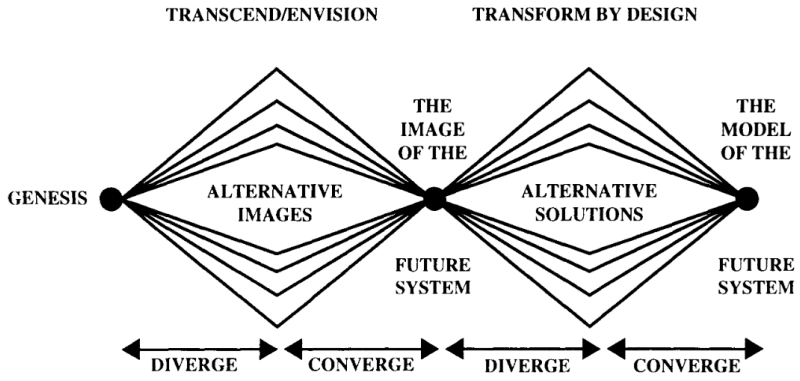


Fig. 8. Bela H, Bánáthy, *The Dynamics of Divergence and Convergence*, 1996, *Designing Social Systems in a Changing World*. Springer US, p. 75

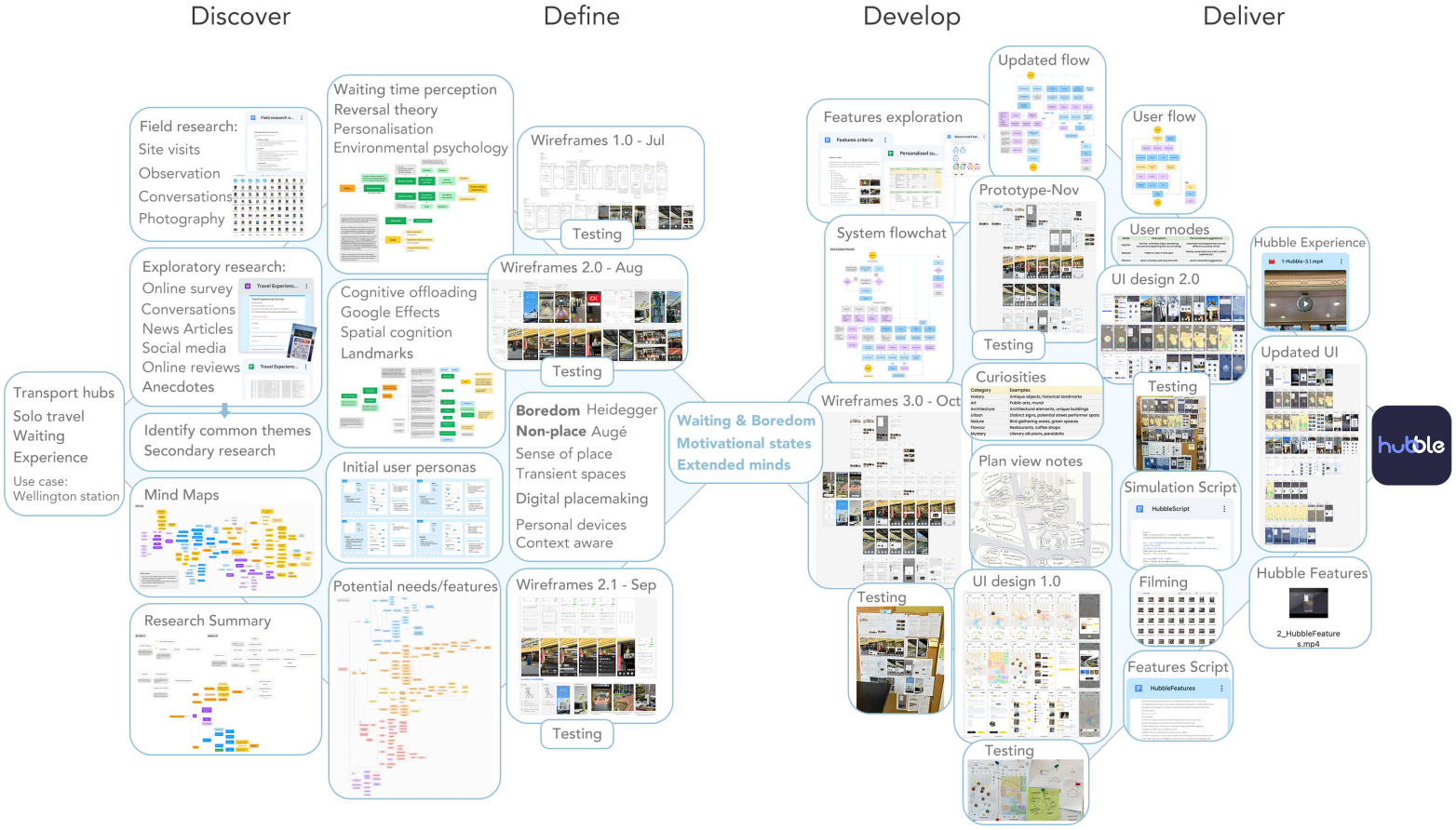


Fig. 9. *Development Process of Hubble Presented through Double Diamond*, work by author, 2024.

3.2 Discover

The Discover Phase starts from an initial idea or a moment of inspiration, and deeply engages with the problem through comprehensive research. It involves conducting exploratory research using various methods, such as field visits and reviewing existing studies to gain insights into the problem. This stage resembles the “reflection” phase in the Multilevel Design Model. It could begin with finding a problem, or a negative evaluation of the existing situation; alternatively, it could start by recognising an opportunity, or a positive assessment of potential future developments (Joore and Brezet 94). The inspiration for this project emerged while waiting alone in different airports and train stations, leading to the exploration of solo travel experience at transport hubs. Wellington Railway Station is used as a case study for the design and a primary location for conducting field research.

3.2.1 Field Research

Field research requires researchers to immerse themselves in natural settings for observation and interaction, directly experiencing the emotions and situations they study (Pontis 37). During the exploratory phase, field research was conducted at Wellington Railway Station by blending in as a passenger. This involved observing the surroundings and people at varying conditions of time and weather, capturing environmental details through photos and videos (Fig. 10), and occasionally engaging in spontaneous conversations with other travellers, often during travel disruptions. This immersive approach, combined with divergent thinking, was used to understand the transport hub experience from different perspectives. The initial findings identified problems in three major areas: general confusion in the local transport system, some difficulties in wayfinding and certain negative perceptions towards long waiting time. It was observed that most people engaged with their mobile phones while waiting. Informed by the insights from existing studies, various mobile applications, including digital maps, virtual assistants, and location-based games, were downloaded and tested during field research, along with other exploratory research approaches.

Fig. 10. *Wellington Station at Different Times of Day*, photograph by author, 2023.

3.2.2 Exploratory Research

Exploratory research aims to clarify ambiguous problems by enhancing the researcher's understanding without yielding definitive conclusions. The type of research begins with a broad concept, serving as a tool for identifying potential focus areas for further investigation. It emphasises the flexibility in adjusting the study's direction based on emerging insights or information (Bhat).

As the field research conducted at a single transport hub presented certain limitations in its applicability to broader contexts, an online survey was conducted to gather additional insights from a worldwide audience. At this preliminary stage, the survey questions were general, with only the responses to two open-ended questions offering some perspectives and anecdotal information for the subsequent literature search. Responses to the question, "How has the use of personal devices influenced your travel experiences?" indicated that personal devices not only make travel easier but also provide a sense of safety and reassurance. The theories outlined in section 2.4.1 Cognitive Extension explained this phenomenon, which discusses that people integrate external tools into their cognitive system to extend daily performance (Clark and Chalmers 7) and the perception of smartphones as self-extension in the digital age (Park and Kaye 217). Some responses suggest that smartphones could be "both a tool and a distraction", which led to the exploration of theories in section 2.4.4, Rethinking Navigation, and the principle of calm technology. Calm technology focuses on designing technology that integrates into the periphery of people's attention without causing distraction or stress (Weiser and Brown). The design of this project was subtly influenced by this concept.

To find common themes in the transport hub experience, anecdotal information was gathered from various sources. This included responses to another open-ended question within the survey that collected the best and worst experiences at transport hubs. Additional sources included social media platforms, news articles, discussions with others, and online reviews.

The most common issues in the negative experiences mainly involve delays and travel disruptions, while positive experiences are often associated with help and kindness from other travellers. Mind mapping was used to organise information and brainstorm ideas at this stage (Fig. 11). User personas were initially created to categorise potential users by type of traveller. However, it soon became clear that a more systematic approach was necessary to analyse travellers' preferences and needs. Through literature reviews, the reversal theory was found suitable to apply in this context to understand travellers' shifting motivational states, as discussed in section 2.3, Motivation in Motion.

Fig. 11. *Mind Mapping at Early Stages*, photograph by author, 1 Jun 2023.

3.3 Define

During the Define phase, insights and ideas from the Discover phase were examined, selected, and then refined into specific problems that provide more context than the initial problem. In the Multilevel Design Model, this stage is referred to as the "analysis" phase, where an ideal situation is broadly conceptualised, and what the new scenario requires is identified (Joore and Brezet 94). At this stage, the project moved into a convergence phase, with a focus on narrowing and defining the scope. The common theme found in the exploratory research indicated that negative experiences at transport hubs often involve extended waiting times, with "boredom" frequently mentioned within this context. Wireframes were created and iteratively refined to test the conceptual ideas and further examine the identified problems. From the initially broad areas of general confusion, wayfinding and waiting, this phase narrowed down the focus to the experience of waiting and the associated phenomenon of boredom in such scenarios.

3.3.1 Wireframes and Iterations

Wireframing is a process used by designers to sketch overviews of interactive products, thereby establishing the structure of potential design solutions (Interaction Design Foundation). The initial idea of this project was to create a virtual hub assistant that provides personalised guidance and suggestions by using the context-aware capabilities of mobile devices. The personal experience from the aforementioned "62-hour odyssey" with significant delays was re-examined and analysed to develop scenarios and user personas for the first wireframe (Fig. 12). As the passengers from the same flight formed a group chat during the long delays, reviewing the chat history has provided insights into the potential needs of travellers in waiting situations. However, the design scope at the time, aimed at offering a comprehensive solution for enhancing the transport hub experience by addressing common issues of confusion, wayfinding, and waiting, led to an ambiguous direction. Testing of the initial wireframe revealed many

shortcomings, including a lack of uniqueness and innovation, since it mainly provided information, which could also be available through physical signage, interpersonal interactions, or existing applications.

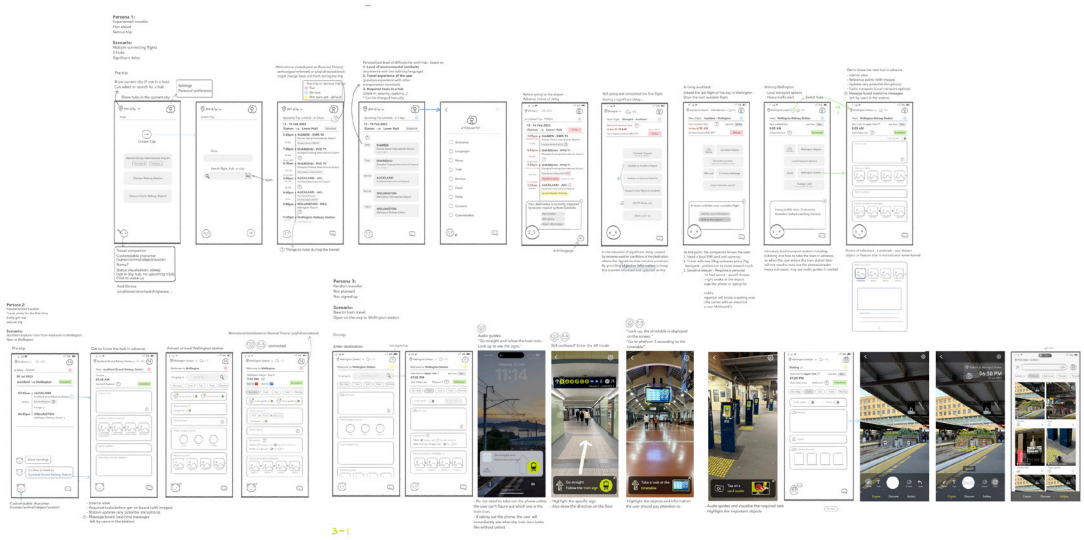


Fig. 12. *First Wireframe*, design by author, Jul 2023.

Reflecting on the insights from evaluating the initial wireframe, the exploration continued. During ongoing field research, a new idea emerged when observing some travellers taking photographs in particular station areas with unique features. While famous tourist attractions always gather people, these smaller features often go unnoticed. In *The Art of Travel*, De Botton finds a subtle and profound form of exoticism in the mundane details that differ from one's usual environment. He highlights how something as simple as a sign at an airport, which might be overlooked by the casual observer, can evoke a sense of the exotic. The joy of travel comes not from escaping to a radically different world but from noticing and appreciating the small deviations from everyday norms to which one is accustomed (57). By considering every distinct element as a tiny attraction, they could act as smaller hubs within a transport hub. The second wireframe (Fig. 13) added this concept into the AR explore feature, with feature spots being interactive points among travellers. The evaluation of the second wireframe discarded one of the previous problem areas of "general confusion in

the local transport system”, and guided the direction towards a deeper exploration of the concept of “place”. This led to the research on the sense of place, placemaking, and the role of technology in shaping urban space, as elaborated in 2.2, Transient Spaces.

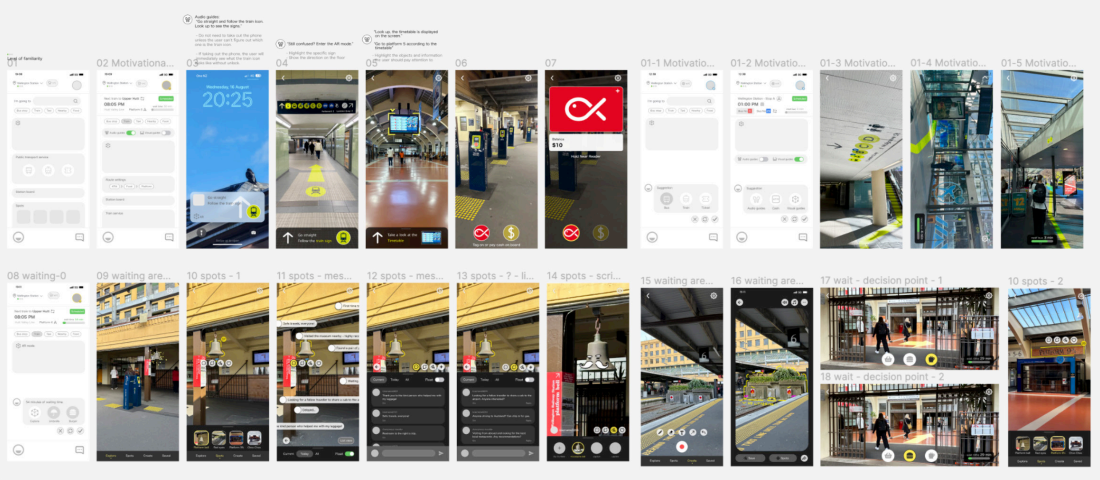


Fig. 13. *Second Wireframe*, design by author, Aug 2023.

The refined iteration of the second wireframe (Fig. 14) narrowed the design scope to waiting experiences at transport hubs. It examined essential needs in such contexts and kept the feature of providing suggestions. Acknowledging users’ possible need for navigation to reach the suggested locations, three modes of wayfinding were designed based on the theories discussed in section 2.4.4, Rethinking Navigation. The audio experience was initially considered to add playful elements to the place. However, as the aim is to encourage the engagement of the user’s physical surroundings, which includes the ambient sounds, the audio aspect was later refined to simply aural feedback that supports the visual experience in one of the wayfinding modes.

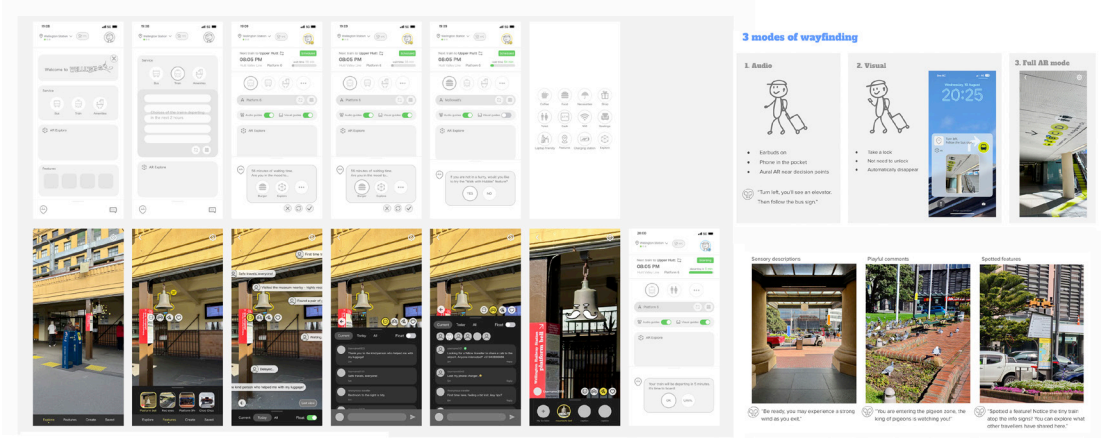


Fig. 14. *Refined Second Wireframe*, design by author, Sep 2023.

3.3.2 Features

Through ongoing field research, wireframe testing, and literature reviews, the main features of the app have been broadly defined. The discussion in Section 2.1, Waiting and Boredom, outlines the general goal of the project: to find inherent values in the process of waiting and the potential opportunities presented by boredom. Section 2.2, Transient Spaces, explores the sense of place, digital placemaking, and forms of presence in public spaces, revealing that a sense of place arises from emotional connections to the place and is shaped by human experiences and stories. Integrating these insights with Section 2.4.4, Rethinking Navigation, which highlights the importance of landmarks in spatial cognition, leads to the feature considering landmarks, including any distinct objects or features in the transport hub environments, as interaction points for travellers to explore and leave traces. Theories in Section 2.3, Motivation in Motion, have helped to understand the traveller's shifting motivational states between goal-oriented and activity-oriented, which guided the project to consider different modes for the traveller's changing needs. The context-aware capabilities of personal devices, discussed in Section 2.4.3, Context Awareness, led to the feature of providing personalised suggestions based on the user's waiting time, location and walking speed. Following this, the project moved into the Develop phase.

3.4 Develop

During the Develop phase, design solutions were generated, guided by insights from previous stages and drawing inspiration from diverse sources. New wireframes were created and shared with more people for feedback, which then led to further refinement and the development of a prototype for testing using the interface design tool Figma.

3.4.1 Wireframes and User Flows

The third wireframe (Fig. 15) was developed based on the defined concept of features. It initially included a virtual character, which was later removed due to insufficient evidence of its necessity and concerns that it might overly distract users. An initial system flowchart (Fig. 16) was created to organise the functionality of all features and was revised multiple times to reduce complexity. The main features in this version include “Essentials and Experiences”, which display context-relevant suggestions at the forefront; a feature named “Features” that lists distinct elements within the environment; “AR Explore”, allowing users to discover and leave traces around feature areas; and “Lounge”, which shows these traces in a chatroom-like format, and categorise the chat channel by feature zones. It also considered users’ various moods, along with different modes for using the app.

This version, when presented to more people for discussion, yielded interesting insights into what people do when they are waiting and bored. Inspired by this and integrating research by Murphy et al., which suggests that boredom can be a shared state that fosters communal reflection and the discovery of shared interests (289) as discussed in Section 2.1, Waiting and Boredom, a new feature was added for people to be “bored together”. The feature enables travellers to share their experiences of boredom, serving as a creative board for waiting times. The feedback also led to further consideration of how to simplify and personalise the user experience, as the wireframe was still perceived as complicated and presented too much information at once.

Fig. 15. *Third Wireframe*, photograph by author, Oct 2023.

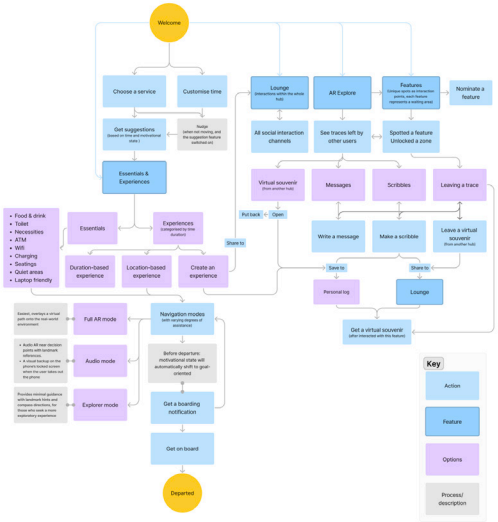


Fig. 16. *Initial System Flowchart*, design by author, Nov 2023.

3.4.2 Prototyping and Testing

The third wireframe was refined and made into a Figma prototype (Fig. 17) for testing. Redundant information was removed, and considering the mobile phone's capability to calculate waiting time, distance and walking speed, the suggestion feature was refined to offer one single, time duration-based suggestion each time to reduce choice overload. Time duration tags were added to both the suggestion cards and the experiences shared by users to enhance the relevance. A new mode of wayfinding was added for users in the explorer mode, which only provides landmark-based clues and compass directions.

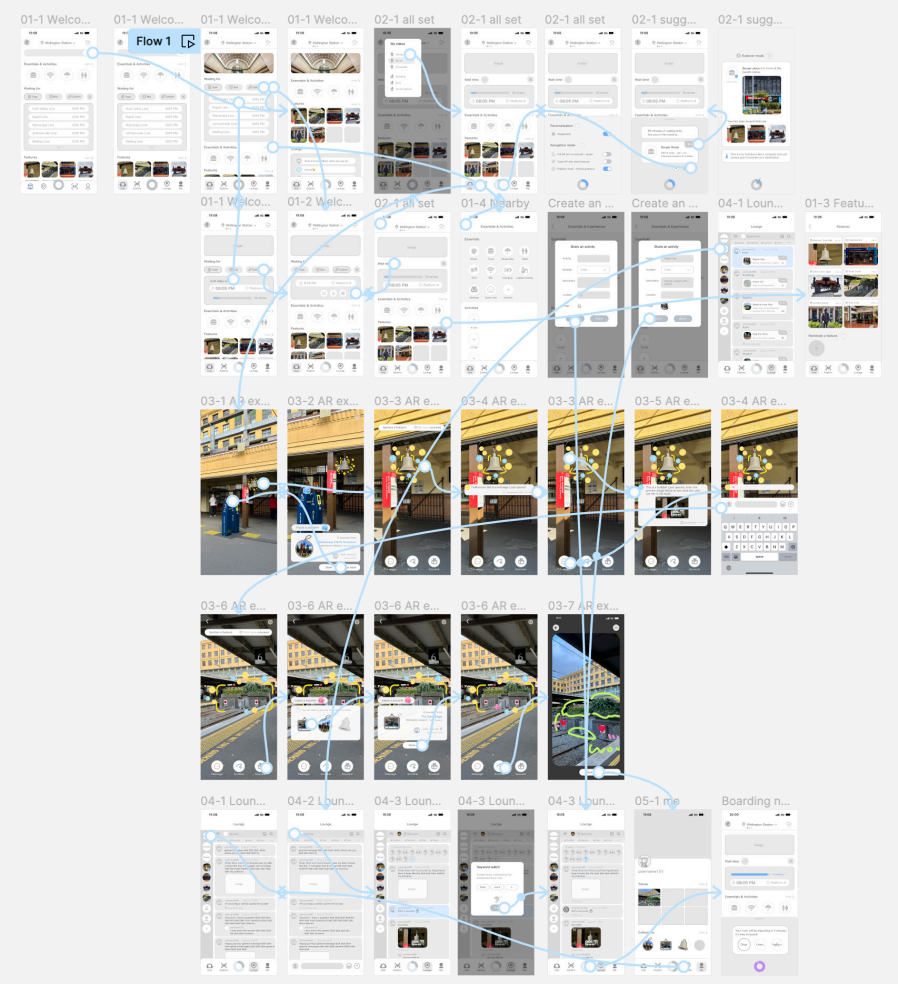


Fig. 17. *Refined Third Wireframe as Figma Prototype*, design by author, Nov 2023.

3.4.3 Location of Curiosities

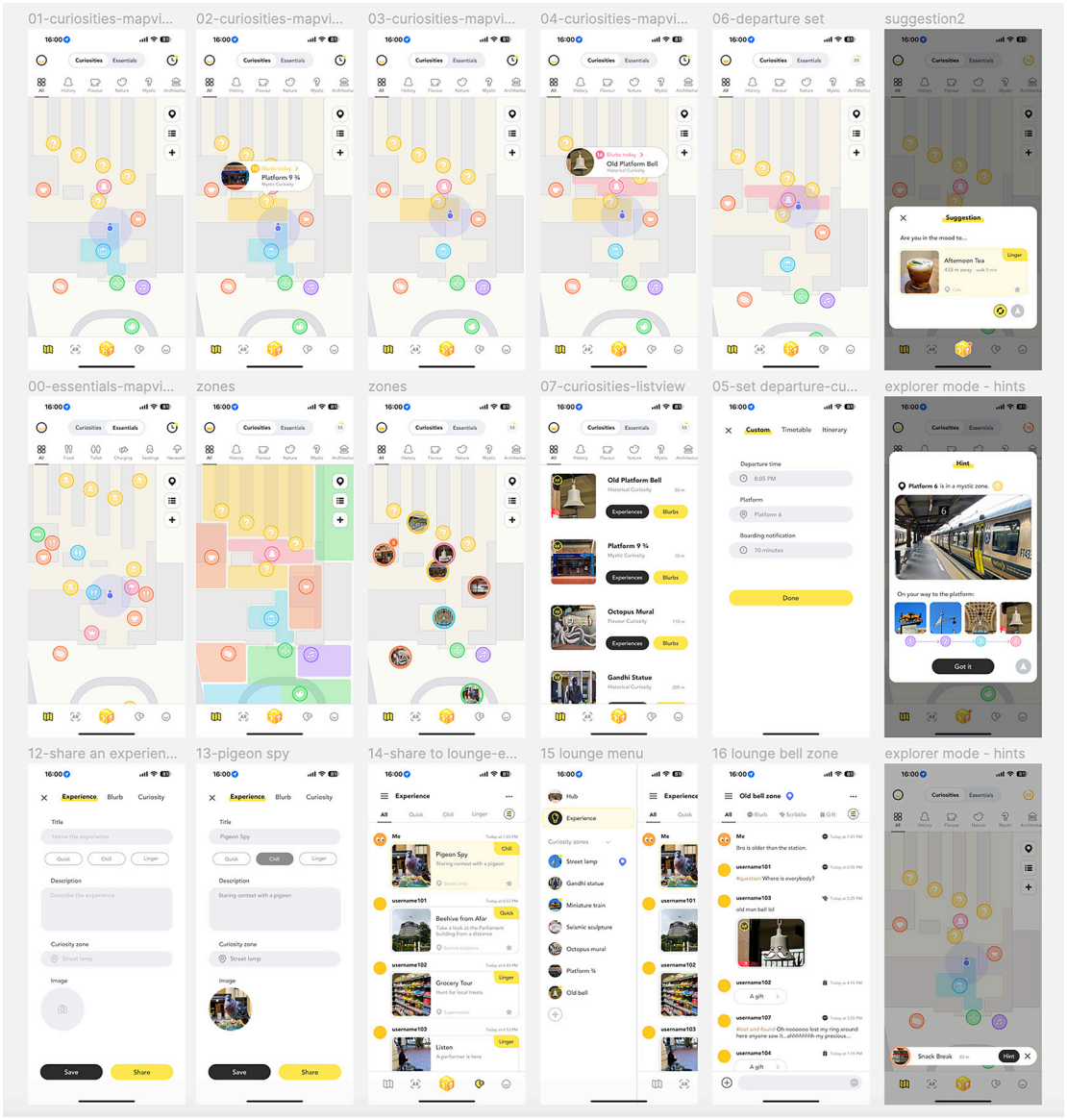
While distinct elements within transport hub environments have been an essential concept linking the main features of the app, its name needed further consideration. Inspiration was drawn from the Cabinet of Curiosities, also known as Wonder Rooms, which were early precursors to modern museums displaying diverse collections of art and natural objects. These collections are unique and eclectic, reflecting the collectors' perspectives and knowledge of the world (Wallentine). Similarly, landmarks and features around transport hubs, each with their own stories and history, can be considered locations of curiosities. De Botton suggests that curiosity in travel means being open to the unexpected and finding wonder in the mundane, by noticing the seemingly trivial details that give a place its character and charm (84). "Curiosities" in *Hubble* range from iconic landmarks to subtle, unique finds within the transport hub environment. Each curiosity represents a waiting zone for exploration, relaxation or socialisation, with seven categories listed in the table (Fig. 18). Pokémon GO's wayspot eligibility criteria (Niantic) served as a precedent to establish the criteria for these curiosities. During field research at Wellington Railway Station, the location of curiosities and other essential spots were recorded in the plan view (Fig. 19). This was also informed by continuous observations of the areas where people tend to linger or take photographs throughout the year.

Category	Examples
History	Antique objects, historical landmarks
Art	Public arts, murals
Architecture	Architectural elements, unique buildings
Urban	Distinct signs, potential street performer spots
Nature	Bird gathering areas, green spaces
Flavour	Restaurants, coffee shops
Mystery	Literary allusions, pareidolia (finding faces)

Fig. 18. *Curiosities Categories*, work by author, Feb 2024.

Fig. 19. *Field Research Notes*, work by author, Feb 2024.

The user interface was redesigned (Fig. 20), featuring a plan view that integrated zones of curiosity and essential locations. Information within the interface was reorganised and visualised to reduce complexity. The initial map view interface showed all the curiosity spots at once, which could diminish the sense of mystery and exploration, and led to some confusion during testings. Two user modes were considered based on users' motivational states. For explorers, who are activity-oriented, the curiosities map is designed to offer a more game-like experience; for goal-oriented users, the essentials map provides quick access to essential spots. The idea was to adjust the app's playfulness based on the user's available time; the less time they have, the more straightforward the app should become. However, due to the interfaces being in an incomplete state, these concepts were not fully conveyed. Therefore, the subsequent refinement aimed to make the discovery process interesting, and define the functionalities for different states of users more clearly.



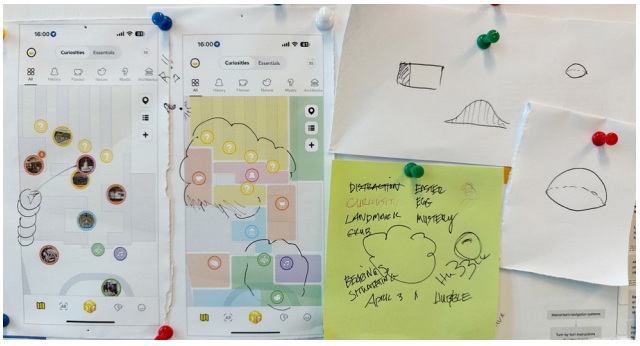


Fig. 20. *Initial User Interface and Testing Notes*, design by author, Feb 2024.

3.5 Deliver

In the Deliver phase, the design solutions are becoming clear. In the Multilevel Design Model, this stage is known as the “experience” phase. To simulate the new concept in reality, it introduces a new scenario with unique features to be experienced. Various formats such as prototypes, models, or simulations can be used to assess the design solution, which then leads back to the initial reflection phase (Joore and Brezet 95). A positive evaluation concludes the design process, and a negative outcome may initiate another cycle of design (Fig. 21). During this phase, the project refined the user interface, found new ways to present the concept, and conducted more user testing to evaluate the design. The name *Hubble* was selected, as it includes “hub” that represents transport hubs; it is commonly known as the Hubble Space Telescope, which reflects the spirit of exploration; and according to its definition in the Collins English Dictionary, “a small hump, as on the surface of ice or a road” (“Hubble”), it could be a metaphor for unexpected moments in a journey, which align with the project’s idea of small disruptions inspiring new insights.

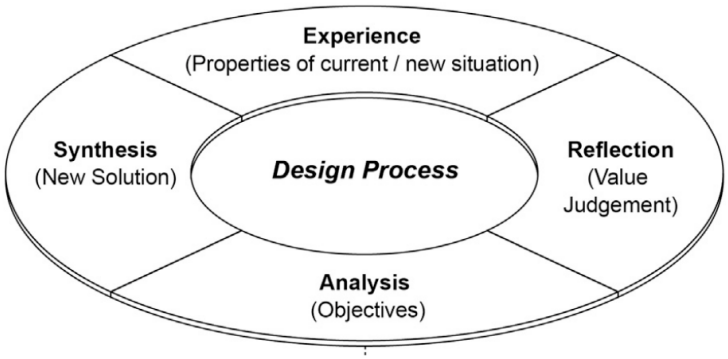


Fig. 21. Peter Joore and Han Brezet, *Typical Design Cycle as applied in Multilevel Design Model*, Journal of Cleaner Production, vol. 97, 2015, p. 95

3.5.1 Modes and Suggestions

Following the development and evaluation in previous phases, the user flow diagram has been revised and simplified (Fig. 22).

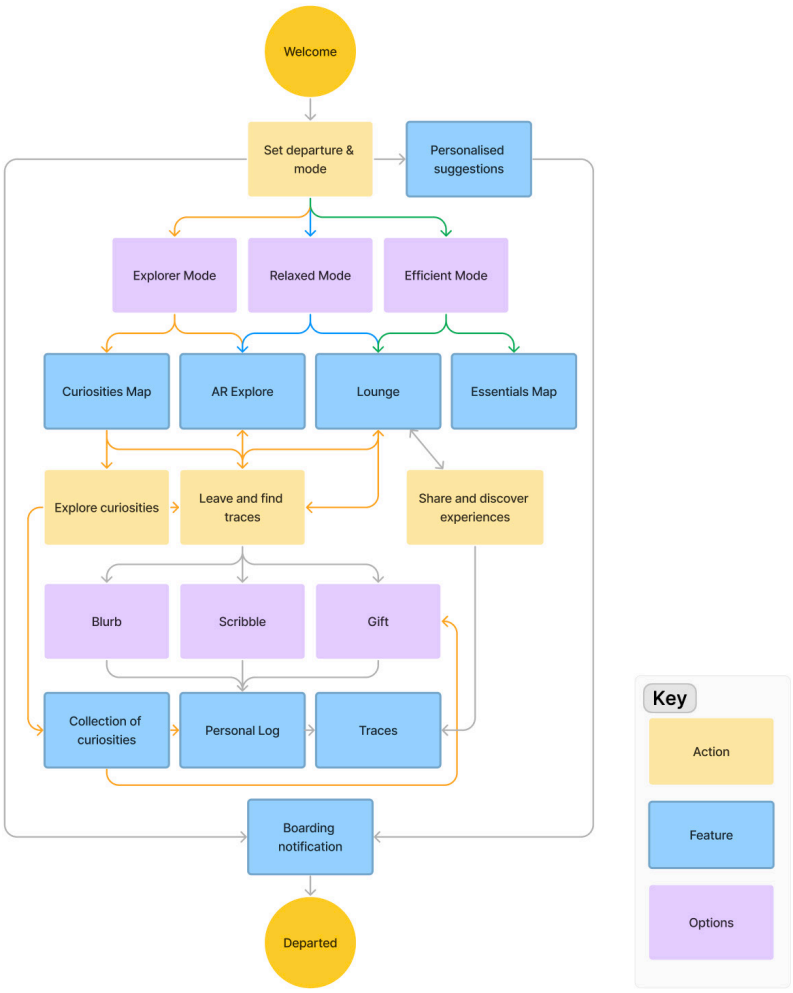


Fig. 22. *Simplified System Flowchart*, design by author, Feb 2024.

Hubble introduces three modes of using the app based on the user's motivational states and moods: Explorer, Relaxed and Efficient. The Explorer mode is designed for travellers in an activity-oriented state who enjoy wandering around and discovering new surroundings. The Relaxed mode is for moments when users are seeking rest and prefer minimal movement. The Efficient mode is suitable when travellers have less time left and like

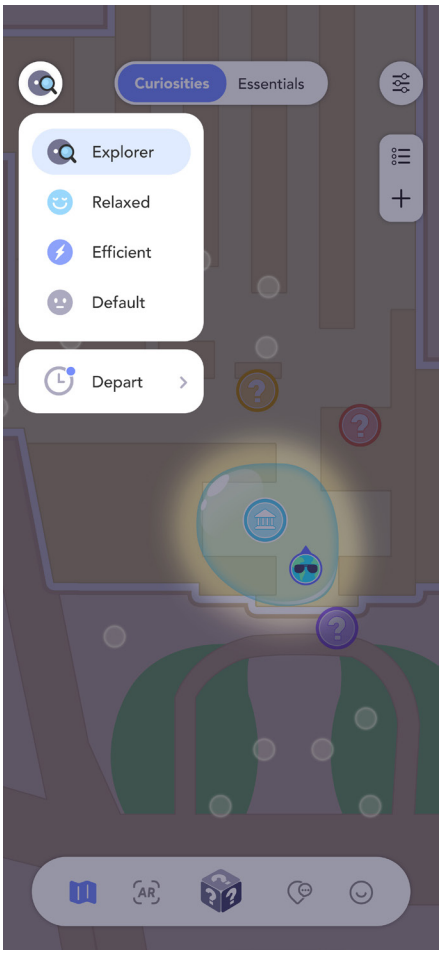


Fig. 23. *Interface for Selecting User Modes*, design by author, Mar 2024.

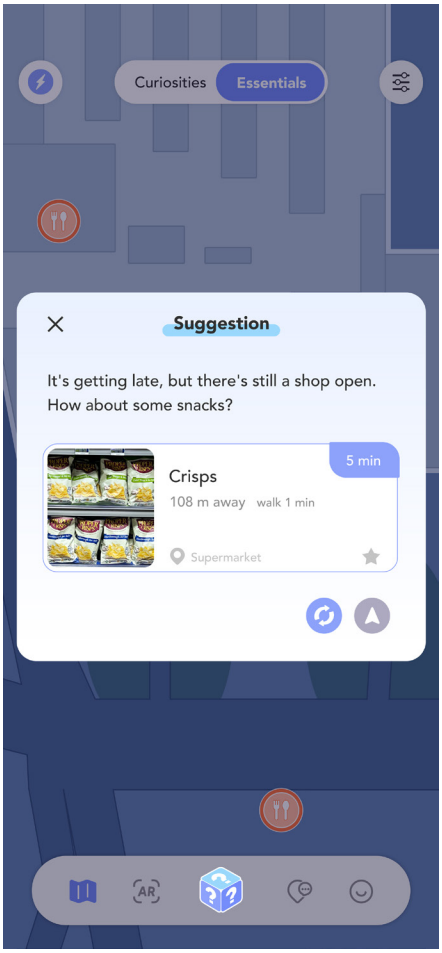
quick, essential suggestions. Since a traveller's motivational state may change, users could shift between these modes during their waits. Ideally, the system would automatically detect the user's current mode; as current technology may not guarantee full accuracy in identifying people's mood, the mode can be adjusted manually (Fig. 23). The suggestion feature is personalised based on the user's current mode, as detailed on the table (Fig. 24), and combining other factors such as waiting time, location, potential motion data, time of day and weather condition. The suggestion cards were initially tagged with time durations in all modes, but considering time is being managed in the background, the focus could be shifted away from clock-watching towards enjoying the experience. The label was

Mode	Description	Personalised Suggestions
Explorer	Activity-oriented, enjoy wandering around and exploring the surroundings	Essentials and experiences across different curiosity zones
Relaxed	Prefer to stay in one spot	Nearby essentials and calm, restful experiences
Efficient	Goal-oriented, with less time left	Quick, essential suggestions

Fig. 24. *User Modes and Suggestions*, work by author, Mar 2024.

later updated to ‘Quick’, ‘Chill’ and ‘Linger’ in the Explorer and Relaxed mode (Fig. 25). Additionally, users with privacy concerns or those less interested in personalisation will be in default mode, where suggestions are based only on known factors such as time of day and weather conditions.

Suggestion in Efficient mode



Suggestion in Explorer mode

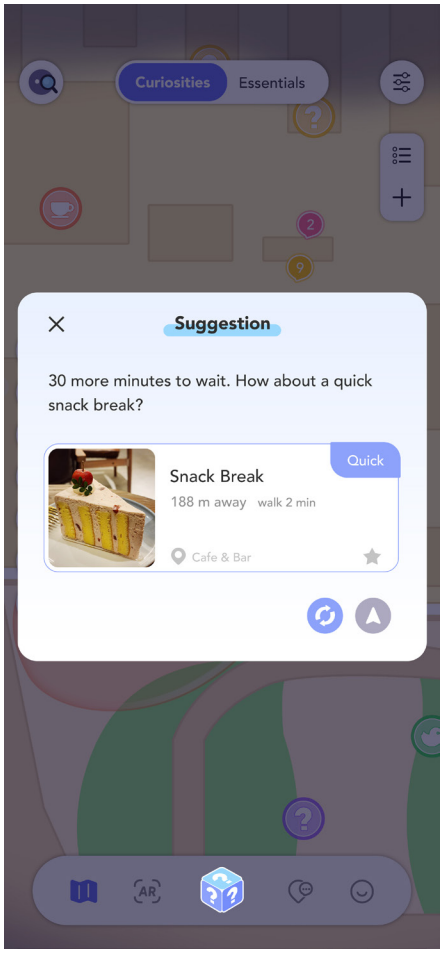


Fig. 25. *Interfaces for Personalised Suggestion in Different Modes*, design by author, Mar 2024.

3.5.2 Exploring Curiosities

The interfaces of the curiosities map were redesigned to enhance the discovery experience (Fig. 26). It starts with the user's current zone, which is presented as a bubble. Each bubble represents a zone of curiosity, categorised into one of seven themes. As the user moves into a new zone, a corresponding new bubble appears. Users can see curiosity spots in their adjacent zones, while other unexplored areas are covered in shade, with dimly glowing dots hinting at potential curiosities. As users explore, the curiosities are collected from the map, each curiosity spot will then display the number of traces left by other travellers.

Fig. 26. *Curiosities Map Interface*, design by author, Mar 2024.

3.5.3 Leaving and Finding Traces

Each curiosity spot serves as an interaction point where users can leave three types of traces. ‘Blurbs’ are text-based traces, ‘Scribbles’ enable users to add drawings into the AR environment, and ‘Gifts’ integrate the geocaching concept into the AR experience. Users can collect a location-based virtual souvenir from each curiosity, which will show on the collections page after each trip. These souvenirs can later be left at a different transport hub as gifts for other users to find. When a user finds a gift left by someone else, it displays on the gift page. In AR mode, ‘Blurbs’ and ‘Scribbles’ appear as floating bubbles near each curiosity, while ‘Gifts’ are presented as a gift box (Fig. 27). This feature is inspired by the earlier discussed concepts of “footprinting” (Jirón et al. 605), aiming to form invisible yet recognisable marks in a traveller’s memory, which imbue the place with emotional connections through shared experiences and stories. As the traces are attached to unique features and landmarks in the transport hub, they potentially contribute to spatial cognition (Presson and Montello 378), subtly supporting the traveller in becoming familiar with the environment.

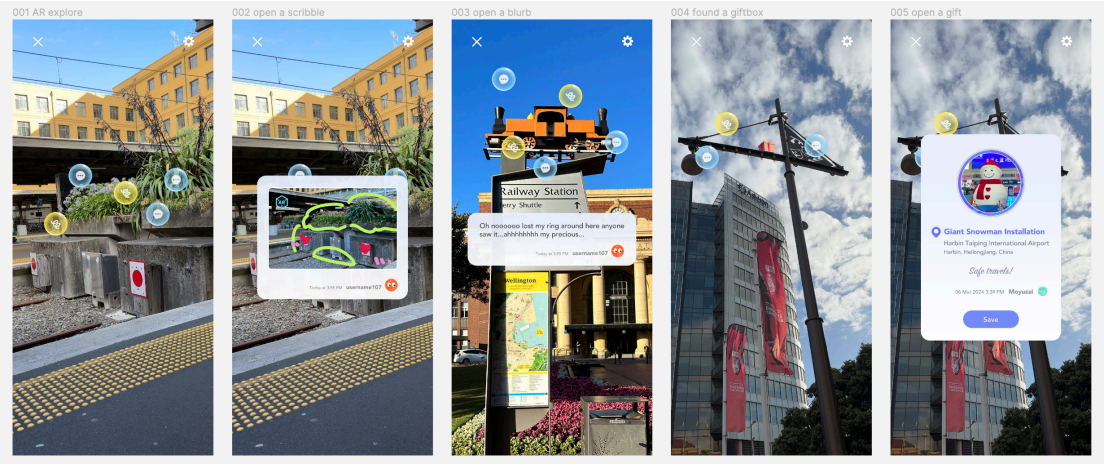


Fig. 27. *Interfaces for Leaving and Finding Traces in AR Mode*, design by author, Mar 2024.

Traces can also be left and found in the Lounge feature, which shows traces in a chatroom-like format, with each curiosity zone having a location-based channel. Users can share their experiences of boredom in the Experience channel, and interact with the entire hub in the Hub channel (Fig. 28). The design of this feature draws inspiration from chat systems in massively multiplayer online games, such as World of Warcraft, where some chat channels are assigned to specific zones and purposes, and players' interactions can be based on proximity. The Lounge feature is suitable for users in Efficient and Relaxed modes, and for travellers who like to remain in a "cocoon" (Ito et al. 73) when using public spaces.

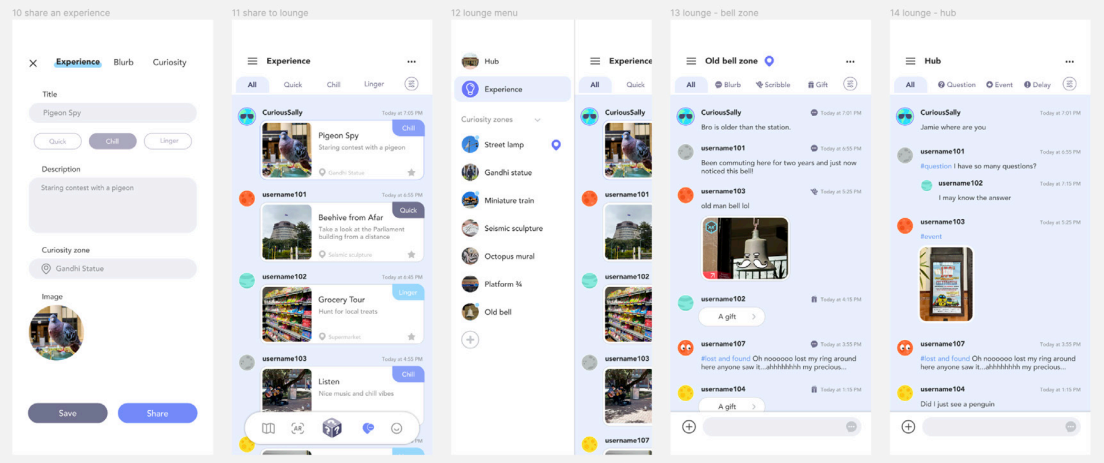


Fig. 28. *Interfaces for Sharing Experiences and Lounge Feature*, design by author, Mar 2024.

3.5.4 Essentials and Wayfinding

The essentials map categories seven types of areas: seatings, necessities, quiet zones, food, toilets, charging stations and relaxing areas. As boarding time approaches, the essentials map will gradually simplify to display only the most important spots. A filter is available to view other categories (Fig. 29). To get a boarding notification, the departure time is needed. It can be a customised time and location, selected from the timetable, or imported from an itinerary (Fig. 30).

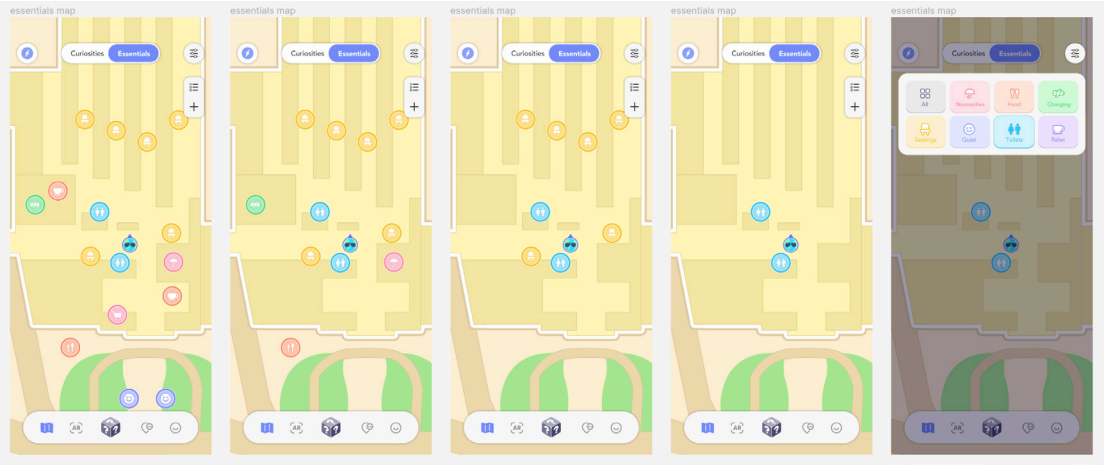


Fig. 29. *Essentials Map Interface*, design by author, Mar 2024.

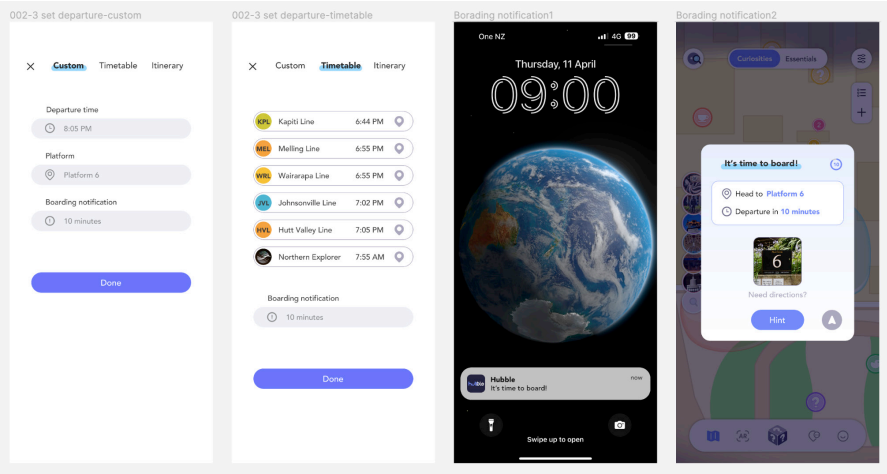


Fig. 30. *Interfaces for Setting Departure and Boarding Notification*, design by author, Mar 2024.

There are three wayfinding modes with varying degrees of assistance and interaction. The easiest is the AR navigation mode, which overlays a virtual path onto the real-world environment and highlights the existing signage (Fig. 31), drawing on Wang et al.'s study that suggests the integration of existing signage into digital navigation (188). The audio mode provides spoken instructions near decision points with landmark references, and is complemented by a visual backup on the lock screen that activates when the phone is taken out (Fig. 32). This mode draws insights from Ooms and Van De Weghe's research on "intuitive route descriptions" that are associated with a lower cognitive load (174). The explorer mode offers minimal guidance with only landmark hints (Fig. 33) for users who seek a more exploratory experience, as landmarks are important components in the environment that could assist navigation and facilitate the acquisition of spatial knowledge (Credé and Fabrikant 165).

Fig. 31. *Interface for AR Navigation Mode*, design by author, Sep 2023.

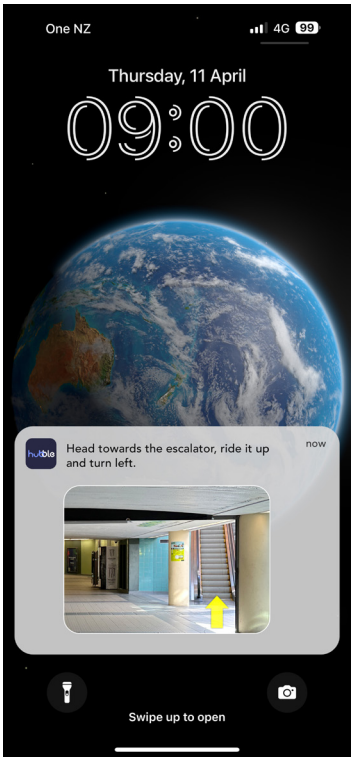


Fig. 32. *Interface for Visual Backup*, design by author, Apr 2024.

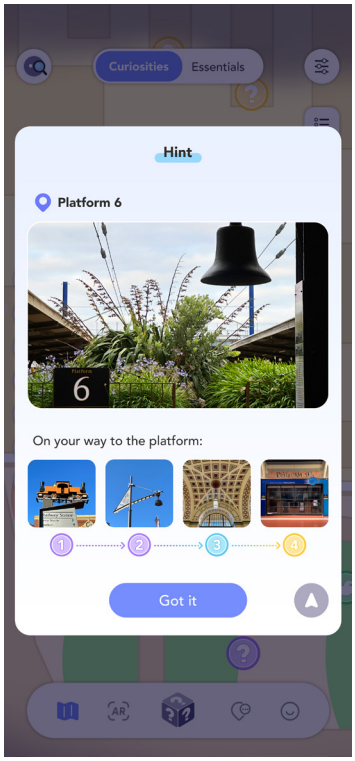


Fig. 33. *Interface for Wayfinding Hints in Explorer Mode*, design by author, Mar 2024.

3.5.5 Testing

Various approaches were explored for presenting and evaluating the project at this stage. The previous method of only showing the screens was found to be ineffective unless users were provided with comprehensive explanations of all features. Therefore, a simulation video was created to demonstrate how the app is used in real-world scenarios. Feedback indicated that the video has been effective in introducing this project. However, while it mainly focuses on the user's experience, finding a way to present detailed features and interfaces is still necessary. Additional testing methods included a simulation that involved engaging a traveller a week before their journey, asking them to look for unique features while waiting at the airport. Initially sceptical about finding such features, several features were discovered on the day of travel as the traveller paid more attention to the airport environment. This project was then introduced and discussed during their wait at the airport. A site visit was conducted at Wellington Airport to evaluate the applicability of the concept (Fig. 34). The evaluation yielded positive results and indicated the need for a user guide to provide a more detailed introduction to the user interface.

Fig. 34. *Potential Curiosities at Wellington Airport*, photograph by author, Apr 2024.

3.6 Design Outcomes

The design outcomes are presented through two videos: a simulation video that introduces *Hubble* through the user Sally's experience at the train station, and a guide video that details *Hubble*'s features and interfaces.

3.6.1 Scenario 1: Boredom and Curiosity

Sally is on a solo journey. She enters the train station with excitement for her next adventure. However, she soon learns that her train won't depart for another hour. As time slowly passes, her excitement fades into boredom.

Fig. 35. *Sally Waiting for the Train*, still from a video by author, Feb 2024.

She opens *Hubble*, and since her itinerary is already imported, the app recognises her waiting time and automatically sets her to Explorer mode. She enters AR Explore to see if anything interesting is around and spots some floating bubbles from the distance.

Fig. 36. *Entering Hubble*, design by author, Mar 2024.

Fig. 37. *Floating Bubbles in AR Explore Feature*, design by author, Mar 2024.

“That must be a curiosity spot.” Sally thinks, and decides to take a look. It’s an old platform bell. She reads the story written under the bell and finds out that the bell is even older than the train station.

Fig. 38. *Sally Reading the Mystery of the Platform Bell*, still from a video by author, Feb 2024.

Sally adds a Blurb to this curiosity, creating another floating bubble around the bell. Her Blurb is also shown in the old bell zone of the Lounge.

Fig. 39. *Leaving a Trace to a Curiosity*, design by author, Feb 2024.

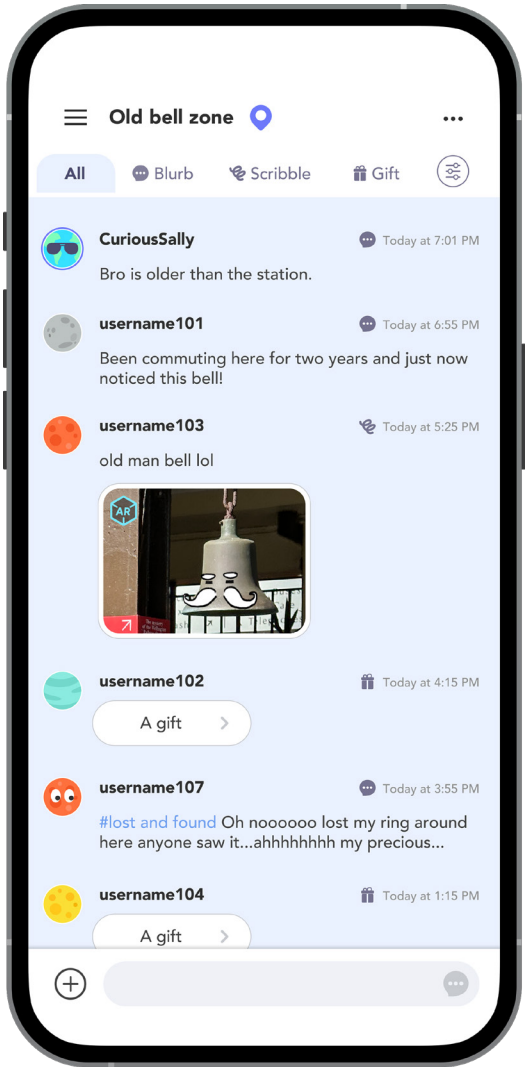


Fig. 40. *Location-Based Channel in the Lounge Feature*, design by author, Mar 2024.

Now that one curiosity is unlocked, she takes a look at the curiosities map and starts to explore around the station.

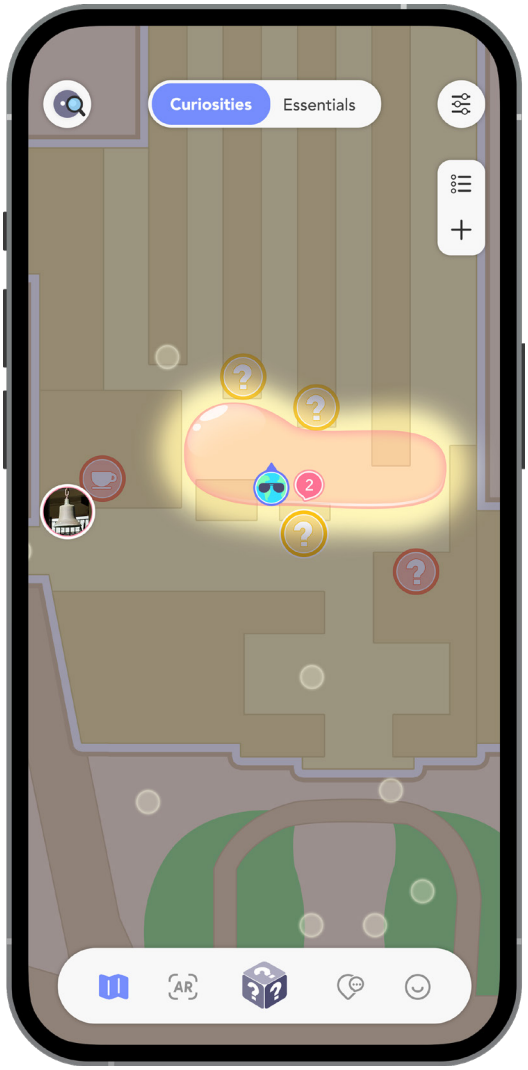


Fig. 41. *Curiosities Map with Unexplored Areas Covered in Shade*, design by author, Mar 2024.

Fig. 42. *Curiosities Map with the User Moving into a New Zone*, design by author, Mar 2024.

After exploring for a while, she has visited some curiosities. She finds a bench on the plaza and checks out what she has discovered.

Fig. 43. *Curiosities Map with Curiosities Collected from the Map*, design by author, Mar 2024.

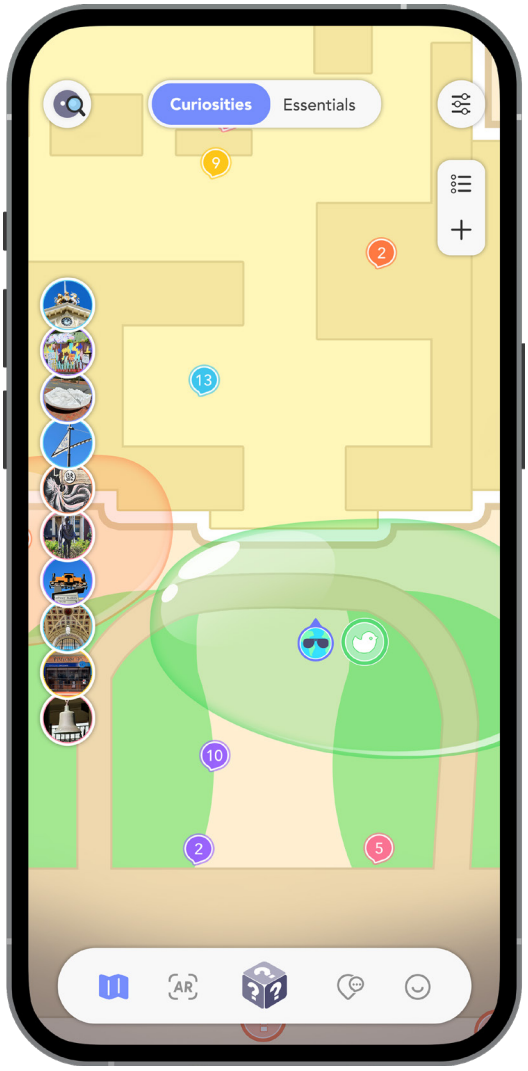


Fig. 44. *Curiosities Map with More Curiosities Collected from the Map*, design by author, Mar 2024.

These unlocked curiosities can be seen in a list view. Curious about the Seismic sculpture, she digs deeper into its story.

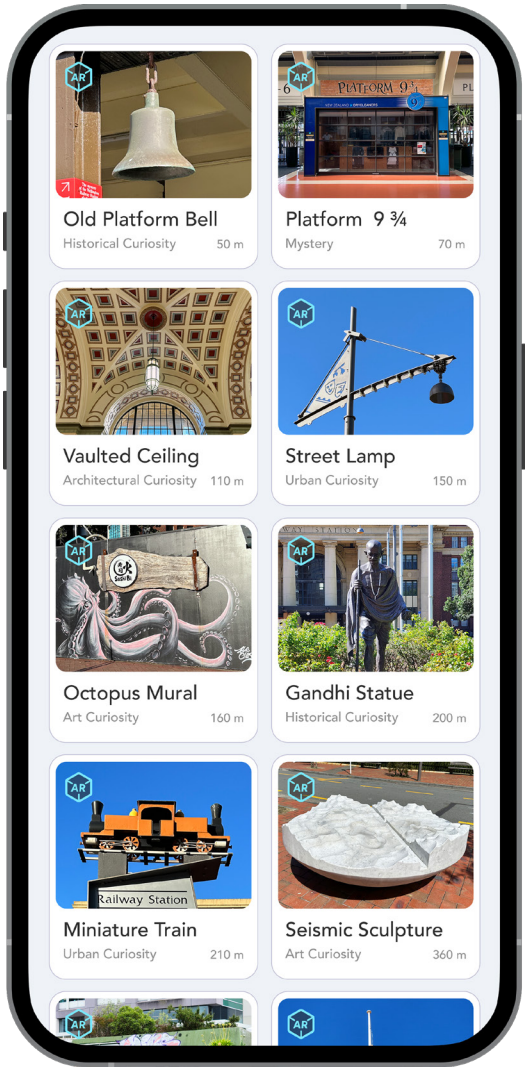


Fig. 45. *List View of Unlocked Curiosities*, design by author, Mar 2024.

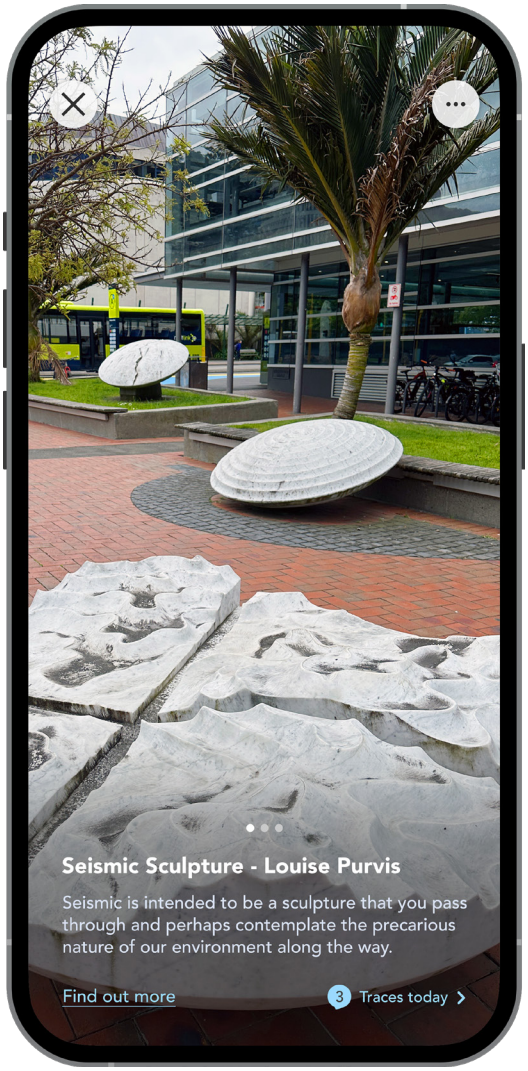


Fig. 46. *Information Page of Unlocked Curiosities*, design by author, Mar 2024.

3.6.2 Scenario 2: Connect and Inspire

Sally has been sitting on the bench for some time, and *Hubble* has switched to Relaxed mode. She is using the AR Explore to look for something in her surroundings.

Fig. 47. *Sally Scanning Her Surroundings*, still from a video by author, Feb 2024.

She spots a virtual gift box resting on the street lamp and opens it. “Aww, it’s from my home country!” The sudden connection to home brings her a warm and familiar feeling.

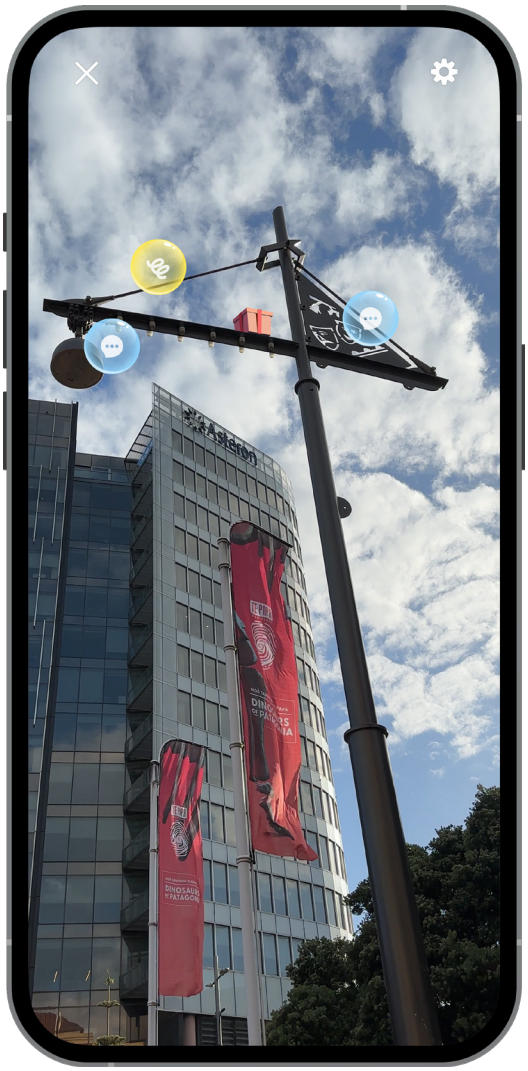


Fig. 48. *A Virtual Gift Box in AR Explore Feature*, design by author, Mar 2024.

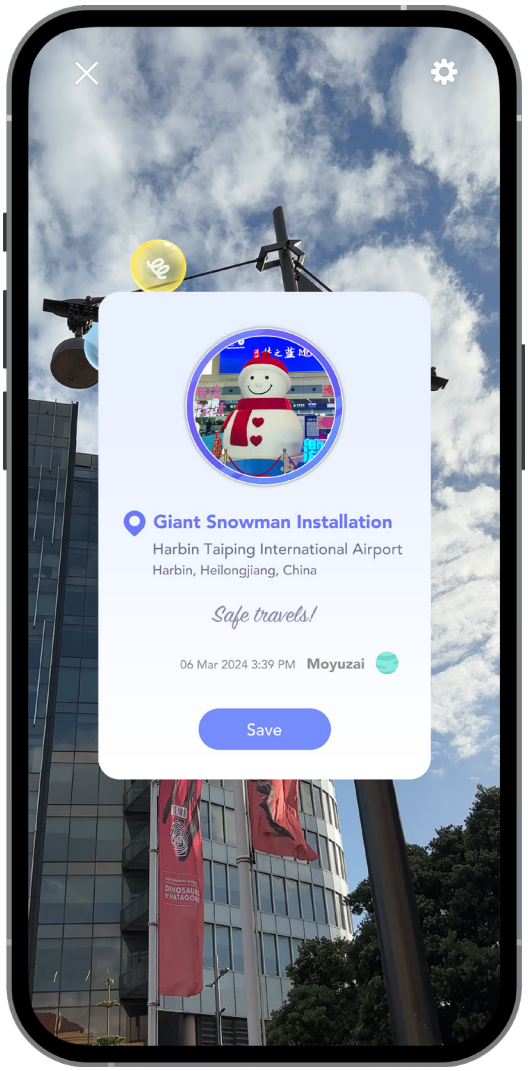


Fig. 49. *Gift Opened in AR Explore Feature*, design by author, Mar 2024.

She saved the gift and decided to leave her virtual souvenir here for others to discover. She selected the souvenir from her last trip to Queenstown Airport and put it on top of the miniature train.

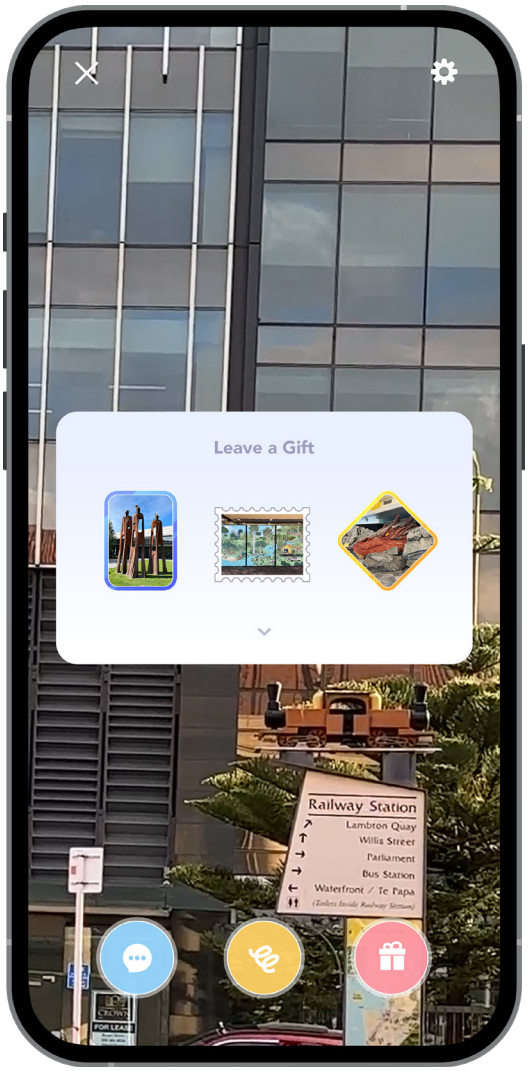


Fig. 50. *Leaving a Gift in AR Explore Feature*, design by author, Feb 2024.

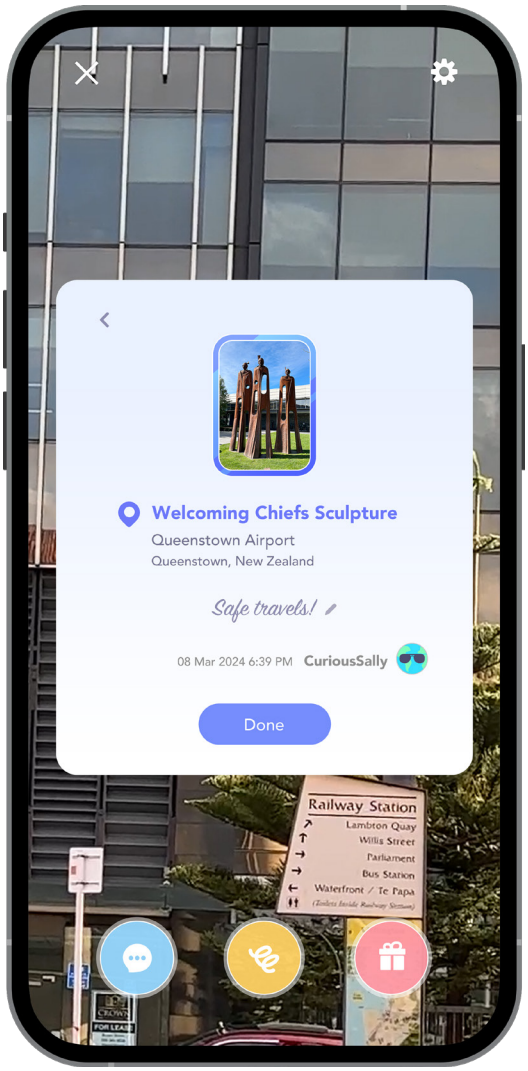


Fig. 51. *Leaving a Gift in AR Explore Feature*, design by author, Feb 2024.

Pigeons wander around the plaza, drawing Sally's attention. What might seem like a boring moment actually brings her subtle joy.

Fig. 52. *Sally Observing Pigeons*, still from a video by author, Feb 2024

She shares this experience on *Hubble* and looks through what others have shared. “Birdwatching at a burger place?” She chuckles. “I must try this.”

A suggestion pops up for an ice cream break. She is intrigued and walks towards the burger place.

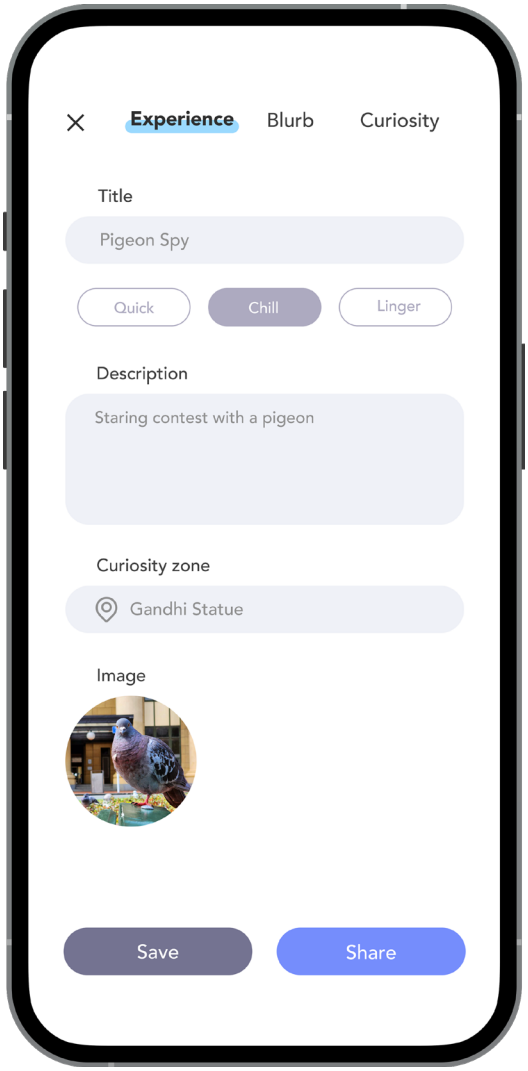


Fig. 53. *Sharing an Experience Feature*, design by author, Mar 2024.

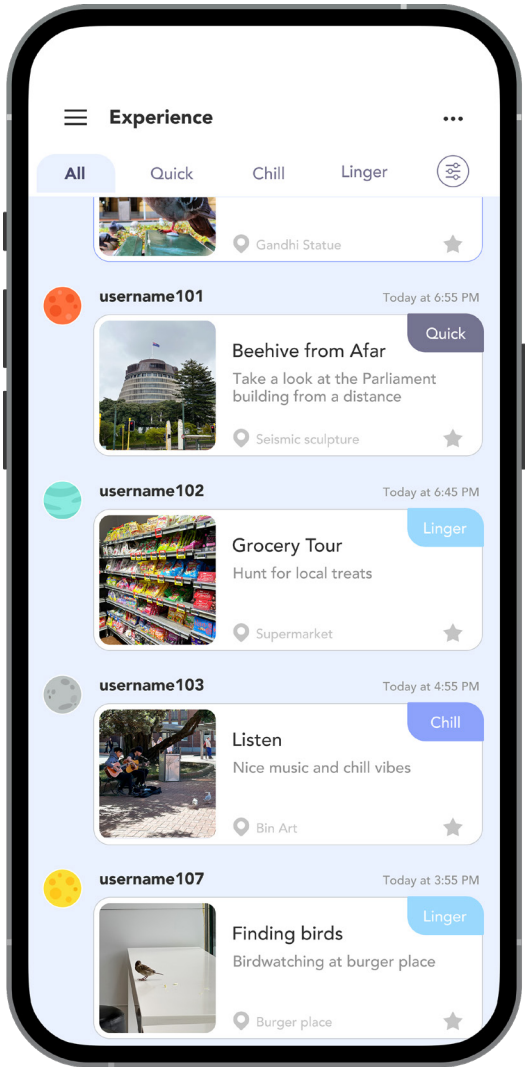


Fig. 54. *Experience Channel in Lounge Feature*, design by author, Mar 2024.

3.6.3 Scenario 3: Retrace and Remember

It's getting close to boarding time, *Hubble* switches to Efficient mode. Sally gets a suggestion to grab some snacks for the road.

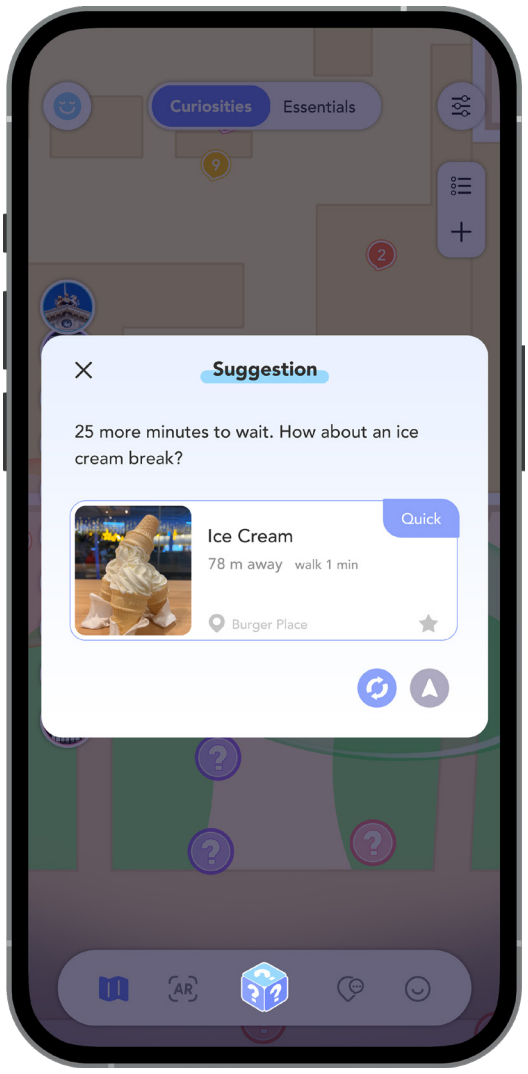


Fig. 55. *Ice Cream Suggestion in Relaxed Mode*, design by author, Mar 2024.

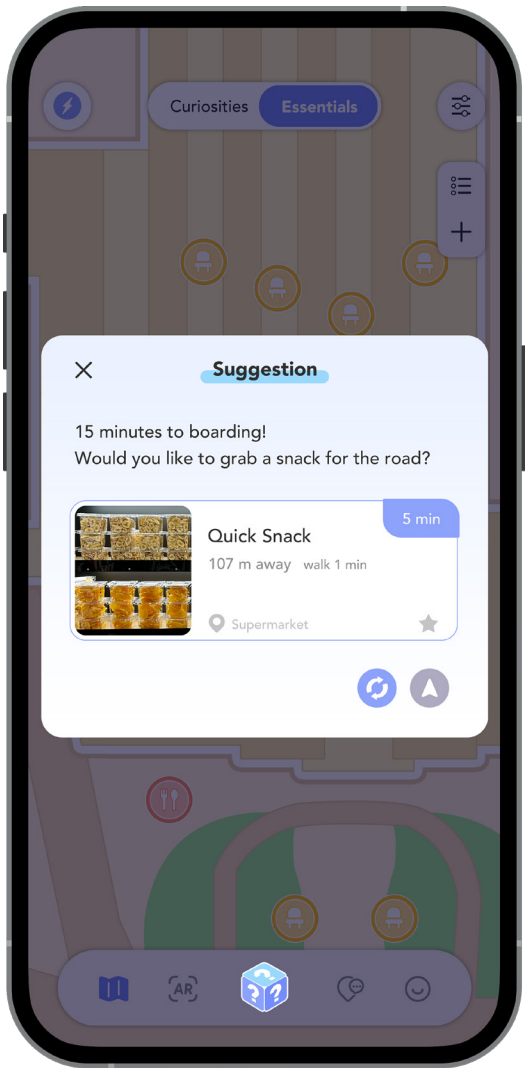


Fig. 56. *Quick Snack Suggestion in Efficient Mode*, design by author, Mar 2024.

Soon after, she receives a boarding notification. Now more familiar with the station from her exploration, she checks the hints and retraces her steps to the platform.

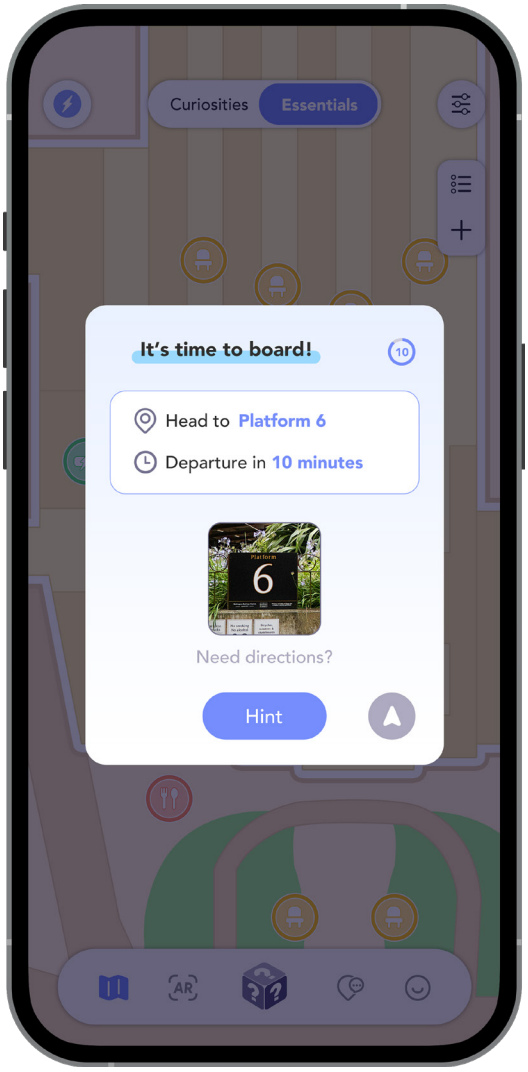


Fig. 57. *Boarding Notification*, design by author, Mar 2024.

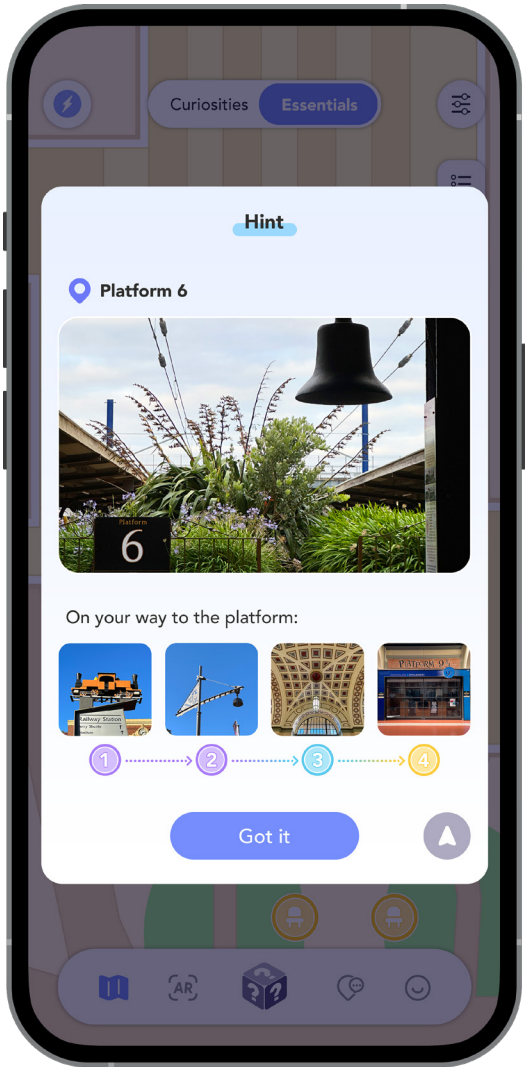


Fig. 58. *Hints to the Platform*, design by author, Mar 2024.

As the train departs, the curiosities Sally has explored show as souvenirs on her collection page, ready to be brought to the next hub.

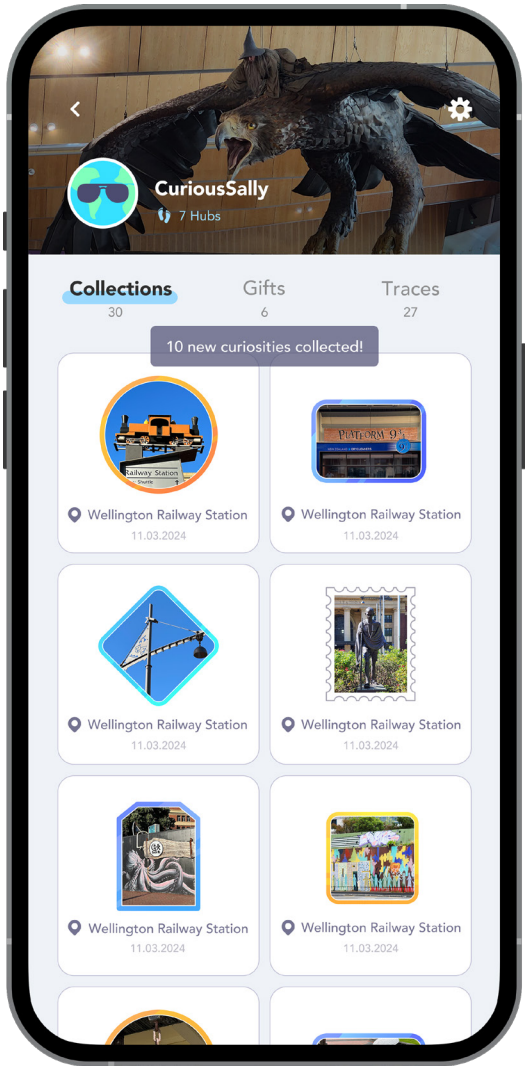


Fig. 59. *Collection Page Interface*, design by author, Mar 2024.

4.0 Conclusion

This project aims to create a positive waiting experience for solo travellers at public transport hubs, inspired by the common perception of boredom associated with waiting and the potential opportunities this time could offer. The research looked into the functional nature of these transient spaces and their experiential value in contemporary contexts. It analysed the shifting motivational states of travellers in waiting scenarios and the use of personal devices that influence interactions within these public spaces. The insights led to a design that invigorates public spaces through technology and offers travellers innovative ways to experience their surroundings. When travellers find joy in noticing subtle features, and experience the exotic in mundane details, they may become more observant and apply more attention and curiosity to other places they visit, potentially leading to a more mindful and enriching journey. The iterative design process, along with continuous field research, facilitated a multifaceted exploration of the concept of place. Each visit to previously overlooked, seemingly uninspiring locations, influenced by evolving concepts and insights at the time, led to varying perceptions of these familiar surroundings. This has also deepened my understanding of the essence of travel.

Since the research focused on boredom, the design prioritises the needs of activity-oriented travellers in Explorer mode; other modes and the essentials map might not have been as thoroughly researched and developed. Due to time and resource constraints, the user testing group was limited, which may not fully capture the diverse experiences and needs of potential users. While using a train station as a case study, applying the concept to different transport hubs will require further research. For example, adapting the design for airports should consider longer waits, potential overnight stays, and areas accessible before and after security screenings. The curiosities map could expand to cover a broader city area, and the essentials map could include more categories. However, this is an initial blueprint and a starting point for future exploration.

Reflecting on the project's limitations has presented several directions for potential future research. While boredom was the focus, anxiety is another negative feeling associated with waiting at transport hubs, often perceived by travellers in a goal-oriented state. This could lead to the development of additional user modes. The target users in this project were solo travellers, future exploration could examine other groups with special needs, such as families or children. Safety concerns could be another research direction to improve the experience for people travelling and waiting alone. While mobile apps are widely used by travellers today, the potential technological advancements may introduce new methods. Exploring new technologies or non-technological methods with similar concepts could lead to other suitable design strategies.

In conclusion, this exploration demonstrates the potential of design thinking in everyday situations, with the common experience of boredom as an opportunity for innovation. It explores the relationship between design, technology and human emotions, and introduces an innovative way of using technology to experience public spaces. The journey of this project starts with boredom and concludes with curiosity, illustrating how mundane moments offer opportunities for both travellers and designers to think and see the world from fresh perspectives.

Works Cited

Alexander, Matthew, and Kathy Hamilton. *"A 'Placeful' Station? The Community Role in Place Making and Improving Hedonic Value at Local Railway Stations." Transportation Research Part A: Policy and Practice*, vol. 82, Dec. 2015, pp. 65–77

Allan, Keri, *"Station Design: Planning for the Future." Future Rail* | Issue 105 | November 2023. 20 Nov. 2023, https://rail.nridigital.com/future_rail_nov23/station_design_planning_future.

Aluri, Ajay. *"Mobile Augmented Reality (MAR) Game as a Travel Guide: Insights from Pokémon GO." Journal of Hospitality and Tourism Technology*, vol. 8, no. 1, Mar. 2017, pp. 55–72

Apter, Michael J. *"Reversal Theory and Personality: A Review." Journal of Research in Personality*, vol. 18, no. 3, Sept. 1984, pp. 265–288

Augé, Marc. "From Places to Non-Places." *Non-Places: Introduction to an Anthropology of Supermodernity*. Verso, 1995, pp. 75-115

Bánáthy, Bela H. "Transformation by Design." *Designing Social Systems in a Changing World*. Springer US, 1996, pp. 71-77

Basaraba, Nicole. *"The Emergence of Creative and Digital Place-Making: A Scoping Review across Disciplines."* New Media & Society, vol. 25, no. 6, June 2023, pp. 1470–1497

Bhat, Adi. "Exploratory Research: Definition, Types and Methodologies." *QuestionPro*, 6 Nov. 2018, https://www.questionpro.com/blog/exploratory-research/

Buchanan, Ian M. *"The Disappearance of Boredom."* Rivista Di Filosofia, no. 23, 2017.

Cascetta, Ennio, and Armando Cartenì. *"The Hedonic Value of Railways Terminals. A Quantitative Analysis of the Impact of Stations Quality on Travellers Behaviour." Transportation Research Part A: Policy and Practice*, vol. 61, Mar. 2014, pp. 41–52

Clark, Andy, and David Chalmers. *"The Extended Mind."* Oxford University

Press on Behalf of The Analysis Committee, vol. 58, 1998, pp. 7–19.

Credé, Sascha, and Sara Irina Fabrikant. *"Let's Put the Skyscrapers on the Display—Decoupling Spatial Learning from Working Memory."* Proceedings of Workshops and Posters at the 13th International Conference on Spatial Information Theory (COSIT 2017), edited by Paolo Fogliaroni et al., Springer International Publishing, 2018, pp. 163–170

Cord, Anna F., et al. *"Geocaching Data as an Indicator for Recreational Ecosystem Services in Urban Areas: Exploring Spatial Gradients, Preferences and Motivations." Landscape and Urban Planning*, vol. 144, Dec. 2015, pp. 151–162

"Crossrail Art Programme." *Art on the Underground*, https://art.tfl.gov.uk/crossrailartprogramme/

Danckert, James A., and Ava-Ann A. Allman. *"Time Flies When You're Having Fun: Temporal Estimation and the Experience of Boredom."* Brain and Cognition, vol. 59, no. 3, Dec. 2005, pp. 236–245

De Botton, Alain. *The Art of Travel*. Vintage International, 2004.

De Vos, Jonas, et al. *"Wait Time, Travel Time and Waiting during Travel: Existing Research and Future Directions." Transport Reviews*, vol. 43, no. 5, Sept. 2023, pp. 805–810

Dewey, John. "Progressive Organization of Subject Matter." *Experience and Education*, Collier Macmillan Publishers, London, 1963.

Eisermann, Richard. "The Double Diamond Design Process — Still Fit for Purpose?" *Medium*, Design Council, 11 May 2023, https://medium.com/design-council/the-double-diamond-design-process-still-fit-for-purpose-fc619bbd2ad3.

Eldelin, Emma, and Andreas Nyblom. *"Place Making in Transit: Literary Interventions at the Airport and in the Underground." Transfers*, vol. 11, no. 1, Mar. 2021, pp. 48–75

"Eligibility Criteria." *Wayfarer Help Center*, Niantic, niantic.helpshift.com/hc/en/21-wayfarer/faq/2770-eligibility-criteria/

"Framework for Innovation" *Design Council*, https://www.designcouncil.org.uk/our-resources/framework-for-innovation/

Guo, Yuntao, et al. *"Impacts of Pokémon GO on Route and Mode Choice Decisions: Exploring the Potential for Integrating Augmented Reality, Gamification, and Social Components in Mobile Apps to Influence Travel Decisions." Transportation*, vol. 49, no. 2, Apr. 2022, pp. 395–444

Guren, Cliff. "Choreographing Creative Thinking." Cliff Guren, https://www.cliffguren.com/articles/choreographing-creative-thinking

Hagen, Mark Van, and Mirjam Galetzka. *"Waiting Experience in Railway Environments." Journal of Motivation, Emotion, and Personality: Reversal Theory Studies*, vol. 3, no. 1, Dec. 2014

Halegoua, Germaine, and Erika Polson. *"Exploring 'Digital Placemaking.'" Convergence: The International Journal of Research into New Media Technologies*, vol. 27, no. 3, June 2021, pp. 573–578

Heidegger, Martin. "Becoming bored and passing the time." *The Fundamental Concepts of Metaphysics: World, Finitude, Solitude*. Indiana University Press, 1995, pp. 93-105

Horan, Cathal. "Bored with Time?" *Philosophy Now: A Magazine of Ideas*, 2008, philosophynow.org/issues/65/Bored_With_Time.

"Hubble." *Collins English Dictionary*, HarperCollins, 2023, https://www.collinsdictionary.com/dictionary/english/hubble

"What is Wireframing?" *Interaction Design Foundation - IxDF*. 3 Mar. 2024 https://www.interaction-design.org/literature/topics/wireframing

Ito, Mizuko, et al. *"Portable Objects in Three Global Cities: The Personalization of Urban Places." The Reconstruction of Space and Time*, by Rich Ling, edited by Rich Ling and Scott W. Campbell, 1st ed., Routledge, 2017, pp. 67–87

Jiménez-Barreto, Jano, et al. *"'Ask Google Assistant Where to Travel' Tourists' Interactive Experiences With Smart Speakers: An Assemblage Theory Approach." Journal of Travel Research*, vol. 62, no. 4, Apr. 2023, pp. 734–752

Jirón, Paola A., et al. *"Relearning to Travel in Santiago: The Importance of Mobile Place-Making and Travelling Know-How." Cultural Geographies*, vol. 23, no. 4, Oct. 2016, pp. 599–614

Joore, Peter, and Han Brezet. *"A Multilevel Design Model: The Mutual Relationship between Product-Service System Development and Societal Change Processes." Journal of Cleaner Production*, vol. 97, June 2015, pp. 92–105

Juviler, Jamie. "Google Maps API: How to Get Started." 14 Sept. 2022, https://blog.hubspot.com/website/google-maps-api.

Koglmeier, Elysian. *"Why Art Is Taking Off at Airports." Artwork Archive*, 6 Mar. 2019, https://www.artworkarchive.com/blog/why-art-is-taking-off-at-airports.

Kourouthanassis, Panos, et al. *"Tourists Responses to Mobile Augmented Reality Travel Guides: The Role of Emotions on Adoption Behavior." Pervasive and Mobile Computing*, vol. 18, Apr. 2015, pp. 71–87

Krukar, Jakub, et al. *"Rethinking Wayfinding Support Systems—Introduction."* Proceedings of Workshops and Posters at the 13th International Conference on Spatial Information Theory (COSIT 2017), edited by Paolo Fogliaroni et al., Springer International Publishing, 2018, pp. 151–152

Murphy, Stephen, et al. *"Mundane Emotions: Losing Yourself in Boredom, Time and Technology." Marketing Theory*, vol. 23, no. 2, June 2023, pp. 275–293

Noone, Rebecca. *"GOING IN A DIFFERENT DIRECTION: CRITICAL ARTS-BASED APPROACHES TO GOOGLE MAPS."* The 21st Annual Conference of the Association of Internet Researchers, Oct. 2020.

Ooms, Kristien, and Nico Van De Weghe. *"Finding the Right Match: Human Cognition via Indoor Route Descriptions Versus Existing Indoor Networks and Algorithms to Support Navigation."* Proceedings of Workshops and Posters at the 13th International Conference on Spatial Information Theory (COSIT 2017), edited by Paolo Fogliaroni et al., Springer International Publishing, 2018, pp. 171–177

Park, Chang Sup, and Barbara K. Kaye. *"Smartphone and Self-Extension:*

Functionally, Anthropomorphically, and Ontologically Extending Self via the Smartphone." Mobile Media & Communication, vol. 7, no. 2, May 2019, pp. 215–231

Phillips, Richard, et al. *"Curiosity, Place and Wellbeing: Encouraging Place-Specific Curiosity as a 'Way to Wellbeing.'" Environment and Planning A: Economy and Space*, vol. 47, no. 11, Nov. 2015, pp. 2339–2354

Pontis, Sheila. "What Is Field Research?" *Making Sense of Field Research*, Routledge, London, 2018, pp. 37-52

Presson, Clark C., and Daniel R. Montello. *"Points of Reference in Spatial Cognition: Stalking the Elusive Landmark." British Journal of Developmental Psychology*, vol. 6, no. 4, Nov. 1988, pp. 378–381

"Public Art Program." *Moynihan Train Hall NYC*, https://moynihantrainhall.nyc/discover/art/

Ringmar, Erik, *"Heidegger on Creativity: From Boredom to Re-engagement with the World" Boredom Is in Your Mind: A Shared Psychological-Philosophical Approach*. edited by Ros Velasco, Josefa, Springer International Publishing, 2019, pp. 111-121

Rivero-Rodriguez, Alejandro, et al. *"Mobile Context-Aware Systems: Technologies, Resources and Applications." International Journal of Interactive Mobile Technologies (iJIM)*, vol. 10, no. 2, Apr. 2016

Schaal, Dennis. "Google Maps Poised to Be an $11 Billion Business in 4 Years." *Skift*, 30 Aug. 2019, https://skift.com/2019/08/30/google-maps-poised-to-be-an-11-billion-business-in-4-years/.

"Search for Nearby Places & Explore the Area." *Google Maps Help*, Google, support.google.com/maps/answer/4610185?hl=en&co=GENIE.Platform%3DiOS&oco=0

Wallentine, Anne. "How Cabinets of Curiosities Laid the Foundation for Modern Museums." *Smithsonian Magazine*, https://www.smithsonianmag.com/history/how-cabinets-of-curiosities-laid-the-foundation-for-modern-museums-180983265/.

Wang, Wangshu, et al. *"Considering Existing Indoor Navigational Aids in Navigation Services."* Proceedings of Workshops and Posters at

the 13th International Conference on Spatial Information Theory (COSIT 2017), edited by Paolo Fogliaroni et al., Springer International Publishing, 2018, pp. 179–189

Weiser, Mark, and John Seely Brown. *"Designing Calm Technology."* Dec. 1995

Williams, Russell B., and Natasa Slak-Valek. *"Pokémon GO Is Serious Leisure That Increases the Touristic Engagement, Physical Activity and Sense of Happiness of Players." Information Technology & Tourism*, vol. 21, no. 4, Dec. 2019, pp. 515–533

Witowska, Joanna, et al. *"What Happens While Waiting? How Self-Regulation Affects Boredom and Subjective Time during a Real Waiting Situation." Acta Psychologica*, vol. 205, Apr. 2020

Yan, Wanling, et al. *"Does Global Positioning System-Based Navigation Dependency Make Your Sense of Direction Poor? A Psychological Assessment and Eye-Tracking Study." Frontiers in Psychology*, vol. 13, Oct. 2022