Survival Tools of the Anthropocene

An island-situated study exploring how participatory design approaches can articulate engagement with the Anthropocene.

THESIS

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Figure 1: Researcher looking out to sea from the old pier, Papay, 2019. [photograph]. Source: Jonathan Ford

Abstract

While design has begun to focus more on place-based, convivial knowledge, the current speed of environmental and global change calls for urgent new approaches that re-configure our relationship with the Anthropocene. The Anthropocene is a term proposed in 2016 to describe the new geological era and the current global situation where the influence of human activity on the environment is having long-term irreversible consequences (Anthropocene Advisory Group, 2016). This study asks how participatory design (PD) approaches can articulate engagement with the Anthropocene in an island-situated context. Articulation in this project describes the act of giving shape to and linking connections between people, places and actions (DiSalvo, 2012), creating an engagement space for designers and communities to operate in this era of the Anthropocene.

The research question was explored on the island of Papay (Papa Westray) in the Orkney Islands, through a PD practitioner lens. To address the question the researcher drew on fieldwork from an extended time spent living and researching on Papay, presenting the outcomes in the form of a three-year single case study thesis, accompanied by a digital fieldwork notebook and a portfolio exhibition of practice reflecting on the *Pap-ØY-cene* – ØY meaning island in old Norse dialect. Through a participatory action research – programme design research (PAR–PDR) methodology in collaboration with the Papay Development Trust (PDT), British Science Association (BSA) and Icelandic Glaciological Society (IGS), the research developed through a series of island and Icelandic events and semi-structured interviews with islanders. Peripatetic 'survival tools' were developed to transition between three viewpoints – the remote island environment, the island community and the global scale of the Anthropocene. The word peripatetic originates from the Greek word for walking around. It describes

movement from place to place and was historically associated with nomadic monks, but is currently associated with teachers who move about the Orkney Islands from school to school. The researcher uses the term peripatetic survival tools to describe generative tools that help with moving with and adapting to changing conditions and engaging with issues of survival. Peripatetic tools in this project, such as the Papay Probe (a community-created and community-built set of tools to measure and compare island–glacial relations), helped to slow engagement and reflect upon this large-scale geological issue in a small-scale distributed remote island context and 'produce an opportunity to raise a slightly different awareness of the problems' (Stengers, 2005: 994).

This practice-based enquiry contributes to the field of PD with an engagement framework that opens up boundaries between experts and non-experts and explores an island-situated and action-based 'public of concern', engaging with the issues of climate change. The aim in this research is for design practitioners to be able to use the insights, methods and framework revealed in the single case study on Papay and develop tools that tackle major moving issues such as climate change, enabling progress from where this research stops.

Presentation of submission

This practice-based PhD is presented as a thesis incorporating key images describing the relevant methods and tools, along with an excerpted digital fieldwork notebook, an annotated visual guide mapping the visual elements across the submission, and a portfolio of practice in the form of an exhibition reflecting on the *Pap-øy-cene.* The exhibition is documented in an interactive catalogue, to be viewed alongside this thesis. Four appendices contain additional material – interview and workshop consent form samples, interview transcript and question samples, samples of the analysis network and the full digital fieldwork notebook. The thesis is written in the third person to allow the researcher distance and perspective to view the methodologies and processes of the research. The project involved a reflective process in action (Schön, 1983) consisting of the researcher navigating through the study, living on the island and practising at the same time. A reflective process in action is characterised by Schön as an epistemology of practice implicit in the 'artistic, intuitive processes, which some practitioners do bring to situations of uncertainty, instability, uniqueness and value conflict' (1983: 49). Several work-in-progress exhibitions have taken place throughout the fieldwork, at The Kelp Store on Papay and the Scottish Graduate Arts and Humanities showcase in Glasgow. Documentation of these is referenced within the digital fieldwork notebook. Figure, appendix and fieldwork notebook entries are referenced beside relevant sections, which direct the reader to images, diagrams, excerpted fieldwork notebook and appendices at appropriate times throughout the thesis.

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Fieldwork documentation blog

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Excerpted fieldwork notebook

Excerpted fieldwork notebook:
https://www.evernote.com/pub/higginssaoirse/excerptedfieldworknotebook

Glossary of terms

Auger: Ice sample corer.

Beltane hostel: Main visitor accommodation on Papay.

Benchmark: Old measurement comparing height above sea level with baseline measurement in Newlyn Tidal Observatory.

British Science Week: UK-wide event that takes place every year to promote engagement with science and look at new forms of participation.

British Science Association (BSA): London-based charitable organisation promoting forms of science engagement across UK and Scotland.

Bruck: Rubbish or mess washed in by the sea. Orkney dialect word.

Carty race: Annual competition for islanders to build and race their own carty, made out of recycled materials.

Ec-øy-system: Island ecosystem.

European Marine Energy Centre (EMEC): world-class research centre based in Stromness testing wind and wave power in Orkney.

Expert: Person qualified to give an opinion or fact. The opposite is a non-expert.

Expert-by-experience: Person who knows about something through involvement in it and not necessarily because they have studied it. Originates from healthcare profession.

Expert/non-expert: A combination of knowledge expertise and tacit local knowledge expertise.

Haar: Scottish sea fog.

Hookin: Name of croft on east shore of Papay.

Icelandic Glaciological Society (IGS): Society in Iceland with volunteers and scientists who come together to monitor and measure glaciers in Iceland.

Islønauts: Islander astronauts – exploring island from external viewpoint.

Lyme grass: Type of grass that helps protect land from sea erosion.

Maggie's Seat: Viewing seat on South Wick Beach on Papay, dedicated to Maggie Hourston, who owned and drove a blue tractor.

Monday lunch club: Club on the island for older members to learn about new skills or listen to visiting experts. This meets at The Kelp Store.

Morven House: Described as a gateway house to try out island life for 18 months.

North hill: Area on the north end of the island, owned by the Papay North Hill Grazers and managed by the RSPB (Royal Society for the Preservation of Birds) as a reserve for birds.

Orkney Islands: Group of islands off northern tip of Scotland.

ØY: 'Island' in old Norse.

Papay: Local name for Papa Westray.

Papay pub: Pub night in Beltane hostel on a Saturday night.

Papay Development Trust (PDT): Set up in 1999 to undertake a wide range of activity, from providing gateway housing and a community boat scheme for additional ferry sailings to Westray, to running The Kelp Store heritage, art and craft centre, island tours and boat trips for visitors to the Holm of Papay.

Pap-øy-cene: Anthropocene on Papay.

Pickies: Papay dialect name for Arctic terns.

Probe: Reference to space station probes designed to go into outer space.

Steamer: Boat from mainland Orkney to Papay. This takes goods and passengers to the island. The boat is still called the steamer, referencing the old steamboat.

The Kelp Store: Building which used to be a kelp-drying store. Renovated in 2016 and opened as a culture and heritage centre on Papay.

UK Antarctic Heritage Trust: Set up in 2018 to preserve, enhance and promote British Antarctic heritage and to engage, inform and inspire a global audience.

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This work is dedicated to my mother Geraldine Higgins, who would have been up in Papay enjoying island life and steeped in Orkney archaeology and literature; and most especially to my father Tom Higgins who sadly passed away during this PhD journey.

Declaration

I, Saoirse Higgins declare that this submission of joint thesis and practice for the degree of Doctor of Philosophy meets the regulation stated in the handbook for the mode of submission, and has been approved by the research degree sub-committee

I declare that this submission is my own work and has not been submitted for any other academic award.

Saoirse Higgins

The Innovation School

The Glasgow School of Art & Design 2020

1. Introduction

Figure 2: Engraved by Johan Blaeu, earliest representations of the Orkney Islands, 1654. [image]. Source: orkneyjar.com

1.0 Practitioner statement

This project originated from a desire to re-examine our relationship with the environment in this era of climate crisis and make an active and urgent contribution to change as an art and design practitioner. My background is in product design, starting in the 1980s, and my main influences came from social designer Victor Papanek, the public engagement work of artist Krzysztof Wodizcko, and Italian counter-culture architects and designers, including Superstudio, Achigram and Sottsass. I worked in the design industry in London in the 1980s and 1990s and left this behind frustrated with the lack of socially-engaged, participatory design projects within the field at the time, and wanted to make more critical design exploring the issues, tools and methods to engage with the complexities of 'wicked problems' (Rittel and Webber, 1973: 155-169) producing different forms of publics and participation. I moved towards a more interdisciplinary hybrid practice between art, design and technology to examine these issues, and spent 24 years developing interactive media and socially engaged projects to critically explore the human-technology-nature contested space, examining grass-roots power and agency for change. I developed speculative design work through a series of international residencies and projects working at the Royal College of Art Interaction Design Masters, in collaboration with the Universitat de las Illes Baleares in Mallorca. 'The Stardogged Moon' interactive sensor-based installation was created to explore the connections with the sea, situated on the island of Mallorca (Wilson, 2002). I was also a member of the international interdisciplinary art-science collective The Grafting Parlor, a collective of artists and scientists who exchanged and combined their methodologies through collaborative experimentation and dialogue (Higgins, 2007). The group explored the lab and field, micro-macro engagement with nature (Brandt, 2015; The

Grafting Parlour, 2010). Later I worked in Professor Chris Csíkszentmihályi's activist art and design group at the MIT media lab in the early 2000s on interactive media projects such as 'The Doom machine' and 'Mechanism no.1: war', which reacted to the build-up to the Iraqi war and the sense of disconnectedness and disempowerment felt at the time (MIT, 2004). These projects invited the public to participate and interact with the technology interfaces and contribute their 'voice' (Higgins, 2007).

In relation to my background context, I have defined the term art and artist within hybrid practices that blur the boundaries between art, design, architecture - drawing on interdisciplinary practices that synthesise approaches and aim to reconfigure knowledge through topical and thematic encounters (Lindström and Ståhl, 2015: 25) for active social change. There is a long history of interaction and blurring of art and design beginning with the arts and crafts movement in the 19th century and more recently with the Bauhaus and Vienna Secession, and as discussed further in Chapter 2: Scope of Context - counter cultural movements such as the Kibbo Kift and Global Tools in Italy, and artists such as Jeremijenko (Holt, 2015: 143). As discussed in Chapter 2: Scope of Context artist-designer Natalie Jeremijenko's background is interdisciplinary in art, design, biochemistry, neuroscience and physics and therefore not from the 'private symbolic space' (Bourriaud 2002: 13), which constitutes the more traditional, individual artists work. Her work could be described as 'tactical participatory design' a more political form of participatory design or adversarial design (DiSalvo, 2012). DiSalvo co-opts her work for this concept of 'adversarial design', which describes 'political *design* that evokes and engages political issues' (Holt, 2015:153).

As an islander I have a particular interest in how an edge context (environment and community) survives and thrives with the urgent issues upon us now.

This Orkney-based project initially took shape and developed into a PhD through many summer visits to Papay. This subsequently turned into a full-time move to the island based at Morven House – the island 'gateway house.' This move happened alongside an opportunity to work with the Innovation School at Glasgow School of Art, funded by the Creative Futures Partnership, which became the basis for this practice-based island situated study.

1.1 Thesis structure

The thesis is structured into eight chapters, with an integrated series of images illustrating the key tools created in the project, alongside an excerpted digital fieldwork notebook describing the time living and researching on the island, an exhibition of reflective practice, documented in an accompanying printed publication, and an annotated guide mapping the visual elements across the submission. A selection of fieldwork notebook entries is referenced by date and title within the thesis. The full version of the notebook can be viewed from Appendix 4. This chapter introduces the context of the practice-based research in relation to physical place, philosophical and theoretical underpinnings, methodology and contribution to knowledge. From this introductory chapter, the thesis moves to set out the scope and context of the research question in chapter two, examining the debates and practices of PD engagement in the Anthropocene alongside research on island context. Chapter three outlines the reflection-in-action PAR–PDR methodology developed to collect knowledge/data and answer the research question. It explains methods and tools developed to iterate and navigate the research. Chapter four describes the researcher's relevant fieldwork while living on Papay in relation to the research question, while chapter five analyses the

findings and interprets them through thematic analysis, leading to discussion of the thesis's original contributions to knowledge. These outcomes and insights are discussed in relation to the epistemological and theoretical underpinning of social interactionism and related to the context and key aims. Chapter six reflects on the design methods and reflection framework used throughout the study, while chapter seven discusses the original contributions to knowledge from the research and links these to the literature. The final chapter considers the study's limitations, as well as future research plans, and concludes with a summary of the research achievements over three years.

1.2 Research question

Remote islands such as Orkney have a unique viewpoint on the world, looking in from the edge. Relationships with the natural world are more immediate and concentrated than in many urban situations, which shield us from the direct effects of nature. Through a practice-based research lens, this enquiry presents a framework that articulates a 'long view' engagement with the Anthropocene. The Anthropocene is the new geological era, proposed originally by the chemist Crutzen and biologist Stoermer, characterised by 'the central role of mankind in geology and ecology' (Crutzen and Stoermer, 2000: 17). The research question asks: how can PD approaches articulate engagement with the Anthropocene in an island-situated context? Articulation in the physical sense describes the act of forming flexible joints that link multiple parts. In this project, articulation is the act of forming and linking multiple viewpoints from people, the environment and actions (DiSalvo, 2012), creating new spaces for designers and communities to engage within this era of the Anthropocene.

Large geological-scale changes such as glaciers retreating and sea levels rising are difficult to grasp in their entirety from a daily living perspective, as the timeframes and movements are not within our normal visible range. Designers who work within the Anthropocene in situated contexts and communities have an important role to play in developing new participatory viewpoints that activate and move us forward from our current anthropogenic world state.

This research questions how distributed, decentralised contexts such as the remote island of Papay engage with and contribute to understandings of environmental issues, offering new viewpoints and tools for survival. Survival tools in this study describe the processes and means involved in developing agency of 'survivance'. Survivance is more than just survival. According to first nation writer Gerald Vizenor, 'it is a way of life that nourishes indigenous ways of knowing' to help us live in the current changing conditions (Vizenor, 2008: 271).

To answer the research question, the researcher placed herself on the island of Papay as an incomer islander and *in situ* researcher for the duration of the study. Through a combined PAR–PDR methodology and in collaboration with the Papay Development Trust, BSA and IGS, a series of experimental island events were developed, as well as conversations and tools that explored the notion of making and re-making our own means of survival and 'response-ability' for change (Haraway, 1997: 71).

To succeed with this research and effectively explore the question, narrow disciplinary knowledge was not enough. Issues in the Anthropocene are complex, multi-layered and interdisciplinary, from many areas of expertise. The theoretical and practical research and fieldwork therefore referenced and drew on trans-disciplinary knowledge from anthropologists, philosophers, scientists, artists, geographers, archaeologists, local councils, marine biologists and local community experts, but came from a core practice-

based researcher lens – the benchmark viewpoint within an island context. This mode of practice-led research is influenced by the philosophy of science technology and society scholars Donna Haraway (2016) and Maria Puig De la Bellacasa (2017), anthropologists Tim Ingold (2011) and Arturio Escobar (2017), and philosopher, psychologist and education reformer John Dewey, who proposed that to gain knowledge of a situation, experience must come directly from real-life, on-going interaction with the environment accumulating meaning as we continuously engage with it (Dewey, 1938). This research epistemology developed from multiple, active, co-constructed viewpoints from local experts, island– island communities and the practice-based researcher, aiming to contribute a new PD framework to deal with the complex issues of the Anthropocene.

1.3 Context

Philosophical context

This research places itself within a social constructivist paradigm, where knowledge comprises multiple viewpoints of the world, and the 'knower' and the 'known' are interactive and inseparable (Lincoln and Guba, 1985: 37). The epistemology originates from a relativist ontology, where reality is socially created through the interactions of people, place and things (Denzin and Lincoln, 2005; Law and Mol, 2002) and knowing takes place through theory, practice, experience and articulation (Heron, 1996). In this study on Papay, reality comes from the relationships between islanders, their island as a live, changing agent and the current context of the Anthropocene. The interweaving of timeframes – the enormous geological anthropogenic scale and real-time human scale – with human and non-human agency sets up the philosophical context for the research question.

Island context

This single case study was developed in the northern islands of Orkney, specifically Papay. The Orkney Islands offered a rich context in which to situate the study, with an intense history of human exploration and interaction with the sea from Neolithic times to the present-day renewable wind farm energy technology. The islands are home to many scientific experts studying key archaeological history sites such as the Ness of Brodgar and Skara Brae, and are also home to world-class marine and renewable energy research activity, with the main European Marine Energy Centre (EMEC) based in Stromness. Following the example of writers such as Nan Shepherd, who wrote about the Cairngorms within a long-term embedded timeframe, and 'live-in' naturalists such as Ronald Lockley or Fraser Darling, alongside historic explorers such as John Rae, who

embodied themselves and their research within the landscapes and communities they studied, the researcher based herself in the northern isle of Papay in Orkney as an incomer explorer/islander. On Papay, an island with a population of 88 people and a landmass one mile wide and four miles long, with a high point of 48 metres, the responsibility for survival and thriving lies with the islanders, and environmental issues, such as rising sea levels, are dealt with through their direct efforts. By placing the study within the Orkney archipelago and on one of the smaller, more northern, islands, intense environmental connections, decentralisation and the island community's power over change are acute. This emphasises the importance of this context for the research – a small-scale remote island juxtaposed with the major global issue of climate change.

Design context

This research deals with debate around critical design within the Anthropocene.

> Critical design is a research through design methodology that foregrounds the ethics of design practice, reveals potentially hidden agendas and values, and explores alternative design values.
>
> Bardzell, 2013: 3297–3306

Critical design explores different approaches to design through critically reflecting on processes as they emerge. According to scientists and systems researchers Capra and Luisi, an active state of emergence is necessary to move towards a new framework, 'beyond the dualistic notions of the Anthropocene' (Capra and Luisi, 2014: 10). Although design has become more sensitive to the environment in the form of place-based, embodied co-design (Manzini, 2015; Ehn, Nilsson and Topgaard, 2014), it is urgent to develop new tools that keep up with the rate of environmental change (Fry, 2016: 61). New approaches in longitudinal scale design thinking are necessary with the current

state of the environment and globalisation (Batton, 2016). This new scale or new 'geography of responsibility' is explored within ontological design, which looks at a more relational method of knowing and action for long-term change (Escobar, 2017). Social scientist and geographer Doreen Massey describes the geography of responsibility as relational mapping between identity and place and discusses how these interact to evolve (Massey, 2004). Design theorist Anne-Marie Willis describes ontological design as a way of 'characterising the relation between human beings and life-worlds…we design our world, while our world acts back on us and designs us' (Willis, 2006: 80; Fry, 2012: 5). This research pushes this call for a new geography to interact further through collaborating with local expert knowledge in Orkney and critically engaging with the complex adaptive island system. It makes the designer a participant expert–non-expert within a small-scale distributed island system looking at our relationship with the Anthropocene. Expert–non-expert refers to the combination of expert knowledge and tacit local expert knowledge. It references the multiple levels of co-created knowledge and expertise needed to tackle the enormous issue of environmental change.

1.4 Overview of fieldwork

The fieldwork consisted of a single case study lasting three years on the island of Papay. It was divided into three phases with three key experimental events within a PAR–PDR methodology. The first phase was the orientation phase, or local viewpoint, undertaken in the first year. This consisted of participation in island life as a participant observer, understanding islander and island systems and infrastructure, as well as an initial experimental event. The second year – the immersion phase or relational viewpoint – continued the development of a set of experimental events alongside the undertaking of

semi-structured interviews with islanders and experts in Orkney. The third and final phase included a set of in-depth semi-structured interviews as trust and relationships developed. The fieldwork ended with the 'IceCapReCap' evaluation event, which gave insights into overall levels of engagement with relevant issues and themes.

1.5 Research aims and objectives

The main goal of the research is to offer a new approach to engaging with the Anthropocene, opening up space for designers to operate in, by foregrounding a remote island position, geological timescale and the co-articulation of issues (Lindström and Ståhl, 2014), producing survival tools for the current changing distributed world (Ingold, 2011). The research objectives opened up individual 'science silos' to promote expert–non-expert community-led solutions, alongside understanding and engaging with the particular island context and island narrative for the duration of the time living on the island.

2. Scope of context

Figure 3: Researcher views Mýrdaljökull glacier, 7am: 25th march, 2017, Papay Probe project. [photograph]. Source: Saoirse Higgins

2.0 Introduction

This chapter introduces the scope of context of this practice-based research project in relation to its philosophical and theoretical underpinnings. The main research question asks how critical PD approaches articulate engagement with the Anthropocene in an island-situated context.

The Anthropocene is a key cultural and theoretical framework for the research and this chapter begins by taking the reader through the historical and cultural background to this particular term before examining the main arguments between relevant anthropogenic thinkers and writers. The next section considers the debates, synergies and tensions within forms of critical PD. The research examines reflection *in* action PD, which embraces the difficulties and controversies of situated publics and their participation in an ever-changing world (Binder, Brandt and Gregory, 2009). This is framed within debates on design in the local, place-based and embodied (Manzini, 2015; Ehn, Nilsson and Topgaard, 2014; Fry, 2017), and on design for distributed systems and infrastructures (Star and Bowker, 2002; Pipek and Wulf, 2009; Holert, 2011: 54), as well as a more humble and aware model of design with an ethics of care (Bellacasa, 2012; Ratto, 2011) that approaches the 'messy' world where the participants stand, beside the researcher. The next section of this chapter looks at the geographical location of the 'incomer' island-based researcher within the physical context of the Orkney Islands. The literature centres upon the topic of 'islandness', looking at this archipelago as a 'living laboratory' for research (Berry, 2009: 328). The final section concludes by examining key project examples that resonate with the methods and themes in this study. The chapter should clarify to the reader the breadth of context of this research, the gaps in knowledge and where this research is situated in terms of theory and practice. The

reader should understand where and how the research argument fits into the larger body of work relating to PD and island studies.

2.1 The Anthropocene: nature in culture, culture in nature

> A need has grown for fresh vocabularies and narratives that might account for the kinds of relation and responsibility in which we find ourselves entangled.
>
> McFarlane, 2016, para. 6

Environmental writer Robert McFarlane spoke of the crucial role he envisaged to create new viewpoints and means of talking about and describing our relationship with our environment to move forward in the current world state. His writing is placed within the current world state of the Anthropocene (McFarlane, 2016). The Anthropocene Advisory Group of the Quaternary Stratospheric Organisation is a working group of scientists set up in 2009 to decide whether we have moved from the geological timeframe of the Holocene to the new geological era of the Anthropocene. 'Anthropo' is the Greek term for human and 'cene' means new. The term was defined by the Anthropocene Advisory Group as the new epoch of geological time in which human activity leaves a long-term signature in the strata record (Anthropocene Advisory Group, 2016). The Anthropocene is an emerging term with many angles relating to this study discussed in this section. Philosopher Peter Sloterdijk explores the concept as originating 'under the guise of scientific neutrality', conveying 'a message of almost unparalleled moral-political urgency' (Sloterdijk, 2018: 1). To deal with the Anthropocene, we must consider the consequences of our actions and develop a responsible agency between humans and the environment. In 2000, the Nobel prize-winning atmospheric chemist Paul Crutzen and Eugene Stoermer, an American diatom

specialist who has used the term Anthropocene informally since the 1980s, jointly published an article proposing that the Anthropocene should be considered a new Earth epoch, on the grounds that, 'mankind will remain a major geological force for many millennia, maybe millions of years to come' (Crutzen and Stoermer, 2000: 6). In 2016, it was agreed to make the proposal official. This official status did not stop the on-going debate about the exact meaning of mankind and when the era began.

Anthropocene concept and transdisciplinary narrative

This section maps the main relevant arguments between key interdisciplinary Anthropocene thinkers. By mapping these thinkers, the section examines the context and gaps in the field, calling for tools that develop a new narrative about our relationship to the environment. Science historians Bonneuil and Fressoz refer to the Anthropocene as 'the reunion of human historical time and earth geological time, between human agency and non-human agency' (Bonneuil and Fressoz, 2015: 10). Bonneuil and Fressoz (2015) and Dalby (2015) discuss the need for a new polemical multi-stranded narrative to debate the Anthropocene so as not to ignore its complexity. The research question for this project is situated within this debate, which places PD within a multi-stranded narrative of the Anthropocene.

> The Anthropocene is now more than a proposed new geological epoch that marks the transformation of the Earth System wrought by humanity; it has become a contentious term and a lightning rod for political and philosophical arguments about what needs to be done, the future of humanity, the potential of technology and the prospects for civilization
>
> Dalby, 2015: 37

The Anthropocene is established as a concept within the social sciences, politically and culturally. It is arguably a cultural and geological narrative about human interventions

on a global scale. Descola states that the 'relationship between humans and nature will in all probability be the most important question of the present century' (Descola, 2013: 81). If this is the case (and evidence of this was apparent at the start of 2019 with the increase in protests as part of the climate emergency declaration movement, and the rise of Extinction Rebellion), there is even more reason for designers to develop new frameworks and tools to change ways of interacting with the underlying complexity of the situation (Thorpe and Manzini, 2018). Descola argues for anthropology free from anthropocentrisim and dualistic conceptions of nature and culture. She believes that, to break this dualism down and contribute to our future survival, we need to break out of our disciplines and set up a more general framework that is not so specialist and expert. She calls the separation that has occurred up to now, 'disciplinary compartmentalization' (Descola, 2013: 83). Taxonomies have a long history and have been used in relation to categorising species. Survival was measured by placing species into categories within hierarchical structures, as evident in the work of botanist and zoologist Carl Linneaus, who formalised the system of naming species (Linneaus, 1735). Bateson predicted how this view would change and defined ecology as the study between interconnected complex ideas in a heterogeneous system (Bateson, 1972: 491). Interactions between species, humans and places are not simple and straightforward hierarchies as formerly thought, but require examination of connections between ideas and layers of meaning that work within a rhizomatic network in multiple timescales and contexts (Delueze and Guattari, 2004). Braudel refers to the anthropological scale as the 'long durée' or the long time, and described the present tense as the 'tempestuous borders of the short timespan' (Braudel, 1969: 25–38). This fits well with the present-day short timespan and the tempestuous politics of, for example, Brexit and Trump, as well as the global issue of climate change. To transition to a narrative within the

Anthropocene, Ingold suggests that varying our viewpoints while keeping the object fixed increases our awareness and changes our perceptions of place and environment (Ingold, 2000: 226). In other words, varying the discursive viewpoint and position of the islanders in relation to the island and the researcher, while keeping the on-going issues of environment fixed and central, alters perceptions and understandings of engagement with the environment. This consideration of movement and articulation of viewpoints from experts and non-experts relating to the environment, in the context of a geological scale timeframe, is key in exploration of the research question.

Many opposing narratives exist regarding when the Anthropocene era should have been declared and what this means both culturally and scientifically. Crutzen and Stoermer proposed that industrialisation in the late eighteenth century was the start of the epoch (Crutzen and Stoermer, 2000: 18). The Anthropocene is also arguably driven by technology (Moore, 2013). Technology is used to patch up problems and not deal with longer term solutions to enable the planet to thrive (Revkin, 2016). Technological innovations such as geoengineering or weather modification technology will not solve this issue in the long run. For example, a typical geoengineering project 'seeds clouds' with technology (iodide crystal pellets) to cause rain, controlling, for example, the timing of rain for the Beijing Olympics, or, in other instances, irrigation for farming (MIT Technology Review, 2005). The issues therefore need more detailed attention instead of patching the problem up with present-day technology, without understanding the long-term consequences. Moore re-names the Anthropocene 'the capitalocene', arguing that it results from the current system of capitalism (Moore, 2015). He sees the Anthropocene narrative as reductionist, down to a Cartesian (scientific) binary of humanity and nature, capitalism and nature. He thinks that it is actually a 'double internality' – nature *through* capitalism *through* nature (Moore, 2015: 172). This argument resonates with Haraway

in not defining the problem as a simple binary, rather as a very messy state of affairs. Similarly, Bateson argues that, as a general species, we do not live in a top-down hierarchy, rather in embedded ecosystems (Ellis and Ramankutti, 2015). We are not separate from nature and are responsible for deciding our relationship with it and what to do with the state of nature now (Purdy, 2016). Schwägerl points the finger directly at us to solve the crisis and take responsibility for the future of nature, placing humanity centre stage.

> The long-held barriers between nature and culture are breaking down. It is no longer 'us' against 'Nature', instead it is we who decide what nature is and what it will be.
>
> Crutzen and Schwägerl, 2011, para. 4

The reason we are in this state of crisis, Latour posits, is because of boundaries between experts and non-experts dissolving with technology (Latour, 2011: 2). It is more difficult to have a strong voice taking responsibility and action, as a more complex interconnected system exists in terms of knowledge producers and knowledge receivers – the 'prosumer', as futurist Alvin Toffler puts it in his book The Third Wave (Toffler, 1980: 262). This expert–non-expert situation must be understood to articulate this state of transdisciplinarity, where disciplines are hybrid and not delineated into individual silos. This active 'breaking down of nature–culture worlds' is where this research situates itself – articulating a state where expert 'know-how' is locally based and comprises grass-roots, multi-level, community participation. Democratised technology offers citizens the means to be experts from localised positions.

> Thanks to global positioning systems, geologists and naturalists can take measurements with the same range of precision outside and inside the laboratories.
>
> Latour, 2011: 2

Non-expert citizens have gained some agency to pose their own research questions instead of following questions from elsewhere or above, meaning that there is some hope of moving forward (Stengers, 2015; Latour, 2016). This increase in agency is evident in CLEAR laboratories' approach to democratising the process of data collection in the environment, as discussed in the final section of this chapter.

Haraway (2016) sees two solutions – first, to fix the problem with technology. Similar to the technological argument of Moore and Revkin, Haraway does not entirely dismiss this but argues that technological fixes have their place in visualising problems but not solving them. Technology makes a partial contribution. Philosopher Peter Sloterdijk and Davis and Turpin suggest that this technological Anthropocene be called the 'Technoscene' as it is technologically powered (Sloterdijk, 2016; Davis and Turpin, 2015). The second solution is to say that it is too late to fix (Haraway, 2016: 100). This language is much milder than that of Crist, who notes a twofold approach to civilisation's challenges – piecemeal and technological (Crist, 2014: 392). The piecemeal approach treats problems in an isolated and linear way and the technological fix only helps to perpetuate humanity's exceptionalism (Crist and Kopnina, 2014). The third solution currently evident in politics, especially in the United States and Brazil, is to say no trouble exists at all and that we are living together well on this planet (Stengers, 2015).

> As for the States, we know that with a great outburst of enthusiastic resignation they have given up all of the means that would have allowed them to grasp their responsibilities and have given the globalized free market control of the future of the planet.
>
> Stengers, 2015: 130

Haraway asks how to avoid wringing our hands in despair. Her solution is to 'stay with the trouble' and take 'response-ability' for our actions (Haraway, 2016: 100; 1997: 71). She defines 'trouble' as the means to stir up, make cloudy or disturb. We live in

disturbing, mixed up, troubled times, as is clear from the natural and man-made events happening in the world. Haraway explains that we have dealt with 'trouble' by imagining and designing a preferred future and have thus cleaned away the past and the present. She split the word 'response-ability' to emphasise the conditions to enable action, as opposed to taking no action. This is interpreted as inability to visualise or know everything and that we should become more comfortable with this 'messiness', or distributed way of looking, designing and acting. She proposes that this method of understanding would help to solve our current crisis in the Anthropocene. 'Make kin not babies', she suggests – make more friends and collaborators and work together to stop over-populating the planet (Haraway, 2015: 161). She encourages us to stop and think about the consequences of our actions. Haraway wants 'speculative fabulation', described as a method of tracing 'on-goingness' (Haraway, 2016: 132). She presents speculative fabulation as a way of dealing with the world as it is, in the thick present (Geertz, 1973). The thick present refers to a present tense that considers the depth and the breadth of the moment. The notion of being 'speculative' refers to an abstract type of reasoning looking at potentialities and virtualities, cultivating the signs of change in a situation. Speculative design uses this idea, looking at scenarios and interventions to explore what might happen in the future through design (Dunne and Raby, 2015). The idea of 'fabulation' refers to inventing stories or fables to explain the changing narrative in the present global situation. The debates and issues surrounding the Anthropocene, Haraway suggests, relate to scale, rate, speed synchronicity and the complexity of the problem. Haraway called this epoch 'the dithering' – a state of indecisive agitation – instead of the Anthropocene (Haraway, 2015). Anthropologist Anna Tsing suggested that the Anthropocene is arguably more of a boundary event than a long, massive-scale geological epoch (Tsing, 2015). The Anthropocene could be a short

thin epoch that moves into a more stable and solid post-disciplinary relationship with change. This viewpoint could be the conceptual key to reducing complacency and moving forward. Artists and designers have an important role to play in assisting this shift forward and making this epoch, as Tsing suggests, a short, slim wedge-shaped anthropogenic one.

This section aimed to trace key debates and gaps from the main thinkers across disciplines in the Anthropocene and relate these debates to the knowledge gaps outlined in the research question, examining a new narrative to move forward from the current climate crisis. The research positions its contribution within Latour's breaking down of silos in a proposed 'post-disciplinary' world state, alongside Haraway's call for tracing on-goingness and Tsing's suggestion of a solid future post-Anthropocene relationship with change and adaptation. Examining this gap opens opportunities for multi-layered participation from the ground up, placing the researcher in a hybrid position between the roles of active researcher, co-expert and non-expert, bridging across these positions with reflective tools that articulate these viewpoints, including as part of the Papay Probe (see chapter four), as Haraway puts it 'stir[ring] up and mak[ing] cloudy the "trouble'" (Haraway, 1997: 71). The research takes 'core samples' of the issues from multiple viewpoints to generate new angles of knowledge in the Anthropocene.

The next section looks at these tools – first, the discussion around notions of critical design for resilience, care and repair. Trans-disciplinary forms of design active-ism and where the research places itself within this framework are then considered.

2.2 Situated PD research

'There can be no innocent positions' (Haraway, 1991: 190)

With reference to Haraway, there are no neutral positions when entering a context for research. We come with a background and a set of presumptions, which influence our actions and ways of participating with our environment. This study is at the intersection of current PD practices and forms of activated engagement with the environment. The crux of PD relates to the direct involvement of non-design experts in the design of products or processes relating to or affecting their future. It attempts to change situations and not just study them (Bannon and Ehn, 2013: 42). PD is a way to meet the unattainable design challenge of fully anticipating 'use before actual use taking place in people's life-worlds' (Binder and DeMichelis and Ehn et al, 2011: 158).

PD practices started in the early 1970s in the workplace as a means to give workers more agency, enabling them to take part in decision-making – specifically, to reveal existing participant skills that could be added as resources in the design process (Bannon and Ehn, 2012). The practice has since expanded out of the workplace into diverse communities, NGOs and grassroots initiatives (Ehn, Nilsson and Topgaard, 2014). It offers an alternative practical approach to the user-centred model originating in the field of human computer interaction in the 1980s (Norman and Draper, 1986). From the Scandinavian PD tradition, the emphasis is on reflective practice as a tool for change as opposed to rational problem solving for an end product. PD enables designers and collaborators to enter into a creative dialogue and achieve reciprocal understandings (Bratteteig et al., 2013; Broadley and McAra, 2013; Kensing and Blomberg, 1998; Sanders and Stappers, 2008; Simonsen and Robertson, 2013). For this research, PD can be defined as the collective interweaving of people, processes and

objects (Suchman, 2002; Björgvinsson, Ehn and Hillgren, 2012: 2). PAR comes from qualitative research methods and has evolved in recent years from Brazilian philosopher and educator Paulo Freire's critical pedagogy model (Freire, 1970). It has developed into a methodological approach for community participation and a process of reflection and action aiming for social change from collaboration between researchers and experts. The combination of PD and PAR aimed to tackle the context of designing within the Anthropocene using a reflective practice-based methodology. Anthropologist Charlotte Aull Davies defines reflexivity within the realms of design ethnography as 'expressing a personal awareness of their (researcher's) necessary connections to the research situation and hence their effects upon it' (Aull Davies, 1999: 7). Schön describes reflexive practice as embedded in intuitive, uncertain and value conflict occurring in situations (Schön, 1983). Reflexivity is central to participant observation in this project – 'when the relationship between researcher and researched is intimate, long term and multi-stranded' (Aull Davies 1999: 3–4). Participant observation is characterised as being a careful observer (a careful island participant observer in this project), a good listener and being open to the unexpected (DeWalt and DeWalt, 2002).

PD uses creative practical techniques such as collaborative 3D tool building to encourage opening up of key issues and factors influencing project parameters. PD processes try in principle to consider that the present world is messy, complex and dynamic, and so designing in this context should embrace this messiness and 'acknowledge the heterogeneity and conflicts of interest' from the start to have any effect (Bannon and Ehn, 2015: 56). Much debate has taken place about how designers can navigate this as the world fluctuates politically and physically. These non-static complex social factors need more scrutiny and foregrounding for PD research, and the

design of tools, which attempt to articulate large-scale issues within our changing anthropogenic world. Design of PD methods depends on our discipline/trans-discipline and expert/non-expert participation mode, and how we as designers present ourselves, and our agency in the dynamic structure and framework of the project and context.

> We as designers and artists engage with the complex adaptive systems that surround us, by *revealing* instead of *obscuring*, by building friction instead of hiding it, and by making clear that every one of us (designers included) are nothing more than participants in systems that have no center to begin with.
>
> Slavin, 2016: 40

MIT designer Kevin Slavin discusses the need to participate fully within a complex system that surrounds us. This links to open participative design projects developed to promote communities taking ownership and stewarding their own futures. The concept of stewardship came from environmental advocate Aldo Leopold's idea of 'land ethic', which he defines as the responsibility of care for the land (Leopold, 1949). Stewardship is thus about citizens taking responsibility for the care and maintenance of their own local environments. Examples include the Papay community learning to build a Caasie sea-defence wall to protect the land, and the community sowing Lyme grass on the South Wick dunes to protect against erosion on the island's east coast. More details about these community-initiated events are described in chapter four.

Within PD, designers have adapted and edited methods and tools from many disciplines to develop a participative, relevant and engaged design process. They reference anthropology, ethnography, philosophy, social science and the open maker movement in shared making practices (Koskinen et al., 2011; Sanders, 2002; Swann, 2002; Zimmerman, Stolteman and Forlizzi, 2010; Hertz, 2012; Ratto, 2008). Many variations and sets of design toolkits are available for adaptation and development depending on

context. For example, the Digital Society School in Amsterdam collected a suite of open-source design methods and tools on their website ('Digital society school', 2018). Examples of tools and methods that this research study draws on include sketching and diegetic prototyping (Koskinen et al., 2011; Kirby, 2010), developing generative toolkits (Sanders and Stappers, 2008), cultural probes and boundary objects (Gaver, Dunne and Pacenti, 1999, 6.1: 21–29; Wright and McCarthy, 2008; Star and Griesemer, 1989; Johnson, Ballie, Thorup and Brookes, 2017), building narrative and discursive scenarios, tracings and role-playing (Carroll, 2000; Margolin, 2007; DiSalvo, 2009). Tracings are a form of 'design tactic', referencing De Certeau's 'Practice of Everyday Life', aiming to reveal the underlying structures and assumptions of an issue (DeCerteau, 1984: 19). They speak to Dewey's concern for making issues apparent to construct a particular public or an agonistic public in DiSalvo's research, allowing for flexibility and diversity with multiple viewpoints in a contested space (Dewey, 1927; DiSalvo, 2009).

Role-playing is defined by Thoring and Mueller as 'acting out a situation based on adopting a character or role' (Thoring and Mueller, 2012: 3). It originates with Russian nineteenth-century theatre practitioner Constantin Stanislavski, who taught actors to evoke acting skills by recalling their own experiences (Stanislavski, 1948). Boundary objects, as discussed by Star and Griesemer, act as translation tools and are flexible and adaptive for local needs and strongly structured for individual use. They can be concrete or fluid in form (Star and Griesemer, 1989: 387). Pierre, Ballie, Thorup and Brooks (2017) discuss design artefacts from PD as boundary objects. Wenger (2000) presents boundary objects as constitutive elements in organisational social learning systems. Such tools and methods form the basis for gathering authentic insights into experimental events. Methods require adjustment depending on their aims and contexts, as discussed by Lury and Wakeford (2012). They argue that '…the method (or tool) must

rather be made specific and relevant to the problem it seeks to address' (ibid: 2–3). A method's inventiveness is situated in a particular time and context (ibid: 7). Binder, Brandt and Sanders state that the method of creatively making produces knowledge – 'when making we use our hands for externalising and embodying thoughts and ideas in the form of (physical) artefacts' (2013: 155). For example, in the researcher's collaborative yearlong project – Text Adventure Time – artefacts called 'Artefakes' were designed to reflect on key narrative aspects of the dystopian storyline. This project is described in this chapter in section 2.7. The critical way of making these tools is understood as a shift from caring about the effects of something with no feeling of implication to a more responsible role within making (Ratto, 2009: 153).

Lindström and Ståhl called their participatory spaces 'publics in the making'. Their publics came directly from the making process within temporary sewing circles set up around mainly rural communities in Sweden. The idea was for participants to stitch their chosen text messages onto pieces of patchwork or fabric, encouraging a space for debate, relating to communication and technology, and encouraging space for multiple viewpoints and approaches creating 'matters of concern' as opposed to 'matters of fact' (Latour, 2004: 231; Lindström and Ståhl, 2014: 156). The project encouraged open-ended participation each time as they gathered circles in the venues they visited, using local actors to guide the sessions. Open-ended debate emerged from setting up the right moveable conditions using an already established tool/method of sewing. Latour, in his paper 'A Cautious Prometheus?' (2008a: 13) asked designers where the tools 'that allow the contradictory and controversial nature of matters of concern to be represented' are. He wanted a means for 'drawing things together'. This is the engagement framework developed in this project to draw a 'public of concern' together to deal with

environmental issues. This is done through a PAR–PDR methodology, as discussed in chapter three.

2.3 Challenges of participation

Many levels of participation are possible in a PD project. This is often designed into the framework or research programme beforehand. Architect Markus Miessen describes participation as an empty concept in itself, only producing content in the act of participating and always carrying a conflict within it (Miessen, 2014). Often, practitioners have high expectations of the role of participation to produce equality, inclusion, agency and empowerment (Bishop, 2011). Participation is not neutral, but loaded with expectations and layers of complexity from the researcher and participants. Setting up the means to participate and collaborate is therefore not a straightforward task. Participation and collaboration are as complex as the world in which these processes happen. Latour and Holert claim that communities addressed by designers 'should be conceived as assemblies whose readiness and willingness to become subjects of interpellations to participate may differ dramatically' (Holert, 2011: 55). Finding the right path, space, position, viewpoint and distance for a PAR project is crucial to producing particular contextual types of thick, entangled knowledge. In the context of communities of practice, Wenger refers to different forms of participation as three modes of belonging: engagement, the ways in which we do things together; imagination, the ways in which we build identities to orient ourselves and reflect on our situation; and alignment – the ways in which our activities align with other processes for the infrastructure to work (Wenger, 2000: 227–228). The particular forms of multi-level and multi-position participative methods that developed on Papay through the research

contributed to the emergence of a new framework and survival toolkit to engage with the island in relation to the Anthropocene. These tools were shown within the practice exhibitions that occurred throughout the project, and documented in the digital fieldwork notebook, highlighting tools that were created.

2.4 Critical speculative design

The idea of speculative design came from Royal College of Art studies in critical design, starting in the late 1990s. Critical design takes a critical theory-based approach to design and challenges assumptions and conceptions about the role of objects in everyday life. The history of critical design stems from early Italian radical design and architecture in the 1970s, with design studios such as Archigram and Superstudio, and architectural futurists and theorists such as Buckminster Fuller originating in the 1950s. Speculative design looks at scenarios and proposals for alternate future visions based on different versions of reality. This includes design fiction methods and future scenario-based projects. Speculative design came from a perceived need by designers Dunne and Raby to visualise a 'what if' scenario for the future. They wanted to use speculative design about the future using cultural probes to open up discussion on possibilities for change (Gaver, Dunne and Pacenti, 1999; Dunne and Raby, 2013). Designers posed questions about how society could be, or even darker scenarios of how things could worsen. However, the design discourse was aimed primarily at other professional designers, rather than specific publics or communities impacted or affected by designs. The idea of public was more about being 'thoughtful in a context of complexity' without direct feedback from the potential public affected (Michael, 2012b: 541). Particularly early speculative design had an important role as it separated itself from the

marketplace and looked beyond this, into the blue-sky future, particularly after the financial crash. It used provocations and events to challenge society and provoke reflection and some debate within design circles. Designers Parsons and Charlesworth's 2014 project, 'New survivalism kits' challenged perceptions of survival and through developing imaginary protagonist survival kits to reflect on what the distant future could mean to individuals, based on the current situation (Parsons and Charlesworth, 2014). Kristina Lindström and Åsa Ståhl's 'Plastic Imaginaries' project from 2014 connects with this study in terms of its use of critical speculative and PD. Although the narrative was speculative fiction, it asked participants to discuss and transform material practice in the future. It was produced during a series of public engagement events where invited participants explored two kinds of hybrid matters – the first was 'plastiglomerates', a kind of stone partly consisting of plastic debris, and the second was common mealworms that can biodegrade Styrofoam. The project crossed multiple northern countries – Finland, Norway, Sweden and Iceland, exploring the global problem of plastic waste that is integrating and affecting our lives, and suggested a local grass roots on-going engagement with a solution in the form of composting plastic in the home with mealworms (Lindström and Ståhl, 2014).

An alternate version of participatory design is presented using speculative discourse in a situated local context. Welsh designer Hefin Jones, working within Goldsmiths, calls this participatory speculation (2015). Jones project Cosmic Colliery involved working with communities in the Rhymney Valley, South Wales, to speculate on the possibility of the local abandoned coalmine becoming an underwater astronaut-training centre. Through participatory events, which culminated in a documentary film and a series of radio interviews with participants, they collectively explored how close they could get to this possibility (Jones, 2015).

As discussed in the introduction, Batton's (2016) proposal for a new design narrative framework spanning multiple scales from micro to macro is now arguably a practical necessity in the current climate crisis. As a designer in this crisis, a key requirement is to understand and co-ordinate multiple levels and scales of engagement with the complex moving system of the Anthropocene. This requires a new articulation framework situated in specific contexts to open up space for action. In remote places such as Orkney, local systems and ways of adapting have developed independently of the global model from necessity, resilience and survival. For example, renewable energy is being pioneered on many islands with community-run turbines and research is emerging into new ways of generating electricity via wind and wave. Laura Watts artist, poet and STS scholar, collaborates and creates speculative futures especially about energy and has recently written about this in her book - *Energy at the End of the World: an Orkney Islands Saga*. She discusses the science and culture around energy and innovation at the Orkney island edge (Watt, 2018). Although connected to the wider network, the island is more affected by local parameters because of its isolation from the central system. This relationship is discussed in detail in chapter six. Architects Sprecher and Aarens discuss the need to focus more on local 'adaptive knowledge' to solve the issues (Sprecher and Aarens, 2017). Local 'design place making' has become more important in this open connected world (Manzini, 2015: 178). Designers such as Manzini and Fry present an alternate world view for design of social change to the modernist problem-solving design coming from Herbert Simon's logic of design, disconnected from local and social interaction (Simon, 1996: 111). Design takes place today in systems of distributed agency, power and expertise and it is becoming more difficult to maintain the isolated fiction of the individual designer genius working in his studio (Manzini, 2015: 24). As designers are immersed in the local, the boundaries between the expert and non-expert

are blurred as everybody makes active contributions. Argentinian semioticion Walter Mignolo states that 'how and what we think is indivisible from *where* we think' (Mignolo, 2012: 6). Where we think influences the way we design and articulate change with what is in front of us. Thinking from a small island context affects the way we as islanders perceive and activate the world around us. Manzini believes that designers are now aiming to regenerate 'the local' by creating 'a new ecology of places: an ecosystem in which local culture and production are able to live and regenerate in a balanced relationship between local and global' (Manzini, 2015: 45). This is apparent in the 'Plastic Imaginaries' project, which explores the hybrid materials ecosystem from a local context connected into global consumption and waste (Lindström and Ståhl, 2014).

In a connected world, local experience is influenced in real time by events happening anywhere. The local joined with the global, or 'cosmopolitan localism', is our interface with the whole world. This is not just a question of scale but of the heterogeneous network that we live in (Manzini, 2015). Morton also discusses this through his term 'hyperobjects', discussed in the section on the Anthropocene in this chapter (Morton, 2013). The concepts of scale and local–global positioning were important factors in the research methodology, and are dissected further in chapter three. For example, in the Papay Probe project, introduced in chapter three, scale and relational positioning are foregrounded in the use, for example, of the DIY positioning tool in Iceland, emphasising context as a critical component in engagement with the environment – a context between the small island of Papay and the large moving context of the glacier. This is discussed in detail in chapter four.

2.5 Resilience as a tool and the ethics of care

Design theorist Tony Fry has discussed the ways in which we are being confronted with 'the dramatic consequence of unsustainability' and the need for new tools to navigate the rate of change. Fry re-positions sustainability within design. He calls it 'sustainment' and defines it as 'a transition to a different way of thinking, being, doing' (Fry, 2012: 61). Sustainment calls for an ethics of what to destroy and what to keep. He looks to ontological design, which looks at the holistic system as a whole, along with all the moving parts that make up the system, in order to design for resilience (Escobar, 2017: 17). Resilience as a concept has many meanings depending on context, including disaster management, sociology, engineering and design systems. In an ecological context, it can be defined as a social or ecological systems capacity to 'adapt to exogenous disturbances and reorganize itself in ways that maintain existing function and identity' (Walker and Salt, 2012: 185). The Oxford dictionary's definition of resilience is 'the capacity of a system to recover from difficulties and to bounce back into shape' (Oxford, 2019). Resilience of socio-technical systems is 'likely to become the most powerful driver towards distributed systems' (Manzini, 2015: 21). This driver requires more emphasis within PD approaches and tools. A cultural shift must happen to make systems recovery possible and change the meaning of resilience from a mainly defensive viewpoint (in the context of global risk) to reconciliation between humans and nature and the complexity of the world (Manzini, 2015).

The counter-argument here is that resilience hides issues of vulnerability and socio-economic inequality (Grove, 2018). The crux of the problem is not designing systems to be resilient but solving issues of socio-economic inequality – a complex, multi-faceted problem. Resilience can be defined in an island context as the capacity for islanders to retain their island essence, culture and traditions while undergoing constant change

(Brady, 2016). Islands and their social ecologies share a sense of continuity in change. Islanders' own history is a source of adaptive knowledge learning from generations before. Climate change is causing loss to habitats and biodiversity, meaning that loss and the impulse to preserve have become critical. We live in two worlds simultaneously – a fractal, centrifugal world and a world in a constant process of fixing and re-invention, 're-configuring and re-assembling into new combinations and new possibilities' (Jackson, 2014: 181). Drawing on pragmatist and phenomenological roots, Jackson argues for maintenance and repair as sites of creativity and innovation, knowledge and power, and a neglected ethics of care. In his paper 'Speed time and infrastructure', he considers how infrastructure is normally invisible in use until something happens, when it re-appears under conditions of failure and breakdown (Jackson, 2014). Star discusses setting up infrastructure in a certain way that will work for some parts of a community but may not fit everybody in a one-size-fits-all scenario – 'one person's infrastructure is another person's barrier…' (Star, 1999: 380). Maintenance and repair are important here. Jackson believes that devices and infrastructures should be 'repair-friendly'.

He proposes an alternative way of knowing, which considers care, breakdown and repair as facts, not exceptions to ordinary life. 'Caring for' an issue, or, in the case of this research, an island, also implies a longer-term on-going engagement (Lindström and Ståhl, 2019). This engagement does not end after the workshop or event, turning matters of fact into entangled concerns (Latour, 2004b; 2005b).

Bellacasa discusses differences between concern and care. Caring, unlike concern, implies doing (Bellacasa, 2012: 42). Mol defines the logic of care as embedded in practice and proposes 'caring for' rather than 'caring about'. 'Caring for' implies seeing yourself as part of an issue and having some responsibility towards it (Mol, 2008: 75).

Latour looks at this ethics of care in terms of Dr Frankenstein and his monster. We need to care for our technology systems and not abandon them as Dr Frankenstein abandoned his creation. Stopping caring about technological systems and infrastructure and their consequences is unethical and irresponsible (Latour, 2005c; 2007a).

These principles of care, breakdown and repair, connected with the long-term design of tools for survival, are important elements in answering the research question. These elements are required to set up a PD approach to engage with and consider fully the longitudinal effects of actions taken now. In the next section, design arguments and debates are discussed within the specific Orkney context, showing why this particular place was chosen as the site for the study.

2.6 Geographic placement: physically situated research

'… I've seen the arc of the earth, From the Birsay shore,
like the edge of a planet,
and the lifeboat plunge through the Pentland Firth,
To a cosmic tide with the men that man it'.

Rendall, 1956: 124

Orkney placement

This research is situated in the Orkney Islands, specifically in Papay. Orkney comprises over seventy islands and skerries, twenty of which are permanently inhabited. Four islands are connected to the Orkney mainland by a series of causeways known as the Churchill Barriers: South Ronaldsay, Burray, Lamb Holm and Glims Holm. The causeways were used as defences during the World war two but now connect the islands and removing the need for boat or plane travel between them, making them feel

less like islands and more part of the Orkney mainland. The rest of the island archipelago can be accessed via regular Orkney ferries and the Loganair eight-seater plane from the mainland. Transport radiates from the main island to the smaller northern isles. Papay is accessed from Kirkwall by two daily ferries via nearby Westray, a journey of two hours (depending on weather and sea conditions) or one direct Papay ferry taking the shop and island supplies each Tuesday and Friday (Towrie, 2004). Papay is also served by a twice-daily plane, taking approximately twenty minutes from Kirkwall airport, often flying via North Ronaldsay or Westray to Papay. This route is in the Guinness Book of Records as the shortest flight in the world, clocking in at two minutes from Westray to Papay ('Guinnessworldrecords,' 2017).

> However, despite its fame, it's an essential lifeline service for the people of Orkney, connecting the individual islands via a convenient air link. It is used by teachers, doctors, policemen, and school pupils, helping them to go about their daily routines with ease and simplicity.
>
> The Orcadian, 2016: para.9

Orkney: past and present

The Orkney Islands offer a rich context in which to situate this anthropogenic research. The islands have a history of close human interaction with the sea, from Neolithic times to present-day renewable wind and wave energy technology (Jones Wickham, 2017). The Orkney archipelago is today often considered peripheral to the rest of the world but was once seen as central (Oliver, 2016). It was a busy hub of activity in Norse times from the eighth to thirteenth centuries and the remnants of monasteries such as St Boniface on Papay, as well as important Viking graves and settlements, are scattered across the islands. The local name for Papa Westray, Papay, given by the Norse, means 'island of the priests.' Papay was a site of much ecclesiastical activity in Viking times, with rich

farmland and warmer weather to grow crops (Rendall, 2002). It has had an ever-changing and complex relationship with the sea and is home to a number of locally based international experts in the fields of archaeology, marine renewables, history and geology of sea-related research (Towsey, 2000). It has many sites of globally important Neolithic archaeology, including Skara Brae, built 5,000 years before Stonehenge. Orkney also has the biggest current Neolithic dig in Europe at the Ness of Brodgar and is home to much research into energy renewables – the EMEC has its headquarters in Stromness.

Island-situated research

Following in the wake of ornithologist Ronald Lockley and Scottish writer and poet Nan Shepherd, the researcher based herself on Papay (Papa Westray), Orkney as an in situ local enquirer (Lockley, 1930; Shepherd, 2011). Lockley is moved to the remote Welsh island of Skokholm to do a comprehensive study of shearwaters, while Scottish writer and poet Nan Shepherd engaged deeply with the Cairngorms through a form of peregrination for most of her life, writing about the dynamics and scale of the mountain biodiversity and environment in relation to her own lived experience and connected to the rest of the world. The island of Papay had a population of 330 people in the 1800s, with 80 people working on the main Trail family farm on the island. The population dropped to ninety by 2001 and now stands at 88 (Scottish Census, 2011). The Papay community consists of a mixture of locally born and bred families and retired couples, who moved to the island from 'the south' (mainland Scotland and the rest of the UK), alongside seasonal visitors with holiday houses. For a small landmass one mile wide, four miles' long and forty-eight metres' high, the balance and infrastructure for surviving and thriving is in the control of the islanders, and the physical and holistic

management and care of the island is dealt with through their direct efforts in the form of an infrastructure of committees and the community council. This is discussed in more detail in relation to the research in the methods and fieldwork chapters.

Writer and cartographer Tim Robinson, who mapped and wrote about the west of Ireland, particularly the Aran Islands, met an old man on his travels who explained the basic geography of an island from an islander's perspective: 'the ocean goes all around the island' (Robinson, 1996: 1). The sea surrounds the community and land and directly affects how life operates. Island studies scholar Depraetere defines islands as 'pieces of land permanently surrounded by water with a land area of at least 0.1km squared' (Depraetere, 1991: 1). Virtually all definitions of islands in government papers describe easily measurable aspects of islands such as area, population, distance from the mainland and transport time from a mainland perspective (Fürst, 2015: 65), or incorporate scientific descriptions of island ecology, flora and fauna, as in Praeger's Clare Island study (Praeger, 1915). The definition of an island goes beyond geography. Islands are culturally significant as places contained and easy to grasp, conceptually and practically. They are sought-after places for tourists tired of the rat race and looking for alternative ways to live and spend time, demonstrated by many of the tourists on Papay. Islands have long acted as 'living laboratories' for ecologists and ethnologists (Berry, 2009: 328). To borrow an analogy from technology, the signal-to-noise ratio is strong in remote islands as man's connection to nature is very concentrated. Kiribati president Anote Tong gave a TED talk in 2016 and spoke about his island's urgent issues with climate change, specifically rising sea levels. He explained that islands such as the Solomon Islands and Kiribati suffer the extreme consequences of climate change first-hand as sea levels rise. Islanders are struggling to hold onto their culture and history with the prospect of moving and re-settling in nearby New Zealand. Transience and

shifting cultural identity are becoming symptoms of anthropogenic life. Tong bought land in Fiji to prepare for the inevitable move of his people as Kiribati rapidly sinks below the sea (Tong, 2016). Following a complaint by a Kiribati islander seeking asylum from the effects of climate change, the UN human rights committee ruled in October 2019 that individuals 'who face climate change-induced conditions that violate the right to life' may not be deported ('Human Nations Human Rights: Office of the High Commissioner', 2019).

Islands and coastal areas are most vulnerable to sea level changes and increased storm activity. However, they represent a concentrated environment in which to experiment and observe changing habitats because they are bounded from the effects of larger ecologies and require a delicate balance of critical mass to survive. The location of this study on the edge of this northern archipelago gave the researcher a direct viewpoint from which to study the research question. Ecologists call this the 'edge effect', where ecological systems blend and transition and new tools and vocabularies can be created to help us survive (Laurence and Nascimiento, 2007). The sense of edge, 'geographical precision' (Baldecchino, 2005: 35) and 'obstinate separateness' (Edmond and Smith, 2003: 4), has been a defining feature of islands. Many historic naturalists and explorers, such as Alfred Russell Wallace and Charles Darwin, saw the advantages of studying island life to obtain an indication of potential future global change. Darwin was an important evolutionary scientist who studied indigenous species, particularly in the Galapagos Islands (Darwin, 1835). Naturalist, biologist and explorer Russell Wallace also recognised the advantages of island locations for studying species:

> Islands possess many advantages for the study of the laws and phenomena of distribution. As compared with continents they have a restricted area and definite boundaries and in most cases their biological and geographical boundaries coincide…their relations with other lands are often easier to comprehend than those of continents.
>
> Wallace, 1880: 189

The self-contained scale and 'edgeness' of islands mean that the changing ecology and environment can be measured and monitored easily. Often, species develop differently on islands because of their isolation from the mainland and their sea boundaries (Darwin, 1835).

In the next section, the notion of island remoteness is discussed – this can be subjective, depending on viewpoint and position.

Remoteness

Hermits' and Irish monks' desire for remoteness was about being at one with nature and God and their chosen remote islands were places for contemplation, meditation and prayer. Islands represented a chance to step away from the rest of the world and think clearly away from mainstream modern life (Orkneyinga Saga, AD2000). Modern desire for remoteness comes from the current fast pace of life partially resulting from constant access to others via social media and technology. Remoteness is a subjective concept in terms of one's position within it. In a population of 88 on a remote island, such as Papay, remoteness does not feel the same. However, cut off from regular access to mainland facilities because of weather, remoteness can be very apparent. In the modern world, the scarcity of remoteness has driven up its value. The isolation of islands, in Bill Holm's view, answers an important need of the human psyche:

> Islands are necessary for us to be able to think about what is true at the bottom of our own character; we need to reduce the world for a while, to count it and understand it.
>
> Holm, 2000: 11–12

This desire is evident in tourists visiting Orkney in search of archaeological and historically rich remoteness.

> Boundedness makes islands graspable, able to be held in the mind's eye and imagined as places of possibility and promise.
>
> Edmond and Smith, 2003: 2

Islands can be regarded as the antithesis of the global issue of climate change – an ungraspable problem too big to hold in one's mind's eye. Living on an island is a complex expression of identity, according to Stratford (2008: 160), requiring sharing an ethos of private and communal living, especially important on a small, populated island such as Papay. Péron argues that 'islandness engenders closeness, solidarity, scrutiny and capacity to accommodate and be tactful' (Péron, 2004: 330). Daily living at close quarters, and the need in a small island to come together and participate in collective decisions that impact ways of living mean that 'a kind of 'careful, layered identity' is developed (Fürst, 2014: 71). She offers at least a partial explanation: 'against the background of rapidly increasing personal mobility and globalization of worked economies, the island can be seen to be the quintessential physical place' (Gillis, 2001: 78). Islands are regarded as an escape enabling direct connection with the environment. In the global context, islands have become prime locations for remoteness.

Within the bounded communities of small islands, particularly as small as Papay, it is possible to imagine a social movement starting through positive examples provided by a small group of islanders, moving towards a tipping point beyond which momentum for

change becomes irresistible. The ESRO project initiated on the island is one example of this. This climate change energy-saving recycling project was funded by the Scottish Government and was designed to help reduce carbon and fuel poverty and encourage islands to be more environmentally friendly through recycling, re-using and increasing clean island self-sufficiency (Climate Challenge Fund, 2017).

> …Being marginalized from the process of globalized industrial activity (either by chance or by design) can have certain benefits.
>
> Novaczek, 2015: 146

A sense of place and power over change represent resources that, in these precarious times of climate change and political instability, are sought-after commodities. For this island agency and sense of elevation or separation from the 'normal' globalised, connected world, this research has taken place within this dynamic island space.

2.7 Recent projects

In this section, interdisciplinary art-design-science engagement projects are discussed, which resonate with this research in terms of approaches and ways of developing tools. The examples selected aim to be transformative in their interactions with communities and environments, not just 'consciousness-raising' (Holt, 2015: 10). They all put forward diverse forms of toolkits or systems to deal with gathering and understanding 'matters of concern' (Latour, 2004: 231) to move towards long-term change.

The first examined is the practitioner collective 'Futurefarmers', who use participatory methods such as workshops and events, walks and active making processes to promote reflection and alternate discourses around the human–natural systems relationship, as in the project Flatbread Society. Futurefarmers consist of artists, designers,

anthropologists, architects, scientists and farmers. 'Flatbread Society' used grain as a cultural probe to consider the interrelationship of food production and cultural and knowledge production. The project operated through a series of public programs and a specially built 'common' bake house and cultivated grain field at Bjørvika in Oslo, Norway. The project lasted eight years and resulted in the formation of an urban gardening community called Herligheten, and a full time farmer hired, in collaboration with the Norwegian Farmers Union ('futurefarmers', 2019). This project resonates with this study in its use of on-going, slow, situated participation methods on multiple scales – local and global – and the extended timeframe involved.

Transitional designer Hilary Cottam is currently developing a project around a call for social revolution. She calls her manifesto 'Social Revolution 5.0'. Cottam works with communities and governments across the world and uses intervention workshops, speaking, writing and radio as engagement methods. She is looking for transformative change and broad impact on socio-economic systems and is concerned with the need for people to navigate the challenges of climate change and technology driven socio-economic change (Cottam, 2019) calling for a big vision involving what is already working on the ground. She therefore not only wants designers to consider the longer term but also build on what is useful and available at present. Her work connects with this study in its aim to articulate multiple scales and timeframes from the ground up: 'from margin to centre, to harness the resources of this century and liberate our professionals to support change' (Cottam, 2019).

Designer, artist and engineer Natalie Jeremijenko developed the environmental health clinic at NYU in 2011. This project looked at responsibility for the environment from the standpoint of a 'crisis of agency' (Jeremijenko, 2016: 3). She believes that re-imagining our relationship with natural systems is the 'space race of the 21st century' (Ibid, 2016).

The environmental health clinic was set up to connect personal health with the external social and ecological environment rather than just monitoring the private body. Visitors to the clinic were called 'imPatients', as Jeremijenko posits that they do not want to wait longer for legislative change. They make appointments to discuss their concerns about the environment and at the end of their consultations they receive prescriptions to activate interventions without the designer. The 'prescriptions' are used as maker probes to visualise the concerns of the 'imPatient' (Ibid, 2016). This project worked as an imaginative activist set of design interventions to highlight environmental issues. The limitations of the project were perhaps in the expert model – the artist–designer as expert, or the doctor in this case, handing out 'expert prescriptions'. On one hand, the project acted as a provocation to protest against the healthcare system. On the other, it retained the top-down doctor–patient relationship.

The final three examples given particularly align with this research in their different ways of participatory engagement with the coast – the first is the feminist lab CLEAR (Civic Lab of Environmental Action Research), which emphasises the ability to re-calibrate design tools for 'multiple needs and moving concerns'. COCOAST with a lack of ability to re-calibrate tools, while two Orkney-based artists, Sanderson and Nimmo, depart from the COCOAST model to develop a science engagement project connecting with limpet climate indicators, performed at the ØY festival in 2018 (Papay LookOut station, 2018)

CLEAR

This example is slightly different. Run by a group of 'non-designer' scientists, CLEAR describes itself as a 'feminist, anti-colonial lab specialising in monitoring plastic pollution' (Liboiron, 2018). It resonates with this study, offering a transformational

model or framework for engagement with the local environment and permanently situated in a remote location within the University of Newfoundland.

It aims to put 'the community on a level collaborative footing with scientists' (Liboiron, 2015) and present an open-source policy to data management. They have designed a 'lab book' manifesto to encapsulate their approach. The lab has developed a suite of inexpensive tools for citizen-science research, capable of being built and repaired by non-experts and using local materials. Tools such as 'BabyLegs' are made from baby's tights, lemonade bottles and other material. BabyLegs incorporates trawling for floating marine microplastics from boats. CLEAR's definition of 'participatory citizen science' is based on people participating in how collected data is gathered, managed and communicated. Communities can use their own expertise, question data and direct where data goes if it looks like it will represent them in a harmful way. By being responsive to what is happening within their communities, they can adjust and 're-calibrate' methods of doing things depending on what is happening in the real world (Liboiron, 2015).

A responsiveness and ability to re-calibrate tools 'on the fly' describes a moving peripatetic method equated with the tools in this study and dealing with large-scale situations of change. Emphasis on context, adaptability and tools of changing scale are important for resilient systems in the future when considering the changing environmental crisis. For this project on Papay, methods and tools were re-calibrated as the project developed and participation increased in numbers and duration. This aspect is discussed more in the chapter four.

Community-focused Orkney initiatives

Several community-focused environmental initiatives were underway in Orkney at the time of the researcher's study. These originated nationally, outside the Orkney archipelago. One project is introduced here in the context of exploring toolkits in relation to the expert–non-expert relationship. COCOAST promoted community citizen science to survey and document changes in coastal species between 2015 and 2018 ('Capturing our coast,' 2015). COCOAST offered free training and physical toolkits, including species information cards and hand grids, to help with surveying and identifying species. It was funded through the Heritage Lottery Fund, with many stakeholders involved. Limitations of this project included that the community had no long-term control or idea about what happened to the data they produced. They were essentially working for scientists as 'volunteers' without complete ownership of the process or their data. Data was collected using a kit designed centrally and not co-designed by the community. The kit did what Turnbull suggested – collecting data but not 'indexical with regard to place' (Turnbull, 1993: 53). The data then disappeared into the database without any feedback. The flow of information moved from scientist to community and back to the scientist and stopped there. COCOAST are planning a second project, which aims to address this data feedback issue in order to allow volunteers have more agency within the process of collecting data (Delany, 2019).

Within the BSW LookOut post 2018, COCOAST was curated by the researcher into the suite of events. The COCOAST surveying idea was effectively recreated to become more creatively participatory and imaginative via local Orkney nature enthusiast and philosopher Nimmo and 3D artist Sanderson (Higgins, 2016).

Nimmo and Sanderson radically 'localised' the essence of the COCOAST project, combining the survey with their project exploring limpet behaviour as an indicator of

climate change. They engaged participants in the micro-movements and behaviour of limpets using a bespoke non-expert toolkit designed especially for the job. By painting nail varnish on specific limpets and using GoPro cameras to record their movements, they tracked the movements during the day from low to high tide, audio-recording their grazing sounds with a specially designed DIY listening device. Nimmo and Sanderson's underwater video time-lapse of the movement of limpets revealed their hidden world and showed how animated and alive they are (Figures 6–7). Sanderson also developed an outdoor workshop, pewter-casting limpet shells on the beach as a method of slowing down and focusing on the creatures and their shell structures. The casting methods required minimal expertise and a small amount of risk using the blowtorch to heat the recycled pewter, giving participants a sense of agency. At the end of the session, they could take away a self-cast limpet shell made from reclaimed pewter – a three-dimensional snapshot of coastal limpet life (Higgins, 2018).

2.8 Summary

In this chapter, the narrative began by discussing relevant literature and key players in the Anthropogenic debate, before discussing key arguments within participatory and critical design practice-based contexts. The final section described a selection of recent interdisciplinary participatory art and design engagement and community-led initiatives that are particularly relevant to the study as they construct specific temporary publics to articulate engagement with the environment. The next chapter on methodology details and discusses the methods developed to answer the research question from the particular island-situated northern viewpoint of Papay.

Figure 4: Text Adventure Time project - measuring and mapping the surroundings using the Birds Eye View tool, Hull, 2016. [photograph]. Source: Dave Mee

Figure 5: Text Adventure Time project - Birds Eye View Hat mapping toolkit - sound recorders, ipads, go pro cameras, red ribbon tethers, weather balloon, cable ties, adapted safety hat with headphones, walking and mapping book, 2016. [photograph]. Source: Saoirse Higgins.

Figure 6: Sanderson and Nimmo: close-up marking limpets with nail varnish to track their movement,
Papay east shoreline. ØY festival, 2018.
[photograph]. Source: Cassia Dodman.

Figure 7: Sanderson and Nimmo limpet-tracking project. Participant marking limpets with nail varnish to track movement underwater over time. Part of the 2018 ØY festival (PapayLookOutStation, 2018).
[photograph]. Source: Cassia Dodman.

3. Methodology

Figure 8: South Wick Beach - mapping the coastline, Papay shoreline research station, 2016. [photograph]. Source: Saoirse Higgins.

3.0 Introduction

This chapter details the methodological framework and process used within a single case study. It begins by explaining why a single case study was chosen as the research strategy, and how this fitted in to the particular context and aims of the research. It then moves on to explain the philosophical and theoretical positioning in relation to the Participatory Action Research-Programmatic Design (PAR-PD) methodological framework. Programmatic Design Research (PDR), in terms of programme design, draws on PAR. The PAR-PD methodology was designed in context to produce a narrative of participation between island, islander and practice-based researcher focusing on understanding and answering the research question. The research questioned how PD approaches could articulate engagement with the Anthropocene within a distributed island world context.

Practice-based methods drew strongly on in situ participant observation within this remote context. The ethics involved in the development of the project are discussed in relation to being a researcher living long term on Papay and how this affected the progress, process and participation. Finally, the analytical framework of thematic analysis is discussed in relation to island interviews, design tools and events and exhibitions (Braun and Clarke, 2006). This leads on to a description of the fieldwork detailed in chapter four.

3.1 Single Case Study

This research has taken the form of a three-year single case study on the Orkney archipelago. A single case study is defined by Yin as ‘an empirical enquiry that investigates a contemporary phenomena within its real life context’ (Yin, 2003: 13-

14). An empirical enquiry is defined as a way of gaining new knowledge via direct and indirect observation and experimentation and can be a mix of quantitative and qualitative data. The extended length of the study allowed the researcher the time for orientation, immersion and practical experimentation along with reflective research development and iterative action within a three-year seasonal cycle of island living. The single case study for three years on Papay afforded the researcher a focus and intensity to study the interconnection between islander and island and begin to construct a potential form of 'new narrative' in order to understand the current 'entangled' or 'messy' situation (McFarlane, 2016; Law, 2004: 4).

3.2 Methodological Framework

Epistemological and theoretical Positioning

This study is situated epistemologically within a social constructivist paradigm, where knowledge is co-constructed and has multi-viewpoints of the world (Lincoln and Guba, 1985). Historian Braudel defined a version of these viewpoints relating to time that is relevant to this study within the 'long durée' or 'long now' (Braudel, 1969: 725-53; Brand, 1996). The 'long now' is defined by Stewart Brand as a 10,000 year, long-term vision of the future by humans in order to develop a sense of responsibility for planetary survival (Brand, 1996). Brand and Braudel look to this scale and the need to be able to visualise this timescale as an answer to our 'troubles' (Haraway, 2016). Braudel defines three timescales: individual or real time, social time and geographical 'long now' time. For this project the researcher utilised these scales as part of the epistemological positioning method reflecting on the fieldwork - the local view, the relational view and

the geographical long-view (Braudel, 1969). The local view being the perspective within the island ecology itself; the relational view between islander and interisland; and long view is the external global scale. This epistemology is grounded on a relativist ontology, where realities 'are multiple, constructed and holistic…and the enquiry is value-bound' (Lincoln and Guba, 1985: 7). Reality is the multiple interactions of people, place and things (Law and Mol, 2002; Denzin and Lincoln, 2005). In this case, reality is constructed by the interaction of the islanders - expert and non-expert and with the ecological island environment - the land and sea, the migrating birds and other island species and fluctuating weather patterns that effect life strongly.

This study also draws from new materialist ontological thinking, where the emphasis is on the materiality of the world and human/non human agency. New materialism examines how relational networks or assemblages of animate and inanimate affect and are affected (DeLanda, 2006: 4; Mulcahy, 2012: 10; Youdell and Armstrong, 2011: 145). Instead of separating epistemology, ontology and ethics it is an 'entangled' ethico-ontological-epistemological framework (Barad, 2007). It looks at the relational connections between events whereby 'everything is relational and contextual rather than essential and absolute' (Fox and Aldred, 2015: 5; Bennet, 2010). This flattened ontology is contested by other new materialist thinkers, such as anthropologist Tim Ingold and Eduardo Kohn, who are interested in transforming human/nonhuman (e.g a tool, a technology or a building) into an animate/inanimate distinction (e.g a bird/ a rock) (Conty, 2018). New materialist ontology tries to break out of dualisms such as 'the mind-matter and culture-nature divides of transcendental humanist thought' (van der Tuin and Dolphijn, 2010: 155), but is then in the midst of more social dualisms of human/non-human, animate/inanimate and inside/outside. So there is a tension between the idea of the flattened ontology and dualist view.

Social constructivists focus on texts, 'systems of thought' and 'discourses', while new materialist thinkers, such as Latour and Haraway, focus upon social production (Fox and Alldred, 2015). Social production emphasises elements that may not necessarily be material but have the capacity to contribute to produce material effects, such as in this study between viewpoints, time and scale; while social construction is the lived experience of materiality – such as in the islanders lived experience of island life. The focus in social constructivism on systems of thought and discourses can create a distance between theory and active practice disconnected from the materiality of the world, which new materialism places centre stage (Fox and Alldred, 2019: 5).

Social constructivists believe that objective knowledge and truth is dependent on where you are positioned and your perspective. So constructions of reality 'do not exist outside of the persons who create and hold them; they are not part of some 'objective' world that exists apart from their constructors' (Steier, 1991: 2) (Guba and Lincoln, 1989: 143). There is a tension in social constructivism between claiming that knowledge is coming from individual minds and the view that knowledge can be shared and disseminated publicly. New materialism critiques the objective view and looks at local accountable ethical viewpoints and situated knowledge (Haraway, 1988). The need for situated knowledge is seen as an urgent matter to counteract the external universal 'God's-eye view' of the Anthropocene (Alaimo, 2017: 90). But this in itself pushes against distributed agency with technology localised everywhere (Latour, 2011). How can there be specific accountability for the issues of climate change within a world of distributed agency? There is a tension between the politics of the local viewpoint that is seen as not having the capacity to speak for the world outside, because it is focused on the situated, and the outside objective 'God's-eye' macro view of the Anthropocene. This delicate balance between the two viewpoints is examined within the research.

The methodological framework draws on both theoretical models in order to develop a thick entangled description of this complex Anthropogenic 'assemblage' gathering multiple viewpoints in order to examine the research question from human (islanders/experts/experts by experience) and non humans (island, sea, coast,) perspectives. As discussed in Chapter 2 the research positions itself in Latour's post-disciplinary hybrid world of experts-non-experts and localised knowledge, informing macro scale issues of climate change (Guba and Lincoln, 1989: 143).

Using contextual methods adapted from a PAR-PDR framework, relational dialogic patterns between island and islanders were 'detected and amplified' to study the question of how to contribute to survival in the anthropocene (Law, 2004:14).

PAR-PDR framework

The methodological framework developed for this study draws on PAR and PDR using a set of programmes of intent from Programmatic Design Research methods (Brandt, 2016). PAR is an approach to research originating from the social sciences that emphasises the involvement of stakeholders in knowledge production that aims for new insights and social change (Bergold and Thomas, 2012). It promotes the concept of emergent new knowledge co-created between practitioner and collaborator (Frauenberger et al., 2015). In this case, knowledge was co-constructed by the interaction between the researcher, islanders and island. The PAR process cycled through reflection and action, in collaboration with participants, and ended with an evaluation of the journey. This cycle occurred within three key experimental events within the three-year cycle of the research.

PDR is specifically considered for research through design processes (Cross, 2006; Gaver, 2012; Seago and Dunne, 1999; Frayling, 1993). Research through design

processes are based on a brief or 'programme' that states the overall intentions of the experiment (Frayling, 1993). It cycles around practical experimentation at the core, with results formulated within a reflection stage, which then feeds back into the programme and iterated to the next progressive level to advance the research forward to the next stage of enquiry until a conclusion and results (Hallnäs, Brandt, Redström, and Eriksen, 2011). Krogh, Markessen and Bang (2015) describe several ways that experimentation is developed as a method with PDR. They categorise them into five methods: accumulative - where the experiments are in a laboratory setting and focus on the cognitive aspect and not the contextual; comparative - where design cases are compared with each other; serial - where experiments are done sequentially and insights gained from the experiment before, to move on to the next one; expansive - revealing the qualities of an area through investigation, expansion and broadening; and probing - where design ideas are explored as they emerge and are impact-oriented. For this study probing emergent ideas occured through the events and workshops, which allowed for the most 'drifting' (Krogh, Markessen and Bang, 2015: 44). Drifting is the point in the process of experimenting where the research question begins to stabilise and get reframed to make contextual sense after a cycle of reflection from the experiments that have gone before. It correlates to the similar concept of Schön's move-testing experiments (Schön, 1983: 155). Schön categorises the design experiment into three - exploratory, move testing, and hypothesis testing. Exploratory - is used to probe and get a feel for the situation, hypothesis testing - to check and confirm or advance a hypothesis, and move-testing - used to test an idea by making a move to consolidate the question (1983: 145).

The PAR-PDR methodology employed a series of methods that aligned with the ethos of participatory design, enabling active engagement and multiple participatory positions to

explore and reflect upon the ‘present in action’, as outlined by Tandon. He saw action as a legitimate mode of knowing, which thereby took the realm of knowledge into the field of practice (Tandon, 1996: 21). Paulo Freire's concept of praxis flows from the position that action and reflection are united in a loop - ‘reflection and action on the world in order to transform it’ (Freire, 1972: 149).

> Reflection without action is sheer verbalism or armchair revolution, and action without reflection is pure activism, or action for action's sake.
>
> Freire, 1972: 149

This cycle of reflection and action was particularly important for this research as it tackled the question of activating, engaging and developing a responsibility for the surroundings and a particular connected and mindful relationship with the environment, building up a sense of agency and power to affect transitional change in the ‘long view’ (Tandon, 1999; Braudel, 1969: 725-53). Haraway described the context for doing research in the field as a state of constant movement from the present, with the researcher adjusting all the time to allow for the state of moving stabilisation. In other words, a state of change that is manageable. This was done through close participant observation, interviewing, re-calibrating of tools and methods as the project progressed and recording in the digital fieldwork notebook. As described by Schön (1983) and highlighted in action research, the reflective practitioner operated in a constant cycle of actively making and doing, and then reflecting upon the action, iterating throughout the process

In the same vein, PAR sees that action and reflection must go together, even temporarily so that praxis cannot be divided into a prior stage of reflection and a subsequent stage of

action. When action and reflection almost take place at the same time, oscillating between the two states, it would be possible that they mutually illuminate each other. Using PAR fosters agency through supporting participants to move from a place of dialogue about issues that are of concern, to a place where they take action on those issues (Crotty, 2008:11; Reason, 1994; Denzin and Lincoln, 1994). The PAR-PDR methodology was innately emergent (Escobar, 2017) and produced unexpected results that could not be predicted before practicing, which suited the emergent nature of island life for the researcher and the inductive nature of the research.

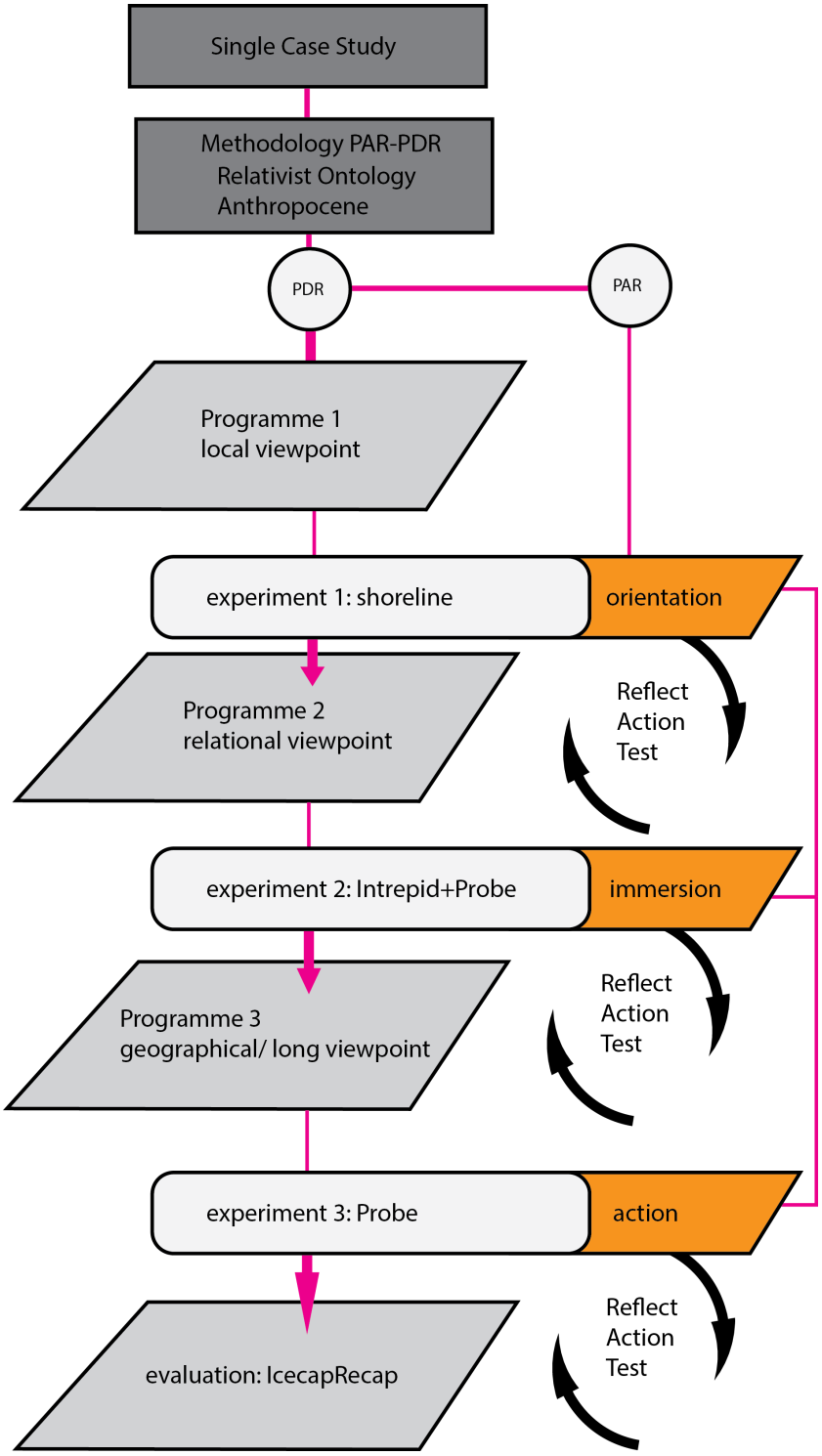


Figure 9: Methodological framework-PAR-PDR, 2018. [diagram]. Source: Saoirse Higgins.

With reference to Figure 9: Methodological framework-Programmatic Design Research is influenced by PAR and PD and places the construction of new knowledge in the dialectic interaction between practical experimentation, and the overall programme of intent (programme 1, 2, 3) (Redström, 2017: 96). The programme of intent guides what type of action or experimentation happens (experiment 1, 2, 3) and the appropriate methods and processes used to test the enquiry, within this specific island context. The overarching research question - How can participatory design approaches articulate engagement with the anthropocene in an island-situated context? - interacted on the very outer layer of the methodological framework, connecting to the broader external research community, such as the BSA and IGS, and critical participatory design researchers exploring issues of the anthropocene (Larsen and Johnson, 2016). As discussed in the PAR-PDR framework, the types of experiments played an important role in describing the research interests and programmatic positioning. In this study decisions were taken as a result of live processes changing and evolving within particular local island parameters. Bellacasa describes it as 'sticky' knowledge (Bellacasa, 2012: 91). Sticky or situated knowledge is data that collects surrounding influences, in accuracies, tolerances and epistemologies of a particular viewpoint (Haraway, 1988). In this study the viewpoint came from a theoretical position of social constructivism, drawing also from new materialist ontologies - sticky knowledge within a seasonal changing island environment, infrastructure and island politics.

3.3 Situated knowledge through a PAR-PDR methodology

To answer the core research question the methodology was divided into three PAR phases and three PDR programmes of intent. These programmes of intent were set up to

emphasise three specific viewpoints within the fieldwork, connected to three years living on the island. Year one consisted of the orientation phase and local viewpoint; year two overlapping to the third year was the immersion and engagement phase with a relational and long viewpoint looking from the island outwards; and year three explored the external long view in relation to the island, and evaluating and analysing the research data. The orientation phase allowed the researcher to settle into the island and understand the island system. The immersion phase allowed for more active work on the research, as the researcher became familiar with the islanders and infrastructure, which opened up the opportunity for more in-depth participation and bespoke experiments. The final phase occurred in the last year living on the island, when the work was completed, evaluated and analysed.

1 Orientation

The PDR programmatic framework of intent began by exploring and investigating the research question through initial yearlong participatory observation and participation in island life. These methods are discussed in detail in chapter four and chapter six. The key objective within the orientation phase was to be broad and inclusive while engaging with different communities, with the intention at a later stage to focus on deeper engagement within specific groups. Through participatory observation and reflection via field notes, the experiments were designed to encourage key figures in the community to participate. Participatory observation took place through socialising and getting to know the islanders via community gatherings, events and presentations and also informally interviewing islanders both on Mainland and Papay. The island ways and means of organising events was noted and reflected upon within a digital fieldwork

notebook. It was important at this early stage to begin to explore the research question and examine island-islander relationship and responsibility. As observation and new islander-researcher orientation took place in 2016, the researcher joined in on island seasonal life, but at the same time remained towards the background to build up trust as the research progressed (Teal and French, 2016). This background status was achieved through consciously not taking part in everything that was presented and not actively volunteering for island tasks straight away; but experiencing, observing and reflecting on all the activities taking place throughout the year and naturally building friendships and connections with people on the island. This status continued until there was a greater understanding of how everything worked. This understanding came from a one-year seasonal cycle of island life, which included one winter. Winter in Orkney is deemed by Orcadians as an initial milestone for new incomers, elevating the incomer status having experienced constant northern darkness and regular extreme stormy weather. Trust was built through ethically developing relationships and an understanding of island working rhythm and ways of living on a remote island. More insight into island life is discussed in chapter six and reflections documented in the digital fieldwork notebook.

Key methods-programme 1: Papay shoreline research station

The main method used to gain insight into the islanders' connections with each other and their environment was an externally located PAR event with a series of participatory tasks and a specially designed generative tool kit for exploration (Sanders and Stappers, 2008). A suite of playful exploratory tools was developed using locally found materials, and referencing historic analogue environmental science fiction measuring and exploration devices, such as early Kibbo Kift tools and exploration tools

of explorers such as *Jacques Cousteau*, detailed in chapter four and illustrated in Figure 16 - 26. The references aimed to bring a sense of adventure and connection with their environment, producing a warm empathetic interaction for the islanders, taking into consideration the lack of technical connectivity on the island (phone, gps and internet). These tools were designed to open up multiple ways for the islanders to participate and interface with the shoreline, taking the local island viewpoint out of the normal daily perspective and magnifying what is normally invisible or unimportant. The design of the tools aimed at disrupting normal island rhythm and producing a speculative and discursive participatory use within the future anthropogenic world, prompting thought about the relationship and connection with our surroundings (Jones, 2015; Tharp and Tharp, 2013). Many of the tools were introduced and adapted several times through the subsequent experiments to keep narrative continuity and build up a project history, along with encouraging participation through learnt familiarity with the artefacts.

1-2 Orientation to immersion

Key methods-programme 2: Papay Intrepid Explorers

Fictional narrative and role-playing were used as central methods in this event to change the imaginary viewpoint for the island children to look at a 'long view' global scenario. The island was imagined as sinking beneath the waves, with the children saving the island through an investigative, experiential understanding of the surrounding environment. Role-playing was used to act out a 'what if' scenario eliciting a response from participants in the event. This method is used frequently within PD and PAR to imagine a scenario and act out alternative ways to interact without real risk. A dialectical balance was developed between 'what is' and 'what could be' in the design

(Ehn, 1993: 8). Halse and Johansson talk about estrangement of the familiar in 'what if' scenarios that allow distance to discuss present experiences to others (Halse et al 2010; Johansson, 2008). Iverson and Dindler talk about fictional spaces to promote participation in their project (Broderson et al. 2008; Iverson and Dindler, 2008 & 2010). Visualisation of data through drawing as a method was prominent in this event, as this was a familiar tool used at the Papay school by the school children. Data, such as measuring the tide retreating from the shore, was collected throughout the week and visualised by the children using coloured pencils and A0 paper. Data graphs were hand-drawn, with glitter added for effect. A fieldwork exhibition at The Kelp Store presented the audio-visual outputs of this weeklong experiment and generated further interest and informal discussion with other parts of the community, including the parents of the children involved (Figure 29 -35).

2 Immersion

Key methods: programme 3: Papay Probe project

The third key experiment was called the 'Papay Probe project' (Figure 36 - 53). This took place when the researcher was more familiarised with the island and islanders and had observed and participated in island life for a full year. It aimed to position the research within debates on how designers can contribute to new narratives and tools of agency or 'conviviality' (Illich, 1973:75) that articulate responsibility to the environment. It consisted of two participatory workshops, expert interviews and an expedition to Iceland. It drew on the concept of future workshops introduced by Jungk and Müllert in the 1980s as an efficient model to engage citizens in change processes via co-design. Jungk and Müllert (1987) proposed workshops for social change, especially for non-expert participants looking at envisioning a better future. They proposed

several phases for the workshops; the preparation phase; the critique phase - where the problem is investigated critically and the question concerning the problem is framed; the fantasy or visionary phase - where participants work out a vision of the future; and finally the implementation phase - where the ideas are evaluated with regard to their relevance and practicality (Jungk and Müllert, 1987). In this case, the co-design workshops focused on islander's relationship with local and global environment; hypothetically; a 'see saw effect' - Papay island sea levels rising and Iceland glaciers melting. This experiment engaged the community and external participants in the co-development of a suite of participatory designed DIT (Do It Together) experiments to 'check the health' of the Mýrdalsjökull glacier in Iceland and reflect and compare the issues of climate change in relation to local conditions. In collaboration with BSA, PDT and the IGS, the 'Papay probe' was designed and sent with the researcher on an expedition to Iceland and tested on the glacier, with the results brought back to Papay.

3 Final phase: Final fieldwork, evaluation and analysis

Key methods: programme 4: IceCapReCap

The fourth participatory event was organised to gather island participants to celebrate and reflect and evaluate on past events in relation to this study, and also to feedback on steps to be taken for sustainable future action in the context of 2019 Science week and beyond. This took the form of an exhibition display at The Kelp Store of the project artefacts, from experiments 1, 2 and 3 and all workshops and events within the three years, along with printed documentation images and video (Figure 54 and Figure 55). Participants that had taken part in any of these events were invited to take part through hand-delivered invitations to each house. Methods included five-minute individual, semi-structured interviews and paper questionnaire feedback, along with voting on the

best tools used within the three years of events using large, fluorescent coloured sticker dots. The voting acted as a probe to focus and encourage reflection and comments from the former participants about their experience of the events and tools. A traditional raffle was held offering theme-related prizes to celebrate participation, along with a special IceCapReCap cake baked by one of the young islanders learning how to bake for island events.

3.4 Overview of processes and methods

Overall, the choice of methods was driven by a desire to be ethical, sensitive, build trust, respond to contextual nuances and primarily gather qualitative messy data, while building strong collaborative relationships. From initial exploratory visits to the island in 2015, and subsequently living there full-time from March 2016, appropriate contextually sensitive research methods were developed through a process of participatory observation and experimental testing.

> Method is performative. It helps to produce realities. It crafts arrangements and gatherings of things.
>
> Law, 2004:143

To deal with the complexity of the 'messy' situation of the real world, more than one method is required to understand more than one viewpoint. The world is 'an entanglement of pathways from which action emerges' (Ingold, 2011:64). Law acknowledges the entanglement in reality, and the need to illuminate this non-linear reality in the ways that we study it. He describes 'method assemblage' as a reality detector and reality amplifier (Law, 2004:14). The grouping of the two words 'method' and 'assemblage' aims to produce accounts of a moving arrangement of things in a

situation of constant change. To understand the complexity of the anthropogenic viewpoints on the island a selection of methods were used to 'uncover new insights, and re-examine interpretations in unanticipated contexts' (Kincheloe, 2001: 683). The methods revolved around the construction of tools, such as the DIY tide-movement observation kit (Figure 16-19), to generate conversation, reflection and action while measuring and monitoring. Participatory experiments played with scale, connecting with external global narratives of the anthropocene (such as BSA and the IGS's science work on glaciers). Participative DIT events explored key themes and the research question, with regular shorter events in between to build up momentum and keep the research narrative flowing within the timeframe.

Contextual ethical methods

Nakashima and Roue's definition of indigenous practices describes them as:

> The complex arrays of knowledge, know-how, practices and representations that guide human societies in their innumerable interactions with the natural milieu
>
> Nakashima and Roue, 2002: 315

Indigenous practices or knowledge systems in this research are the local island practices and 'know how', the ways and processes that the islanders communicate and view the world. Indigenous researcher Tuhiwai maintains that the researcher has to nurture a respectful, reciprocal, genuine relationship, which lies at the heart of community life. Individual island interviews took a long time to develop until there was a reciprocal comfortable trusting relationship (Tuhiwai, 2016:125). Ethical codes of conduct were developed as the island system became clearer to the researcher. Codes such as

organising events at appropriate times of the year that did not interfere with what was already going on, and followed the island ways of promoting the participation in order to connect and get 'buy in'.

Conducting a single case study for an extended period of time requires acknowledging the situatedness of the context (McAra, 2017). Being sensitive in the interactions between researcher, islanders and external organisations related to the project (BSA and IGS) required careful ethical considerations. The core position came from the islanders and island, with external organisations supporting the creative development. The study draws on the concept of relational ethics (Ellis, 2007), where the researcher takes responsibility for their changing relationship with participants and collaborators over time. Relational ethics recognises mutual respect, dignity and connectedness between researcher and researched (Lincoln, 1995: 287). By iteratively reflecting and questioning each step within the PAR-PDR process, the researcher managed the delicate balance between researcher, participants and island environment. All the participants that took part in events, exhibitions, presentations, workshops and interviews were fully informed and aware of their participation and what that meant in terms of outputs, with signed consent forms designed specifically for each experiment and event. The consent forms were sent for approval before the events to the GSA ethics committee, and samples are in Appendix 1. Any material that was used in exhibitions and presentations throughout the process was discussed again with the participants involved, making sure consent was still given. All the participant's names have been left out of the study to preserve the privacy of a small island population. Any exhibition material was presented first to the Papay Development Trust for approval before it was shown in public. All audio interviews and visual material has been stored on a special protected hard drive for the purposes of the PhD research and practice.

Participatory observation methods

Participatory observation took place through participating in island life for an extended period of three or more years, observing, reflecting and gradually understanding island practices from an island perspective. The experience of island life was documented in general via time-lapse video, photography and audio field recordings, along with a digital fieldwork notebook. The representation that was built from this by the researcher was neither 'theirs' (the islanders) nor 'yours' (as the researcher coming in) (Agar, 1996). It was a viewpoint based on the researcher's view mixed with indigenous and incomer-island view. Halse and Boffi maintain that where method is used by design disciplines the 'core ethnographic aspects of empathy, open-endedness, attentiveness to situatedness, have met with 'designerly competencies' (Halse and Boffi, 2014: 4). The role of the researcher crossed over especially to participant observation when taking on the role of part-time environmental officer (ESRO). This positioned the researcher as a working member of the island. Participant observation has a history in anthropology and sociology. It is a method that involved the researcher fully participating in the community and learning island culture at the same time - 'the process of learning through exposure to, or involvement in, the day-to-day or routine activities of participants' (LeCompte 1999: 91).

DeWalt and DeWalt believe that the goal of participant observation as a design method is 'to develop a holistic understanding of the phenomena under study' (DeWalt and DeWalt, 2002: 110). Bernard (1994) discusses the reasons for using participant observation - how allowing different types of data means the researcher can reduce the 'reactivity' of people acting a certain way when aware of being observed. This awareness happens often in an island situation such as Papay with cruise ships and tourists visiting and various TV documentary crews filming and observing island life. Participant

observation can be limited by it's dependence on the researcher's position, what the researcher chooses to observe, and the type of relationship built by the researcher within the community, as discussed by Schensul, Schensul and LeCompte (1999). Merriam (1988) suggests that the important question is how the researcher accounts for the situated observations in the explaining of the data (Kawulich, 2005).

Semi-structured interviews

A series of semi-structured interviews and individual conversations with key islanders and Orkney-wide experts took place on Papay and on mainland Orkney. Semi-structured interviews (as opposed to structured interviews) are more flexible in nature as the questions can react to the live conversation flowing and the direction the participant is interested in going, in order to develop a deeper understanding of how the person thinks surrounding the research topic and question (Bryman 2012: 470). Initially in the orientation phase in 2016, older retired members of the island community were approached for informal conversation to gain an historic viewpoint and overview of the island, since they had the time to talk and had experienced and viewed population and infrastructural change over the years. Locally known Orkney scientists were approached to gain an insight into the archipelago wide viewpoint on environmental research and their level of engagement with the islanders and islands. This first set of interviews took place in the first year of the study as part of an exploratory phase to understand the context linked to the topic. The next set in late 2017/2018 focused in on specific key islanders with particular responsible roles on the island, relating to the research question. Based on initial 'in the field' reflective analysis of the first set of 2016 conversations, and building on a more established and informed relationship with islanders, a new set of questions and format was developed for the second series of

interviews in the 2017/2018. A series of semi-structured interviews also took place with key Icelandic Glaciological Society experts in Reykjavik in 2017. These interviews related to the Papay-Iceland expedition within Papay Probe Project. Following McCracken's long interview process (McCracken, 1988) interviews were audio-recorded and hand-transcribed. Anthropologist McCracken's guide to interviewing gives the researcher an efficient way of open-ended questioning that 'produces cultural categories and shared meaning' (McCracken, 1988: 9). The first set of interviews took twenty minutes to a half an hour to orientate and build up a relationship with the interviewee to return if needed at a later date. The second set explored the islander's position on the island, the specific viewpoints and values relating to others and the island and levels of participation and engagement on the island. The interview questions are included in Appendix and specifically examined the islanders' relationship with each viewpoint in relation to the overarching research question: How can PD approaches articulate engagement with the anthropocene in an island-situated context?

Events, workshops, exhibitions as tools

Participatory design events, co-design workshops and presentations in the form of work-in-progress exhibitions were developed throughout the process as a means of introducing the project and experimenting, developing and focusing the research conversations, and gathering different levels of participants and participation, along with iterating the research to the next level towards a final conclusion. These particular engagement tools mirrored the already established Papay island maker-craft workshops and visiting islander speakers that regularly gave presentations about their work. Within the participatory design workshops of experiment 3: Papay Probe - initial open-ended probing questions introduced the design process via a digital presentation of

research images. Scaled 3d and 2d prototypes were co-designed and these user-tested the intentions of the project. Prototypes can play a number of roles within 'research through design' scenarios (Sanders and Stappers, 2014). One role that was particularly relevant to this research was the idea that 'a prototype can change the world, because in interventions it allows people to experience a situation that did not exist before' (Sanders and Stappers, 2014: 6). Kirby calls these types of prototypes speculative and diegetic prototypes (Kirby, 2011). They are toolkits for experimenting with make-believe role-playing with co-constructed artefacts. The Papay probe workshops resonated with activity-based focus group design methods, designing collaborative artefacts to generate dialogue and discussion, but also to be actively used on the glacier. These focus group methods centred on 'collective interactions in a process of inductive data gathering' (Langford, Wilson and Haines, 2002; Kitzinger, 1994). The performative method of simulation and testing new tools in the Papay environment occurred throughout all the experiments and events, but in particular in experiment 3 during the Papay Probe project. Fictional narrative techniques were used in the experiments to fuel imagination and engagement in participatory action (Brodersen, Iverson and Dindler, 2008). Bruce Sterling provides a definition in an interview with technology writer Torie Bosch, describing design fiction as 'the deliberate use of diegetic prototypes to suspend disbelief about change' (Bosch, 2012). Thus, design fiction serves to enlarge, enrich and activate our capacity for making sense of future ways of living before we actually get there and open up space for discussion (Sanders and Stappers, 2014; Bleecker, 2009; Dunne and Raby, 2013: 51).

Making probes, prototypes and artefacts within the events, especially in experiment 3, helped to make sense of the future scenario within the research question - how can we as designers contribute to survival in the future by understanding the way the

environment is seen, experienced and nurtured in the present tense (Jungk and Müllert, 1987). Through these methods the aim was to foster the imaginative and maker abilities of the islanders to react to the challenges of the experiments, and in particular for experiment 3 for the Icelandic expedition reconsidering the environment and the role in shaping that environment for the near future (DiSalvo, Clement and Pipek, 2012: 182-209).

Tools for conviviality

Ivan Illich's book *Tools for Conviviality* set out his vision of how society needed tools, which encouraged individual creativity enabling people to give shape and character to their own lives (Illich, 1973). He defined conviviality to be 'individual freedom realized in personal interdependence and, as such, an intrinsic ethical value' (Illich, 1973: 24). He wanted this situation in preference to 'those tools, which tend to impose a mass sameness' (industrial production), and in the current context - products such as the design of social media apps and software, or mobile phones. Illich proposed that what he called 'convivial tools' would be as unpredictable, creative and lively as the people who use them (Illich, 1973: 75). He argued that in an age of scientific technology convivial tools are a necessity for survival and promote participation and agency (Illich, 1973:13). At the same time as Illich was proposing these tools, an experiment in alternate education called Global Tools was set up in Italy by radical counterculture architects such as Andrea Branzi, Sottsass and Riccardo Dalisi, along with Superstudio and Gruppo 9999 among others. Global Tools stood for a new brand of craft-based social design defined by sensitivity to the local vernacular and the rejection of formalism. It was set up to reinvent creativity away from work and production (Borgonuovo and Franceschini, 2015). Craft acted as a means of connecting the act of making and doing,

similar to the early movement in 1920 of the Kibbo Kift and their craft-based tool making - such as nature themed badges, walking sticks, tents, head-dresses and costume-making. To update to the current Anthropocentric era we are living in, and to a post- Anthropogenic era of the future, the tools developed within this study were co-designed and made with local materials and inspired by local knowledge to give shape to the islander-island relationship, measuring and monitoring the actions and indicators of change. These generative tools, such as in the Papay shoreline research station (described in chapter three and shown in Figures 16-31) iterated and reflected the conversations and narratives of the research and were used to point to the next stage within the process. Many of the artefacts appeared again later in events either in their original form or as adapted tools, helping to build a history around the objects and construct a narrative and mode of action. Artefacts such as the tide movement observation kit appeared later to be used as a walking staff and measurer, whilst collecting the height above sea level of all the houses on the island. The artefacts could be seen to be similar to what is described as 'experimental boundary objects to express debate, context and research narrative' (Gaver, Dunne and Pacenti, 1999: 22). In the view of designers Gaver, Dunne and Pacenti objects or probes encourage designers to tell stories with and about the research participants and also can point to the context. The artefacts marked a moment in the present tense that anchored discussion within the experiment. Alternative views on probes (as reviewed by Boehner, Vertesi, Sengers and Dourish, 2007) tend to regard them as ways of acquiring qualitative user information that can be readily interpreted and compared, similar to other methods.

3.5 Modes of Analysis

Thematic framework analysis was used on a selection of semi-structured interview samples that occurred within the second and third year of the study. A second thematic analysis, using the same coding framework was carried out on the artefacts and visual imagery produced from Papay Probe project - experiment 3. The two sets of data were then compared and contrasted using field notes and workshop documentation. Thematic analysis was used as it allowed for flexibility with the forms of qualitative data, and generated themes and codes that 'gathered things' (Law, 2014) to contribute to answering the research question. This analytic method was used on these datasets, with guidance laid out from Clarke and Attride-Stirling (Clarke, 2003; Attride-Stirling, 2001). This study is similar in analytical structure to grounded theory (Charmaz, 2006; Glaser and Strauss, 1967) but the process within programmatic design research methodology, although iterative in nature with one experiment on reflection informing the next iteration, does not simultaneously gather data, analyse and theoretically sample it as in grounded theory methods. This would have to be planned in advance and then the methodology would not have evolved with the process. Interviews were transcribed manually as opposed to via software to preserve the nuances, dialect and inferred meanings of the conversations. Taking into consideration that the researcher knew most of the interviewees, this method was important to make sure nothing was missed in terms of subtle referrals or verbal and non-verbal meanings.

3.6 Summary

In this chapter the choice of a single case study was introduced and discussed along with the epistemological and theoretical positioning of the research within a social constructivist and symbolic interactionism praxis. The methodological framework,

drawing on PAR and PDR, was described within the context of the selected fieldwork and each method was explained and placed within three core experiments and three core PAR phases (Figure 9). Each experimental event was described in relation to the methods and methodology used and how they contribute to answering the research question. Ethical considerations were mapped onto these actions and events and the overall thematic analysis methodology framework described. Having positioned the methodological framework and detailed the methods used, the researcher moves on in the next chapter to present the key case study fieldwork.

4. Fieldwork

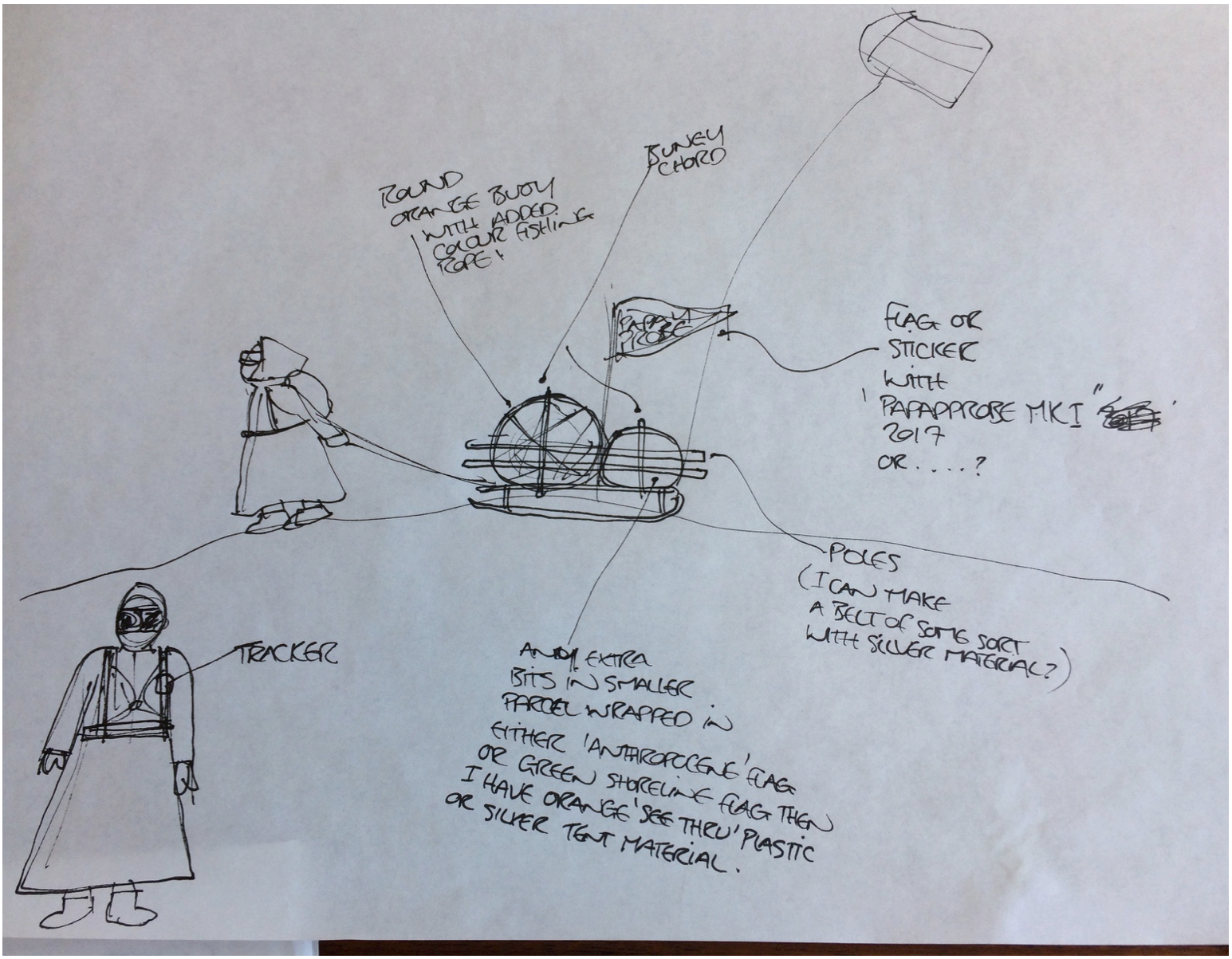


Figure 10: Photo of A3 Sketch - Papay to Iceland expedition plan discussing set up with participants: Papay Probe project, 2017. [photograph]. Source: Saoirse Higgins.

4.0 Introduction

This chapter presents an account of each fieldwork stage developed during my time researching on Papay from 2016 to 2018. The body of fieldwork conducted forms part of the single case study, detailed in chapter three. For this thesis, the most relevant fieldwork has been selected to directly address the research question: How can PD approaches articulate engagement with the Anthropocene in an island-situated context?

The BSA and Papay Development Trust experimental events, along with semi-structured island interviews, were key methods used in the research. Related fieldwork using these methods fed into the main events at each stage – orientation, immersion and final-stage evaluation – strengthening the process with what Brandt and Binder calls 'drift' and sharpening the intentions of the experimental events (Brandt and Binder et al, 2011; Krogh, Bang and Markussen, 2015). Samples of interview transcriptions are available in Appendix 2. A timeline of the fieldwork is presented in Figure 11.

Practice-based research is defined by Candy as an 'original investigation undertaken in order to gain new knowledge partly by means of practice and the outcomes of that practice' (Candy, 2006: 3; Barrett and Bolt, 2007). This project involved a reflective process in action (Schön, 1983), consisting of the researcher navigating through the research, simultaneously living and practising. The practice-based research is situated within Frayling's description of research through design, which means that research is conducted through the processes of design (Frayling, 1993).

This chapter describes the methods and processes used in the fieldwork as part of a PAR–PDR methodology. The location of the fieldwork is first discussed, before the methods are positioned and described in detail at each stage of the study process. The

chapter concludes with a summary and introduction to chapter five. A description of island life is referenced in the fieldwork notebook (excerpted fieldwork notebook: '11th May 2016: Weather+aurora+seasons'; '1st August 2016: Papay power cut').

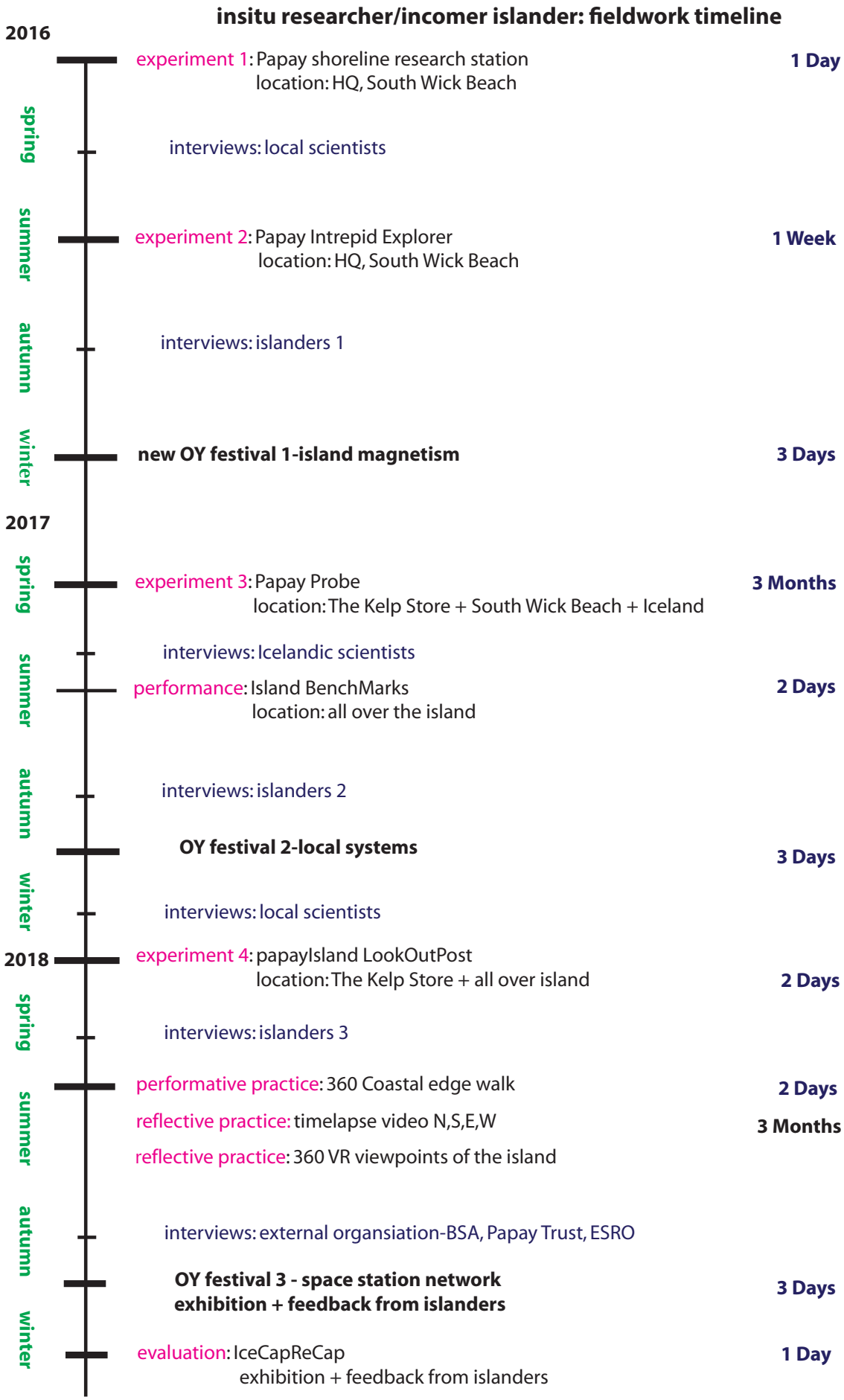


Figure 11: Fieldwork timeline, 2018. [diagram]. Source: Saoirse Higgins.

4.1 Mapping the fieldwork timeline

In Figure 11, the fieldwork is mapped throughout the three-year island study. A description of each key event, as well as the preparation and research undertaken, is detailed in this chapter. The timeline moves from 2016, with a shift for the researcher onto the island, from the position of outsider visitor to that of incomer islander. Islanders refer to people moving onto the island from elsewhere as incomers and people born on the island as indigenous. The orientation phase consisted of the BSA-funded 'Papay shoreline research station' in the spring and the 'Papay Intrepid Explorers' week-long residency in the summer, together with interviews and conversations with local Orkney-wide experts and islanders. The year ended with the development of a new three-day ØY festival of island magnetism in November, centred on the traditional muckle or harvest supper and dance and addressing the theme of island-ness (Higgins and Ford, 2016).

The second year, 2017, began in the spring with the Papay Probe project – a core project supported by the BSA and the Papay Development Trust in collaboration with the IGS. The research timeline moved from island-based experimental events recruiting Papay islanders and visiting Orkney mainlanders to the Papay Intrepid Explorers event and the recruitment of Papay schoolchildren to a more ambitious island network event spanning three months and two countries. This involved Papay and Iceland, with participants in both places. Semi-structured interviews took place with external Icelandic scientists in 2017 and a second set of interviews took place with local Orkney-based experts. The interviews are documented in Appendix 2. In the summer of 2017, a two-day reflexive performance event, Island Benchmarks, was developed, exploring the local and relational viewpoints of the researcher as an incomer islander. The year finished with

the second ØY festival, which focused on local island indigenous systems. 2018 began with the third collaboration with the BSA, a curated event looking at the Papay weather system and local dialect, which measures and describes the weather in detail. This event was in collaboration with Orkney climate specialists and three Orkney artists. The project continued to the end of 2018, when an invited feedback event and exhibition called IceCapReCap took place to reflect on the three-year BSA project. Between the spring and summer of 2018, a series of one-to-one semi-structured interviews took place with islanders, before the third edition of the ØY festival in November focused on the island as a networked space station and examining island resilience and ingenuity to build networks. Ec-øy-system was exhibited in this ØY festival, and a discussion took place about the next steps for a longer term 2019 BSA leadership project, already guaranteed BSA funding through on-going collaborative community science engagement leadership work.

4.2 Fieldwork location

The main fieldwork took place on Papay and involved multiple levels of participation from the island community of 88. Initial participatory observation and orientation fieldwork took place on mainland Orkney and Papay. External Papay fieldwork on mainland Orkney primarily involved interviews with Orkney science experts to gain insight into the breadth of expert work being done around the islands. Most of the science experts are based on mainland Orkney at the two university campuses – Heriot-Watt's Institute for Island Studies and the University of the Highlands and Islands' marine and archaeology departments. A section of external fieldwork and some expert interviews also took place in Iceland in 2017, connecting with the British Science Week Papay Probe project, discussed later in this chapter.

4.3 Participant recruitment

Participants were recruited from a broad mix of adults and children – island visitors, Orkney scientists, adult islanders, Papay schoolchildren (with their teacher as gatekeeper), and less visible island participants in supporting and encouraging background roles. Island-wide participation involved promoting events through word-of-mouth and via posters in key spaces on the island, such as the Papay shop, Beltane hostel, doctor's surgery and Kelp Store noticeboards. Each event was also promoted at island committee meetings and on the Papa Westray Facebook page for external visitors. The Papay shop acts as a useful amplifier of community information, especially for those shopping on Wednesdays and Fridays when supplies arrive from the boat. The school children's participation was guided by the head teacher and was placed within the school curriculum agenda. As the class size comprised only seven children, and because of the remote location of the school, the schoolchildren were used to a diverse curriculum of activities and many visiting teachers and experts. They receive a programme of peripatetic teachers throughout the year, and, often, if a visiting expert is working with the adults, they also visit the school. As the researcher spent time as 'researcher in residence' at the school for the Papay Intrepid Explorers project, the decision was taken to recruit children via 'out of school hours' activities to enable them to participate as individuals alongside their parents, rather than within a school group adhering to the school curriculum.

As the research progressed over the years, through participant observation and reflective fieldwork, methods were developed to encourage more islander participation, especially in the less visible group. This broadening of participation required time developing relationships on the island and individual conversations to identify appropriate ways to encourage participation. This aspect of the research required long-

term commitment to the island, which would not have been possible with a multiple case study within the PhD timeframe.

4.4 Participant observation – island ways and systems

Research and planning of the first phase began with the researcher as a regular island visitor, before a full move to Papay. To begin to investigate, introduce and position the research in a global context, the research enquiry was pitched to the islanders within the global framework of the Anthropocene in the annual science engagement week organised by the BSA. On consultation with the development officer and island ranger, and with the support of the Papay Development Trust, external funding was sought from the BSA to host a science engagement event on the island. The BSA's remit is to spread and extend their activities to under-represented communities, thus promoting new forms of citizen science with small- to medium-sized organisations across the UK. The researcher's intention was to place Papay on the BSA's research radar for the first time, proposing the island as a pioneering future model of participation and engagement. Most BSA events then took place on the UK mainland. This event attempted to demonstrate that 'peripheral' and 'edge' locations should also be included in new forms and spaces for science engagement. The plan was to start the study with this externally linked viewpoint and move towards the local as the project progressed and the researcher became familiar with the Papay island context.

Within this initial phase, and to study the relevance of the context in relation to the research question, semi-structured interviews were set up on the mainland with a range of Orkney science experts. A set of broad questions was designed, enquiring about the science experts' research in the domain of the Anthropocene and connections with land

and sea in Orkney. This was not difficult to arrange, particularly as Orkney scientists are used to being interviewed about their work. In the early stages of the research, time was spent observing and getting to know the island's infrastructure, systems and communication dynamics. Early in the first year, the researcher took part as a participant observer in two community events to protect the coast from sea erosion.

4.5 Orientation: local viewpoint

Introduction: Caasie sea-defence wall-building

Shown in Figures 12 to 15, the two-day Caasie wall-building event enabled observation and reflection on how islanders self-organised and participated together, learning traditional wall-building skills via local expert instruction. The event also gave the researcher a chance to take part in and contribute to island activities early in her time on the island. The main task was to build the Caasie wall to prevent the sea eroding the land around 'Hookin' – a croft on the island's east coast. A Caasie is a traditional wall structure on Papay, comprising slabs of limestone collected and placed upright and packed together tightly with back filling between the front and back of the wall (Figures 14–15). The instructions for building a Caasie wall are not documented in writing, and, from local archive enquiries, appear to be passed down orally. Orkney archaeologist Wickham Jones confirmed that she had not seen any record of Caasie wall-building in Orkney apart from Papay (Appendix 2). Approximately twenty people took part over the two days. The event was documented by the researcher using a time-lapse GoPro video, and colour photography. The time-lapse documentation was used in the Papay Trust Development committee reports as visual evidence of collaboration, helping to promote future funding cases. From this event, a two-day event was funded in 2019 by the North

Isles Landscape Partnership to build another section of coastal wall by Hookin, with the added benefit of inviting Orkney-wide participation, a more developed cultural angle, with poetry from a local Papay writer Jim Hewitson, and historic poet Robert Rendall, together with a proposed island skills manual.

Figure 12: Original traditional Caasie Wall, Hookin, Papay, 2016. [photograph]. Source: Saoirse Higgins.

Figure 13: Completed new section of Caasie Wall, Hookin, Papay, 2016. [photograph]. Source: Saoirse Higgins.

Figure 14: Caasie Wall two-day building event, 2016, Stone steps leading to croft. [photograph]. Source: Saoirse Higgins.

Figure 15: Caasie Wall two-day building event, 2019, Aligning stones vertically and packing them tightly. [photograph]. Source: Saoirse Higgins.

Experimental event 1: Papay shoreline research station

The first experimental event introduced on the island was the 'Papay shoreline research station'. This took place within the first six months of the researcher moving there. The researcher visited Papay several times prior to settling on the island and had begun to observe the surroundings and develop a suitable project introduction. Planning was discussed in advance with both the development officer and Papay ranger in their capacity as island organisers. The Papay shoreline research station name was designed to invoke a mixture of science fiction notions of exploring and discovering new environments and worlds. Examples researched included the undersea adventures of *Jacque Cousteau* and explorer *Jules Verne's* journey to the centre of the earth, discussed later in this chapter. Science fiction narratives are a fiction genre referring to future science and technology and promoting the idea that anything is possible in an imagined world. The name was directed specifically at the Papay community – effectively putting out a call to them to participate in researching their own island. The event was branded with a project logo and special symbol, giving the islanders a performative identity away from the everyday. The brand referenced Papay shoreline elements such as seaweed, which acted as a metaphor for a sweeping radar, monitoring the location (Figure 28) and design influences from the early years of the historic Kibbo Kift movement. The Kibbo Kift movement was set up in the 1920s after the Great War, developed by graphic designer John Hargrave, and initially designed to encourage white-collar workers away from the rat-race and back to nature to strengthen community spirit and promote world peace (Pollen, 2015). Hargrave, alongside members of the kindred, designed many tools and visual artefacts as well as songs, manifestos and pamphlets to give the Kibbo Kift a strong identity and encourage a sense of specific connection and community. Other historical influences on the project tools in this study were the 'Whole Earth Catalogue'

launched by Steward Brand in 1968, which promoted 'small-scale, grass-roots, self-organised low-tech methods' to operate with local tools and more socially and eco-sensitive methods in the industrialised America of the time (Borgonuovo & Franceschini, 2015). Brand collected as many small experiments and tools as he could for the catalogue and travelled around the country in the Whole Earth Truck Store, gathering and lending tools. Alongside this catalogue, the Global Tools movement of the 1970s is also described in chapter three. Global Tools proposed a craft-based ethos for design that relied on practical wisdom. The tools in the study connect with these historic movements in the use of a local vernacular and materials, while emphasising thinking through making and a sense of connecting with the environment and 'embracing archaic forms of wisdom' (Borgonuovo and Franceschini, 2015: 6) to engage with the urgent local and global climate situation. The shoreline event is referenced in the fieldwork notebook (excerpted fieldwork notebook: '8th February 2016: Papay shoreline event updates').

Shoreline timeline

Papay shoreline research station was situated on the east of the island on South Wick Beach, one of the island's main beach areas, which has a history of sea erosion. The beach is beside The Kelp Store, the cultural and heritage centre, with easy access to facilities if needed. To develop a sense of curiosity and introduce a spirit of exploration, details of the event were initially kept secret. Prior to the researcher moving to the island, glass jam jars were requested via a project poster in the Papay shop and delivered to the researcher's house. The jars were subsequently used as shoreline sea sample jars attached to the end of fishing nets (Figure 30). These referenced 1960s

analogue marine biology collection tools (Figure 31). Many jars were delivered, and continued being offered after the event had finished. The jar collection introduced and allowed people to participate at a very basic entry level without necessarily becoming involved in subsequent activities. The first aim of the activities available to the participants was to promote a heightened sustained awareness of the immediate surrounding environment from an elevated viewpoint rather than a normal daily routine perspective. The second aim was to introduce the role of practitioner and researcher to the islanders and, through the shoreline tools and activities designed for them, start to learn what was and was not interesting for islanders.

The third aim was to encourage thinking on a grander scale, enabling people to explore their island as imaginary 'islonaut' explorers. The researcher created this term to describe islanders exploring their own contained planet, or island, as incomers or explorers. The term references astronauts and Russian 'polyarniki' employed by the government in the 1970s to collect data and look after remote weather-measuring instruments (Arbugaeva, 2014).

Shoreline tool-making

From visiting the island and contact with the islanders, tools for this event were developed to enable an interface with landscape and people. These were adjusted and edited as more information emerged. Local island materials were sourced to promote a DIY eco-friendly design. The materials aimed to embody a spirit of island adaptation and 'making do' with what was available, as well as to act as a familiar local material interface between the environment and the islanders.

The maritime references within the shoreline tools came from a past era of science exploration into the unknown and a sense of nostalgia for the physicality of the analogue

exploration of nature, which took place between the 1930s and 1970s, involving measuring and monitoring the environment. A 'Jacque Cousteau-esque' set of exploratory artefacts ran through the event narrative to encourage creative participation and interaction and to connect with physically embodied ways of exploring the environment. *Jacques Cousteau* was a French undersea *explorer,* researcher, photographer and documentary host who invented diving and scuba devices, including the aqua-lung. He also conducted underwater expeditions and produced films and television series, including the *Undersea World of Jacques Cousteau* (Landsberg, 1966-76). The event narrative aimed to embody his spirit of engagement, invention and exploration. Other references came from World War Two analogue devices that appeared in the Orkney radio museum visual archive.

Examples of three key shoreline tools

DIY tide-movement observation kit

The tide-movement observation kit was designed to observe the tide advancing and retreating through a process using simple visualising DIY tools to magnify changes in time and the conversation around measuring and observing the sea and the rising and waning tides as the participants monitored the shore throughout the day (Figures 16–18). DIY tide-measuring poles were made from kitchen broom-handles and painted in red and white stripes. The poles were pushed into the sand as tide-markers at set intervals throughout the day, and tide-collecting glass jars were placed beside each to collect samples of the tide at specific times. Visually, this left a line of tide-poles and tide-collection jars with a physical time-related trace of the sea levels (Figure 18). The tide-poles were used in subsequent events as walking sticks and height measurers to maintain continuity and build a history of tools within the project.

Birds eye view tool

'Birds eye view' tool was designed with local gardening bamboo canes, a plastic bottletop housing the camera inside and a local builder's hard-hat, as well as marine rope handles connected on each side of the hat to keep it balanced in the wind. A camera transmits video and sound from a tripod above the hard hat down to headphones and an iPad or phone in the wearer's hand. The new heightened perspective lifts the view to a 'personal micro bird's eye view'. The wearer experiences a type of out-of-body sensation, floating above the local shoreline. Both video and sound come from above, and the wearer explores the space from two different perspectives – physically from the ground as they walk and visually and aurally from above, looking down (Figures 20–22).

King Canute listening chair

The King Canute listening chair was designed to listen to the surrounding island sounds while sitting on a chair as the sea came in around it – the chair fixed and everything else around it changing. The references originated from the legend recorded in the twelfth century of King Canute the Great commanding the sea to stop coming in (Huntingdon, 1129). A vintage fishing buoy was donated by the fisherman, and cut into two halves and designed into a set of sound-listening dishes. This device was attached to a vintage island chair. The buoys acted as sound gatherers from around the sea and island. Participants sat on the chair while the tide ebbed and flowed and listened quietly to the surrounding environment. The headset design was inspired by World War Two designs for pre-radar listening devices. Soldiers and the public used these listening tools to listen for enemy planes coming from a distance (Figures 23–25). The idea of using this metaphor was to connect with the desire to be properly present, and 'know as we go' (Ingold, 2011: 230), also alluding to the ominous incoming threat of climate change.

Figure 16: Tide-movement observation kit –
two poles mark the retreating tide. Papay shoreline
research station, South Wick Beach, 2016.
[photograph]. Source: Jonathan Ford.

Figure 17: 'Time and tide waits for no man'
sandwich-board performance + participant recording
time at a tide pole, 2016.
[photograph]. Source: Saoirse Higgins

Figure 18: Tide-movement observation kit - tide poles
mark full retreat of the tide 6pm – one tide pole per
hour. Papay shoreline research station,
South Wick Beach, 2016.
[photograph]. Source: Saoirse Higgins.

Figure 19: Close-up seawater collection jar + tide pole,
Papay shoreline research station,
South Wick Beach, 2016.
[photograph]. Source: Jonathan Ford.

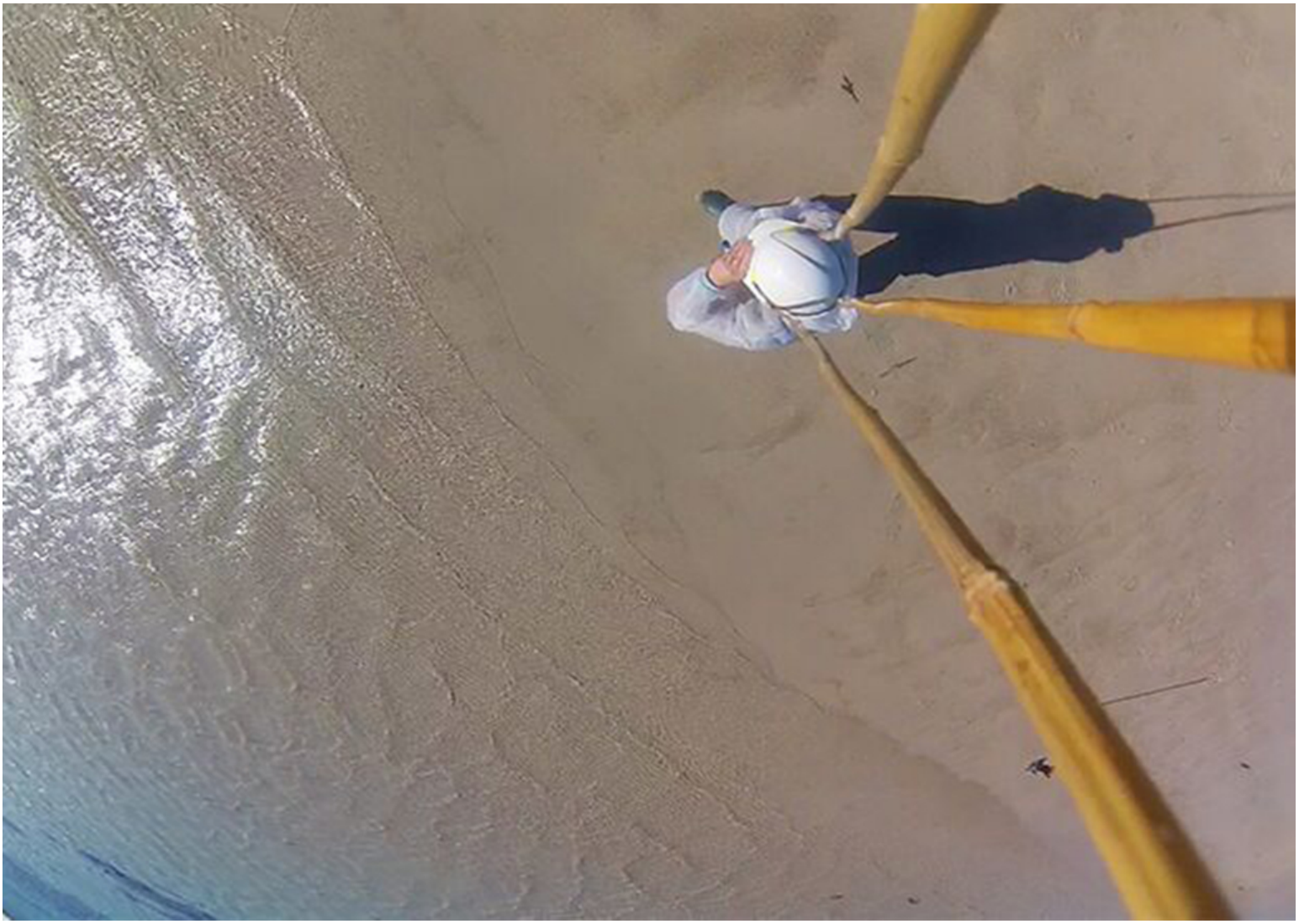


Figure 20: Birds eye view tool - hat view from camera attached to bamboo tripod,
looking down on shoreline, 2016.
[photograph]. Source: Saoirse Higgins.

Figure 21: Adjusting camera inside bottletop camera protector, 2016.
[photograph]. Source: Saoirse Higgins.

Next page: Figure 22: Birds eye view tool - view out to sea with 'wind balance' handles, South Wick Beach, 2016.
[photograph]. Source: Jonathan Ford.

Figure 23: King Canute listening chair, Papay shoreline research station + Intrepid Explorer,
South Wick Beach, 2016.
[photograph]. Source: Saoirse Higgins.

Figure 24: King Canute listening chair - research - World War Two listening device, 2016.
[photograph]. Source: public domain-Imperial war museum.

Figure 25: Close-up of King Canute listening chair, 2016. [photograph]. Source: Saoirse Higgins.

Figure 26: Go pro kite flying, surveying and recording the coast from above, Papay shoreline research station, South Wick Beach 2016. [photograph]. Source: Saoirse Higgins.

Next page: Figure 27: HQ, Papay shoreline research station, view to the sea and Holm of Papay, South Wick Beach, 2016. [photograph]. Source: Saoirse Higgins.

Figure 28: View to HQ, Papay shoreline research station, South Wick Beach, 2016. [photograph]. Source: Saoirse Higgins.

Shoreline participation process

The activities began with an initial welcome 'induction session' on arrival at the silver HQ tent station (Figure 28). The tent was designed to allude to science fiction-style silver space stations, and the idea of working in situ in a fieldwork science camp. The induction session included an overall introduction to the day and a health and safety talk regarding using the various tools and activities, ending with each participant receiving a shoreline research station kit in a bespoke designed kitbag. The kit included a loupé for close magnified observations, a clipboard with a waterproof fieldwork pencil, a laminated 1930s ordnance survey map of the section of the beach to be surveyed, a set of sticker dots to mark wherever was studied, an adapted lab sheet to document data, and a consent form, presented during the induction session and read and signed by everybody. Participants took part in the activities but did not complete every single activity, nor was the emphasis placed on completion – the day was directed by individual interests. It was an opportunity for islanders to suspend normal daily life and creatively immerse themselves within the tools and activities presented. As a researcher, the event encouraged an understanding of the islander viewpoint through participant observation via fieldnotes, time-lapse video and photography documentation throughout the day and evening. Three of the twenty participants from scientific backgrounds had experience of surveying a beach and worked their own way methodically through the activities, while the rest chose activities they were interested in and mostly approached the tasks in a relaxed, informal manner. After the day, the group met at Beltane hostel before Saturday Papay pub. A collection of beach findings with seaweeds and shells were displayed in sample jars for approximately fifteen more pub-going islanders to view. This broadened the project and introduced more potential participants. Some discussion of the findings took place in a simple observational way,

without emphasis on accuracy or detail. The tone of the activities was a mix of 'childlike' – collecting treasures from the beach – and that of a citizen art–design–science event.

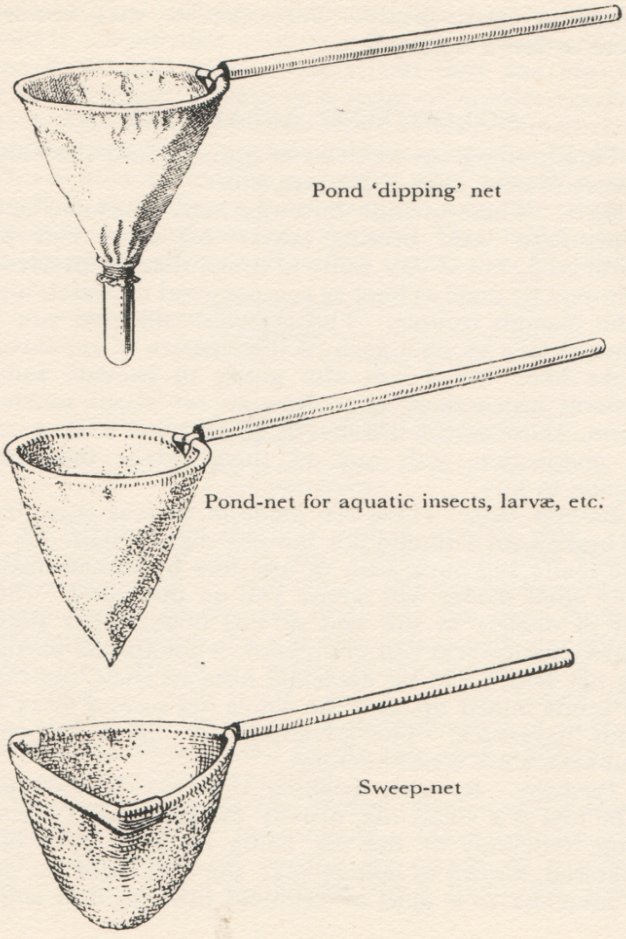
4.6 Immersion: relational viewpoint

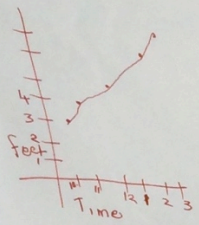
Experiment 2: Papay Intrepid Explorers

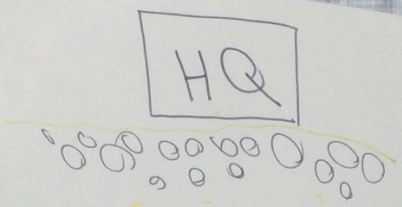
Papay Intrepid Explorers, a week-long residency event, took place in collaboration with Papay school. In consultation with the principal teacher, this residency was placed within the school curriculum and included a longer-term collaboration between the schoolchildren, a mainland Orkney marine biologist and the island fishermen. There were eight schoolchildren in class at the time, ranging from eight to twelve years old. The aim of this event was to develop an imaginary future workshop or 'what if' future scenario, exploring issues of island climate change. The imaginary narrative challenged the children for a week to monitor and record the island before it sank below the sea because of rising sea levels. By deliberately monitoring and thinking about their changing environment, they arguably developed and built up valuable experiential knowledge in readiness for the future.

In consultation with the head teacher, eight historic role model explorers were selected from past eras that specialised in collecting environmental data. This was based on a non-expert model – the chosen explorers had a DIY connection with the environment and possessed key qualities of strength and adaptation. They included *Nan Shepherd*, *Leif Erikson, Jacques Cousteau, Mary Anning, Ami Johnson, Helen Thayer* – the first woman to complete a journey to the magnetic north pole – and *Joy Adamson*. The children chose their explorers, researched their backgrounds, and got into character for the week, dressing up based on their individual creative ideas of each explorer. Using earlier

connections developed on mainland Orkney through informal interviews with local scientists, a seawater-monitoring sensor was borrowed from a marine biologist and delivered to the two Papay fishermen, who, in turn, agreed to attach it to one of their creel pots and leave it submerged on the creel in the sea, monitoring temperature and salinity (salt content) and collecting data for two months (Figures 34–35). The researcher took part in mapping this process, spending the day on the fishing boat deploying and collecting crab creels around Papay. This also served as a method to develop an understanding of the island landmass from the perspective of the sea and understand the fishermen's rich, local expert knowledge of the sea. The process was undertaken through informal interviews and participant observation. The sensor was retrieved by the fishermen after two months and taken by the researcher to the mainland Orkney science campus, where the data was extracted onto a digital graph and discussed with the marine biologist. A short video documentary was made, involving interviewing the scientist explaining the type of data measured with sensors, and what changes in the data meant for environmental change. The video aesthetic referenced social media public engagement videos used by organisations such as NASA and ISS, when astronauts speak to the public on earth via video from space (Nasa, 2020). The video was played back to the schoolchildren and the data results discussed within the classroom with the teacher. This collaboration introduced the project coming from an external Orkney expert perspective, and also introduced the project coming from an internal island perspective looking at the fishermans' sensor deployment and the plan for Intrepid Explorer week at South Wick Beach.


Pond ‘dipping’ net
Pond-net for aquatic insects, larvæ, etc.
Sweep-net





P.I.E - South Wick Sea Chart

Time fixed

10:30 12:30 2:30 5:30	⟷	Distance guess feet tape

Depth		Fixed sticks/distance
10:30 12:30 2:30	⟷	1 2 3

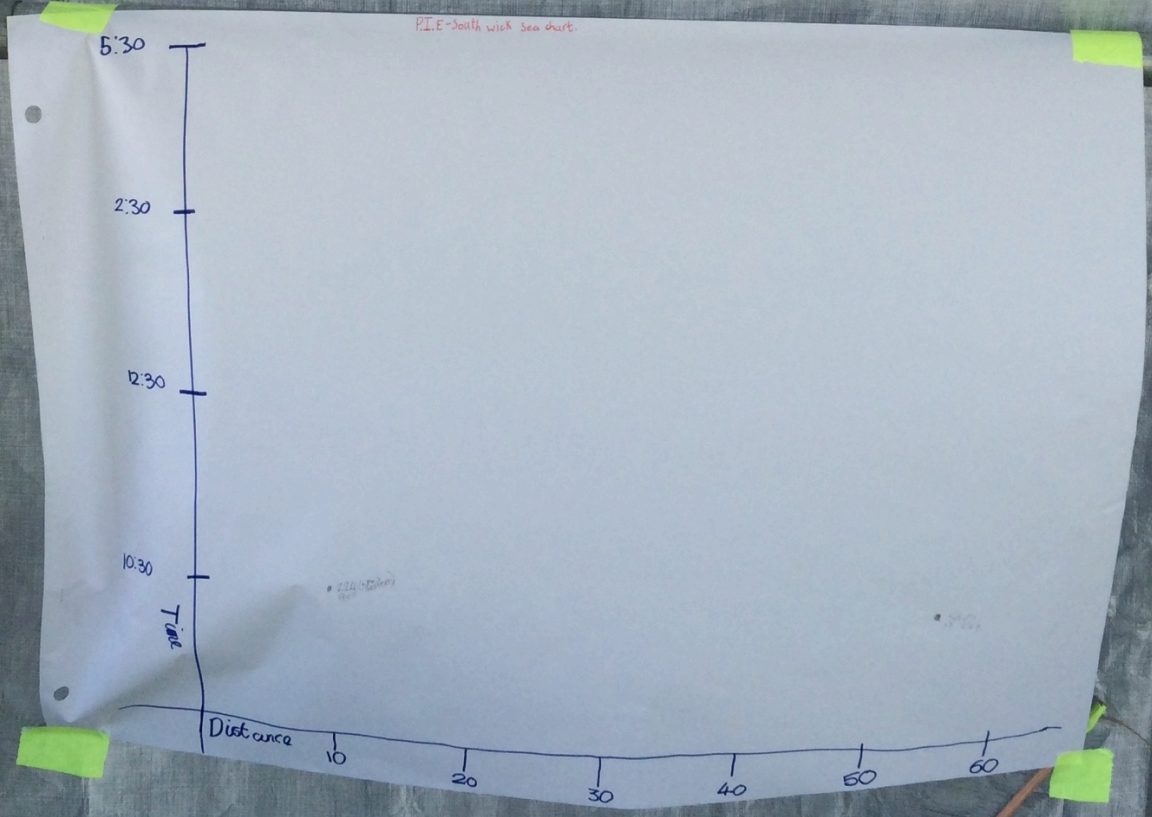


Figure 29: South Wick Beach Intrepid Explorers coastal sweep, 2017.
[photograph]. Source: Saoirse Higgins.

Figure 30: Fishing net water samplers. Papay shoreline and Papay Intrepid Explorers, 2016.
[photograph]. Source: Saoirse Higgins.

Figure 31: Fishing net samplers from 1960s marine science. Bespoke fishing nets for specimen samples.
Papay shoreline, 2016.
[photograph]. Source: Saoirse Higgins.

Figure 32: Calculating the tide with measuring tape and feet. Hand-drawn graph of resulting measurements
P.I.E - Papay Intrepid Explorers, 2016.
[photograph]. Source: Saoirse Higgins.

Figure 33: HQ, Papay Intrepid Explorers blown into the sea after a storm, end of the project week, 2016.
[photograph]. Source: Saoirse Higgins.

Figure 34: Catching crab, gopro head camera, Papay fisherman day trip and interviews, 2016.
[photograph]. Source: Saoirse Higgins

Figure 35: Water-monitoring sensor attached to crab creel, Papay fisherman day trip and interviews, Papay Intrepid Explorers, 2016.
[photograph]. Source: Saoirse Higgins.

Intrepid Explorers methods and tools

The Papay Intrepid Explorers event used many of the same tools and activities as the Papay shoreline research station. This was intentional to encourage children to fully participate in future discussions at an equal level to the adult participants. This aspect was particularly noted within the school group. The event took place two years before school climate strikes began and three years before Greta Thunberg started her campaign. The same silver station HQ was placed at the same spot on the dunes on South Wick Beach as Papay shoreline research station, keeping the same parameters but changing the age group. Many of the same tools as the Papay shoreline project were included, such as sample jam jars, Papay archive marine books, science clipboards and DIY tide-measuring kits, but more observational drawing and rock pool sampling was added. Drawing and rock pools featured strongly in the children's preferences in general. The oldest child recorded short audio vox-pop interviews with each of the children, asking what they were doing and reminding them of the aim of the task – to stop Papay sinking.

The events resulted in an exhibition at The Kelp Store showing all their activities and explorations, with a Papay islander audience, including many of their parents, who also took part in the shoreline station. The children controlled the exhibition design and created a large drawing of a section through the beach, as well as a tide-measuring graph. The hand-drawn data on the graph was based on multiple methods designed by the children to measure the tide, taking a measuring tape from the HQ tent to the water's edge every hour, and measuring the same distance with their feet. The resulting graph was exhibited alongside their exploration videos and sounds (Figure 32).

The researcher documented the event with time-lapse video and photography, together with fieldnotes. The event is referenced in the fieldwork notebook (excerpted fieldwork

notebook: '3rd July 2016: Papay fishermen day trip on the sea'; '1st May 2016: eye level sea level sky water').

4.7 Immersion: long view

Experiment 3: Papay Probe project

This experiment followed the 2016 Papay shoreline research station and Papay Intrepid Explorers events. The Papay Probe project in 2017 lasted three months, with preparation starting in 2016. It continued to have an impact in 2019 and 2020 and this is discussed in chapter six. The experiment consisted of collaboration between the researcher, Papay islanders, the PDT, the Papay ranger, the BSA and the IGS. The researcher already had a working relationship with the IGS, having documented the annual expedition to the Mýrdalsjökull glacier in 2015 to measure, monitor and take core samples. The society is a mix of volunteers, laypeople and scientists, working to measure and monitor glaciers across Iceland. It was set up in 1950 and is an established model of participation and collaboration.

The project focused on designing and making a Papay Probe to be sent to Iceland to 'health-check' a glacier. It consisted of a set of co-designed Papay islander experiments contained on a 'Papay Probe' built to be deployed and used on the glacier in Iceland. Importantly, this was entirely guided by the islanders, with no expert scientists directing or informing the approach. It was thus entirely led by non-experts, or experts-by-experience, using their specific situated knowledge.

The concept behind the Papay Probe referenced space travel and technologies of measuring and probing outer space and deep underwater – as discussed earlier in the chapter, unknown adventure environments to help encourage creative thinking and

excite the imagination beyond daily routine and island edges. These pioneering space station concepts were referenced in the Papay shoreline and Papay Intrepid Explorer events. It also involved positioning within the local while also viewing the global – the see-saw effect of glaciers melting in Iceland and sea levels rising around Papay, conceptually connecting two very different places (Iceland, a very new country, and Orkney, a very old country) although similar in terms of the rolling shape and height of the landscape.

The programme aim was to develop tools able to creatively and performatively measure the glacier health in relation to sea levels around Papay. It aimed to develop an exciting external opportunity for islanders to engage in external collaboration and develop tools they could maintain beyond the project and the researcher's residency, as well as to connect their particular expert knowledge to global climate change. It also aimed to create broader participatory collaboration with old and young islanders and encourage engagement with less visible participants who had not already participated in any events or had been on the periphery. It was used as a method to open up ways of participating, involving designing multiple workshops, tools and opportunities.

The Papay Probe project is referenced in Appendix 4 (excerpted fieldwork notebook: '22nd February 2017: Papay Probe'; '7th February 2017: Arc of Action').

Papay Probe methods and tool-making

Initially, much work was done to pitch the concept to encourage people to commit fully to moving from ideas to making a Papay Probe that could physically be taken to Iceland. This emphasis on global action-based making constituted a major shift from other events. Functioning co-designed tools were a required output for the expedition to Iceland and for the experiments to be actioned on the glacier.

Workshop 1: co-developing ideas and prototyping

The first workshop was set up to introduce the project, co-develop ideas and encourage individuals to take ownership of parts of the design work using familiar methods of paper and pen and scaled prototyping with card. The researcher directed this workshop as the facilitator, and the Papay ranger acted as support. It began with a presentation of images and creative points to introduce the scope of the project, consider the deadlines and develop the tasks. Ideas were brainstormed and sketched on large pieces of A0 paper and discussed in a group to choose those that interested the islanders in terms of measuring and monitoring aspects of the glacier, exploring the idea of 'probing' or exploring and discussing the issue of climate change. Initial 3D scaled paper and card prototypes were created by the participating island children and potential steps discussed to progress the designs. Individual islanders were encouraged to take control of the design and development work without researcher guidance and beyond the workshop time. This took on its own momentum as enthusiasm spread through word-of-mouth. Some ideas for developing tools were not discussed further with the researcher but entirely handled by the islanders, including the Papay garden pack.

The month-long gap between the first and second workshops allowed the researcher to approach other key islanders who had not participated in the workshops, to engage them for their particular expert skills. The time was also used to spread the word about the project, encourage broader participation and allow time to incubate ideas into real artefacts.

Papay Probe tool

Papay Probe sledge

The Papay Probe sledge was a key tool in the project. The sledge design acted like a space station satellite – multi-functional and with many requirements in terms of tools and expeditions from Papay to Iceland and onto the glacier and back. It had to contain and protect all the experiments for the glacier, be easily made, with local tools, materials and know-how, be easily packed down and light enough to be transported onto the glacier, be robust and operate on ice and act as a central hub and powerful symbol of the glacier project. These aspects were explored and discussed in the first workshop to brainstorm ideas. Scaled prototypes were built and one selected, designed by an island school pupil. This model was scaled up and technical drawings made for discussion with the participants, farmers and carpenter. The sledge design was agreed and built from island wood and developed into a specially designed flat-pack wooden Papay Probe sledge. The wood was provided by one of the farmers, designed to be assembled in sections and to be packed down easily for transportation to Iceland. The sledge was performatively 'simulated' and tested for any issues with the experiments on board along South Wick Beach – Papay sand simulating the ice of the glacier (Figures 36–52).

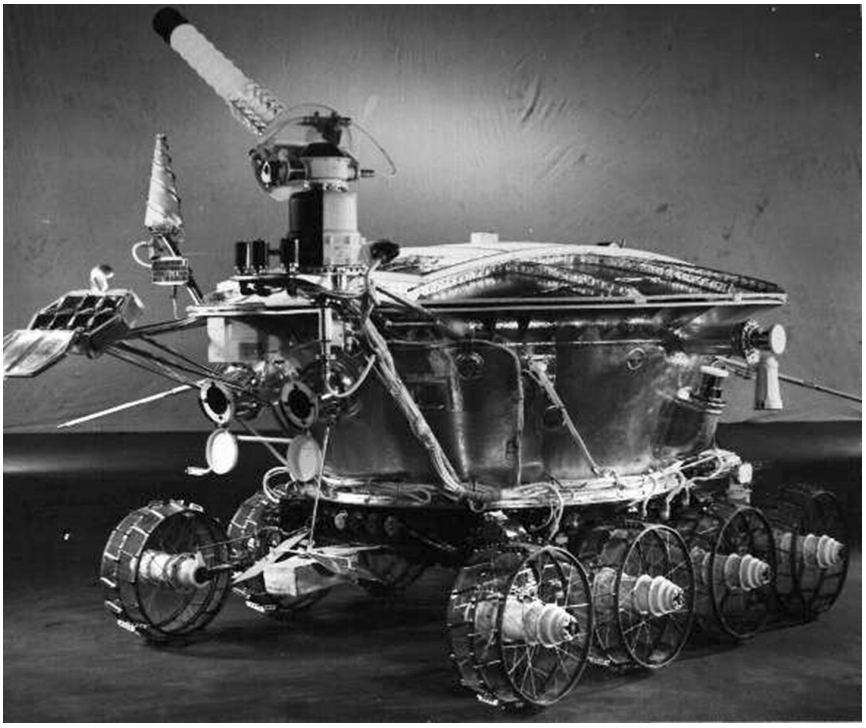


Figure 36: Papay Probe - mapping sequence of glacier experiments workshop, The Kelp Store, 2017. [photograph]. Source: Jonathan Ford.

Figure 37: Inspiration from probes and space, 2017.
[photograph]. Source: public domain- Soviet Lunahod Rover.

Figure 38: Papay Probe glacier simulation testing with young participants, South Wick Beach, Papay. 2017. [photograph]. Source: Jonathan Ford.

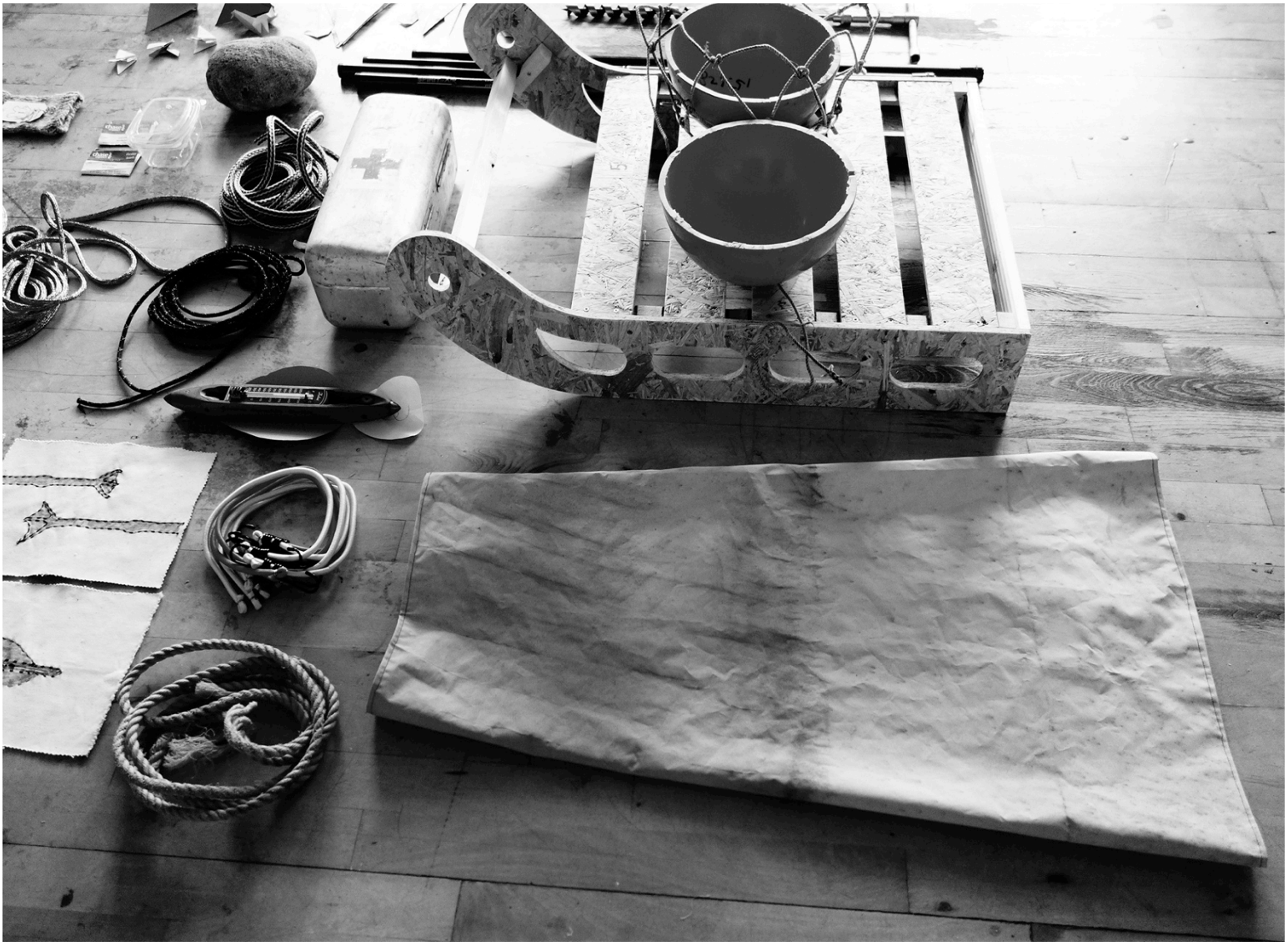


Figure 39: Papay Probe experiments laid out on residency floor, Iceland, 2017. [photograph]. Source: Jonathan Ford.

Figure 40: Papay Probe on Mýrdalsjökull Glacier, Iceland, 2017. [photograph]. Source: Saoirse Higgins.

Figure 41: Still from researcher's GoPro headcam. Pulling the Papay Probe on the glacier, Iceland, 2017. [photograph]. Source: Saoirse Higgins.

Workshop 2

The second workshop, facilitated by the Papay ranger, gathered, focused and developed the design ideas and emphasised the act of building the Papay Probe. By the time of the workshop, the researcher was situated in Iceland at a residency for the project and had been in contact with IGS scientists. Short video messages were sent back from the glaciologists, recorded by the researcher, to encourage and connect science and island experts. The workshop aimed to develop a storyboard for the glacier expedition day. The full-scale sledge prototype was set up in The Kelp Store and possible experiment and performance layouts were mapped and discussed using large sheets of blank paper. A storyboard indicated the movements from one experiment to the next, effectively scoring the choreography of glacier performance. This was a guessing exercise as nobody had walked on a glacier before, apart from the researcher. This activity generated discussion about the differences and similarities between the physical landscape of Papay with its treeless rolling contours of hard rock and soft sandy beaches and the glacier's smooth, treeless, icy contours and cold hard ice. Voxpop audio interviews documented the participants guessing what a glacier would be like.

Part 2: Papay Probe to Mýrdalsjökull glacier

From these workshops and tool developments, the Papay Probe was flat-packed and transported to Iceland, where it was transported and deployed on the Mýrdalsjökull glacier. The expedition 'performance' was storyboarded in the second workshop and the experiments completed as instructed via the performance score using compass directions originating from the 'base station' Papay Probe (Figure 36). The sequence was measured and rehearsed by the participants at The Kelp Store but with little idea of how easy or hard it would be to move around on the ice. The effects of trying to walk on

the three-dimensional icy physicality of the glacier slowed down the experiments in the interests of safety and not sliding into a crevasse. Crampons were hired by both researcher and ranger, which helped with walking on the glacier. A few days before the expedition, the costumes and sequence of experiments designed by the islanders were discussed with the glaciologists. The plans were designed without knowing exactly what the weather conditions would be like on the day. As on Papay, the weather changes rapidly on the glacier, especially in early spring. The scientists from the IGS discussed the weather forecast for the expedition day and the necessary safety precautions for walking on the glacier without a guide, as well as the differences and similarities in history, environment and geology between Orkney and Iceland – Orkney stony, windswept and with practically no trees, and Iceland stony, icy and also with few trees. We spoke of the common links in history between Orkney and Iceland, including their Norse backgrounds and the Orkneyinga Saga, a Norse saga about the history of Orkney and Shetland written by an unknown Icelandic author in the early thirteenth century. The scientists discussed the movement and science of the glacier and ice we were visiting and measurement of the movement using benchmarks similar to sea level benchmarks on islands, including the history of laypeople taking care of the glacier, especially local farmers, while now, more city people are interested in connecting with nature. We discussed the difficulty of transporting an ice core sample back to Papay without it melting and re-freezing and discussed the differences between ice and seawater for the Papay children. The scientists discussed the possibility of the Papay islanders adopting a glacier, which happens through a number of Icelandic schools. This would be the first external adoption. The proposal was taken back to Papay for discussion and has progressed since, as discussed in chapter ten. These semi-structured interviews were audio-recorded on three separate visits to the Icelandic Meteorological

Offices. The material from these conversations is shown in the exhibition of reflective practice and referenced in the exhibition catalogue.

Three key tools

DIY positioning kit

In the second workshop, participants decided that the direction to Papay from the glacier should be initially marked with a compass direction point using a large hand-drawn arrow on the glacier ice. The performance consisted of calibrating a vintage World War Two analogue wrist compass, and spraying a large arrow onto the glacier ice by means of environmentally friendly green food colouring diluted with water sprayed from a bottle onto the ice. By marking the direction to Papay in relation to the moving glacier, the strong connection between the two physical landmasses was emphasised. The DIY positioning kit, referencing early Kibbo Kift tools and nature trail-markers, is illustrated in Figures 42 and 43, and a later version of this idea is shown in the exhibition of practice, referenced in the catalogue.

DIY temperature-measuring kit

In collaboration with the Papay schoolchildren and head teacher, a pair of wool socks was knitted – one of lambs' wool and the other of alpaca. The sock process began by shearing the school sheep and the two school alpacas. The wool was then spun, dyed and knitted on Papay. The socks were designed and developed by the schoolchildren to act as heat sensors for the glacier, measuring how cold the ice is on the glacier, thus comparing the effectiveness of alpaca and lambs' wool. The socks were sent to Iceland with a set of instructions designed by the schoolchildren. The researcher was instructed to wear the socks without boots for a set amount of time on the glacier. This was blind-

tested and the results were written down by the researcher on a hand-made report card and sent back to the schoolchildren. The alpaca sock was by far the warmest. According to the Papay schoolchildren, this is because alpacas have hair with hollow fibres, lighter and warmer than lambs' wool (Figures 45–47).

DIY ice auger for core samples

In collaboration with the Papay farmers, a small auger was purchased to take a glacier ice core sample. Much discussion took place about how to take the sample using their local experience and knowledge of core sampling soil and rock, relating this to what they knew of glaciers and ice from the internet. Making a test prototype sample in the adjacent island of Westray in the ice plant was suggested, but this was rejected because of lack of resources and time. The process of taking the sample from the glacier and transporting it back to Papay was also discussed in Iceland with the scientists. Three samples were taken on the glacier – snow on top of the glacier, ice from the front of the glacier where we were situated for the experiments, and ice from the side of the glacier. These were documented on the glacier, transported in sample bottles and re-frozen in Papay (Figure 44) (sample discussion with the farmers: Appendix 2).

DIY origami wind sensor kit

The origami wind sensor kit was designed as an analogue wearable sensor kit, giving the wearer a wind direction reading, but also a physical embodiment of the wind's strength while wearing the kit. The wind is a key feature of the Orkney environment and controls many island activities and plans. One experienced craft-maker on the island designed and made the wind sensor hat with a number of paper origami bird 'wind sensors' connected to the top by long coloured string. The origami birds were made from the local Orkney newspaper, The Orcadian, and attached to the hat using coloured string. An

image of a compass dial stuck on the hat marked the wind direction. Although there was very little wind on the glacier on the day of the expedition, the mild wind blew the origami birds in a North Easterly direction (Figures 48–51).

Figure 42: Finding the direction of Papay using a wrist compass and spray bottle with green food colouring, Mýrdalsjökull glacier, Iceland, 2017.
[photograph]. Source: Saoirse Higgins.

Figure 43: Direction of Papay on the glacier. Green food colouring sprayed from bottle. Mýrdalsjökull glacier, Iceland, 2017.
[photograph]. Source: Saoirse Higgins.

Figure 44: Glacier ice sample bottles. Mýrdalsjökull glacier, Iceland, 2017.
[photograph]. Source: Saoirse Higgins.

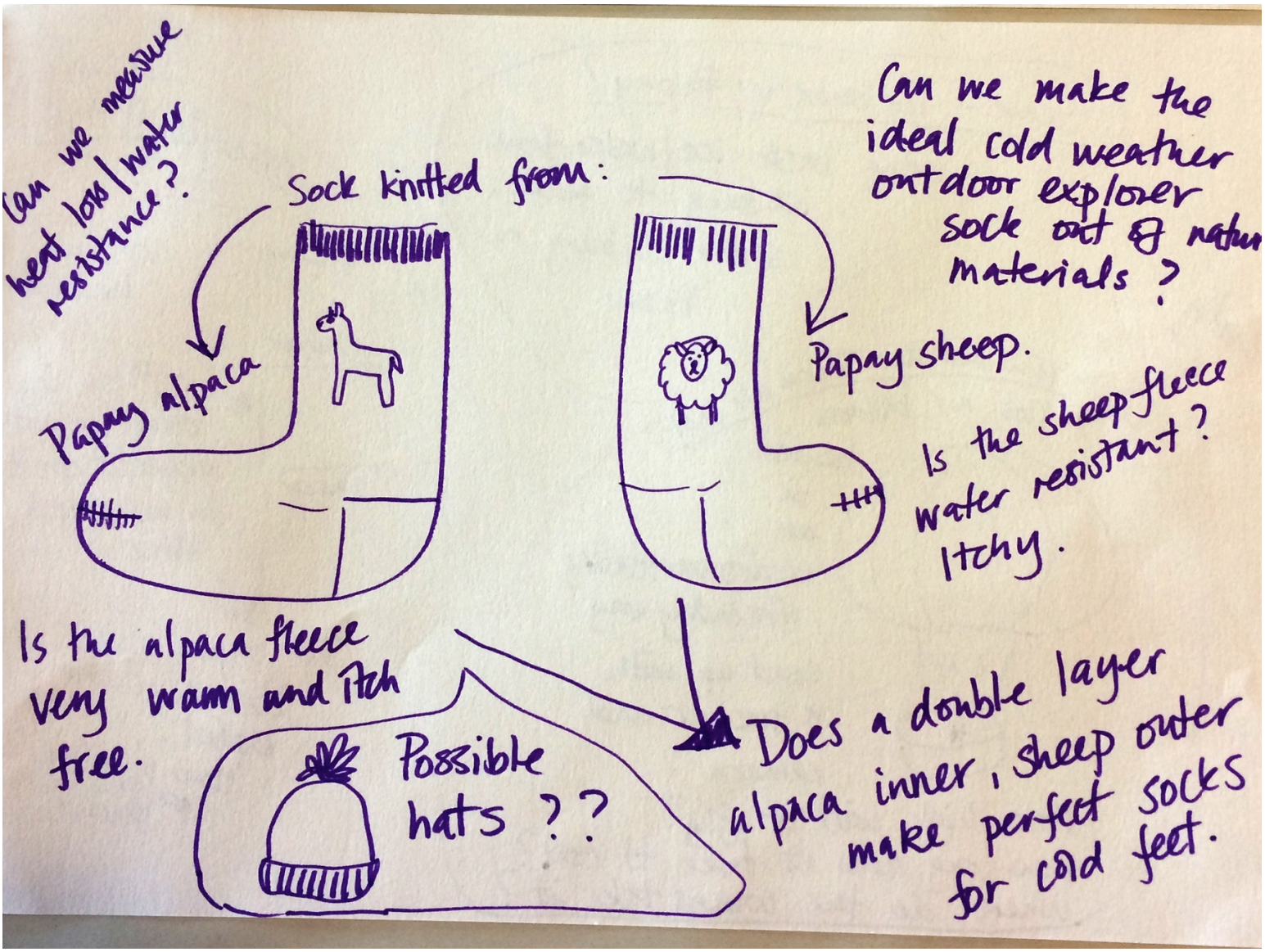


Figure 45: Glacier temperature experiment design workshop 1, sketch of design + participants draw feet templates. The Kelp Store, 2017. [diagram]. Source: Saoirse Higgins.

Next page: Figure 46: Glacier temperature experiment tool - knitted alpaca and sheep's wool socks Iceland 2017. [photograph]. Source: Saoirse Higgins.

Next page: Figure 47: Researcher recording glacier temperature with alpaca sock and sheep's wool sock on the glacier, 2017. [photograph]. Source: Jonathan Ford.


EXPERIMENT 1


Papay Westray School
Challenge:
• Which sock 1) Bob or 2) Fred is more comfortable to wear?
• Which sock 1) Bob or 2) Fred keep your foot warmer after 30 minutes wearing on a glacier?
* Please use heat scanner software if possible!
• Which sock 1) Bob or 2) Fred warms a cold foot up fastest?
• Which sock 1) Bob or 2) Fred made from Papay school
alpaca?
For Iceland
love from Papay
School
xxx.
Bob.
1
un
Fred
2
deux


Marmot

Figure 48: Researcher wearing origami wind sensor hat. Measuring the wind, 2018. [photograph]. Source: Jonathan Ford.

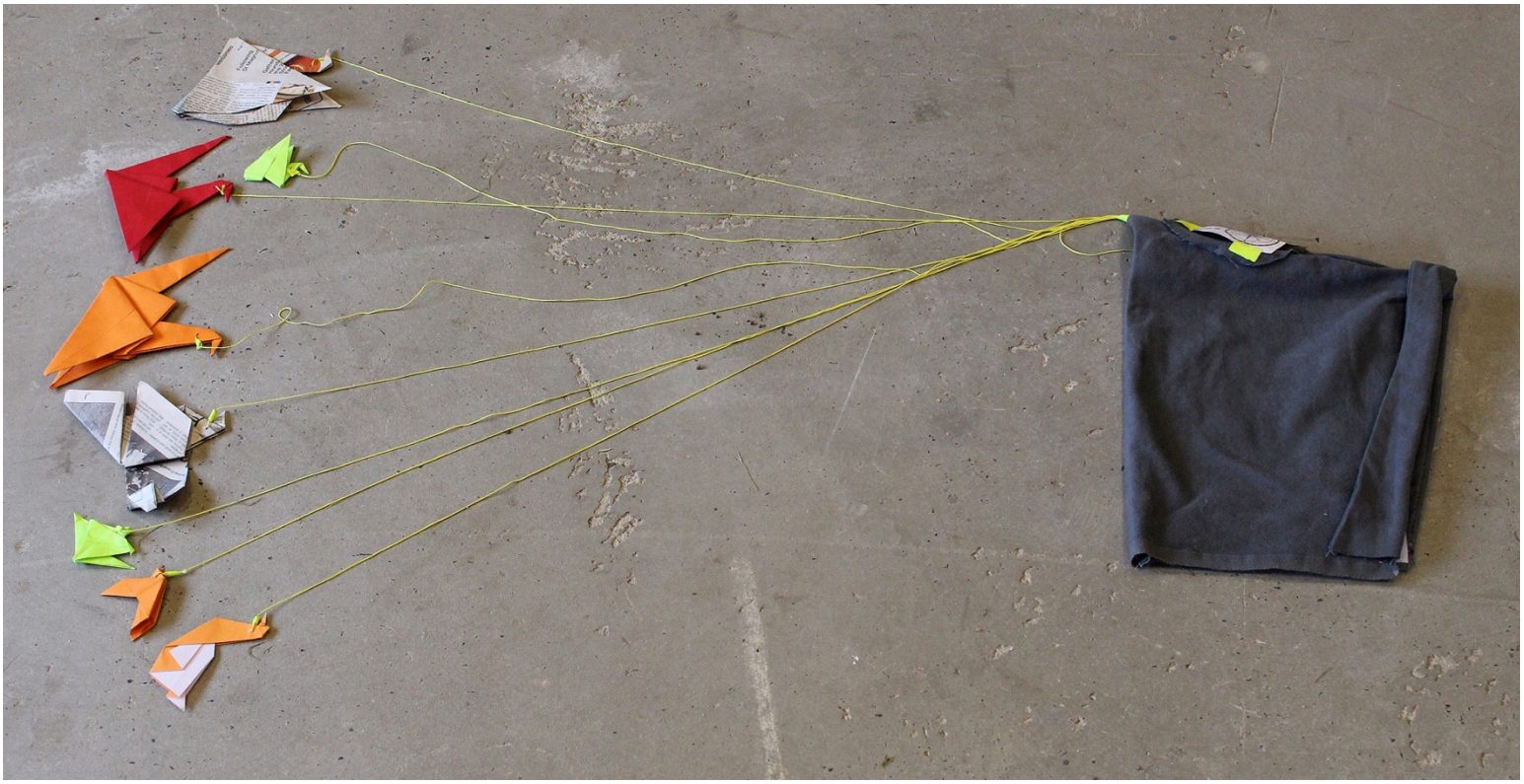


Figure 49: Origami wind sensor hat – paper birds, coloured string, felt hat, paper compass. The Kelp Store, 2018. [photograph]. Source: Jonathan Ford.

Figure 50: Kibbo Kift headdress – origami wind sensor hat inspiration. [image]. Source: *Designing Utopia*, 2015.

Figure 51: Origami birds made from *The Orcadian* newspaper and coloured card. Papay probe, workshop2, The Kelp Store, 2017. [photograph]. Source: Saoirse Higgins.

More Papay Probe tools: pumice stone, seeds, thermometers, flags

Prior to the Icelandic expedition, more artefacts and tools were developed and presented to the researcher as more islanders heard of the project through word-of-mouth. One artefact was a large pumice stone found many years ago by a retired Papay journalist and writer. He offered the pumice stone to the expedition to be delivered back to the volcano it came from, as he thought the origin of the stone was Iceland. The stone was washed ashore on Papay from the ballast of a passing ship, but originated in an Icelandic volcano, according to the glaciologists. Pumice stones lie all along the roads in Iceland and are most unusual in Papay.

This rock was used as a probe to hold a conversation with the glaciologists in Iceland about the scale of global change relating to glacier movement and volcanic eruptions. The scientist and researcher discussed how objects like this pumice become displaced far afield by nature, and compared the similarities and differences in the environments of Orkney and Iceland (Figures 52–53).

Some final tools delivered to the researcher before the expedition included:

a Papay seed-growing kit developed by the Papay community gardener later in the process and presented with instructions to the researcher; Papay garden seeds made into a special mini-pack to be germinated on the glacier to grow back on Papay; a vintage spinning wheel thermometer customised by one of the Papay schoolchildren to take temperature readings on the glacier; and a set of Papay Probe flags hand-made from canvas and embroidered by the island project group to mark each experiment on the glacier, placed on long telescopic poles made originally for fishing. The flagmaking for this project followed a tradition of flagmaking for each past event in the study (Higgins, 2016).

Figure 52: Pumice rock and Neolithic oyster shell-Papay to Iceland, Iceland, 2017. [photograph]. Source: Saoirse Higgins.

Figure 53: Icelandic Glaciological Society scientists discuss the Papay Probe expedition with the researcher and Papay ranger - holding the Papay pumice rock. Icelandic meteorology office, Reyjkavik, Iceland, 2017. [photograph]. Source: Saoirse Higgins.

4.8 Semi-structured islander interviews

As a result of the researcher's position on the island and local knowledge of the island and islanders, interviews were held later in the project. People spent some time considering interview requests and carefully arranged these to suit their timetables. This reflected the care that went into the final decisions in terms of choosing and accepting interviewees. Nine key islanders were interviewed individually in 2018 for twenty- to thirty-minute sessions after completion of the experimental events. Four of those interviewed took part in the events but this was not the focus of the interviews. Although many people on the island contributed to island operations, the islanders that were chosen all played significant roles in participating in the island infrastructure. Three were indigenous Papay islanders and six were from elsewhere, but had settled and been living on the island for more than three years, with family born on the island. Three of the interviews took place in the interviewees' homes, as this suited them better, and the rest took place wherever the researcher was based at the time.

All the interviews used the same structured set of questions, which moved from open-ended to more specific detail. The aim of the interviews was to gather personal backgrounds – indigenous or incomer – and get to know viewpoints on island participation, infrastructure and the future of the island, as well as personal connections with the island environment (Appendix 2). All the interviews were audio-recorded with interviewee consent, before being hand-transcribed to capture detail and connections in the answers.

4.9 IceCapReCap evaluation event

The IceCapReCap evaluation event was designed to gather the participants who took part over three years of the study and discuss their viewpoints and opinions. This was done via an exhibition of the visual data and tools designed and generated within the three-year study. The tools were exhibited in order of event and divided into tables covered in the silver material used in the HQ tent, which appeared in various formats in all the experiments. The evaluation was presented as a 'look back' at events and a chance to receive feedback on participation and ideas for the future. A selection of large A0 colour prints, illustrating the tools in action, were chosen from the three experimental events. A selection of colour images was projected on a screen, showing the event processes together. None of the participants had seen the documentation of all the events together in the context of the overall research. The project flags were shown hanging on a single 'washing line' string across the space. The tools were labelled using tags normally used on artefacts in The Kelp Store archive exhibits to blend them into the island's cultural archive. The tags explained the tool names, projects and year of creation. The order of the day was discussed with the ranger and the development officer, including what would be appropriate and interesting for everybody. An IceCapReCap cake was commissioned, baked by one of the Papay schoolchildren, who was beginning to contribute to baking for island events.

To prepare and build up participation, individual paper invitations were sent to all participants. The event was also advertised in the shop and on the Papay Facebook page. Thirty-one people came – a mix of children and adults. When people arrived in the space, they were individually greeted by the ranger and offered a free raffle ticket and circular yellow sticker. The ranger explained that they could vote for their favourite object, which encouraged everybody to closely examine the tools and read the artefact

tags. It also encouraged conversation and reflection on the objects and events, reminding people of the activities. The best object vote was primarily put in place to promote conversation and discussion around why the objects were co-designed and the manner in which they were used. The projects were laid on tables but accessible for anybody to touch or pick up (although nobody did pick anything up). Meanwhile, the researcher interviewed a sample group of five former participants in the adjacent room. The interview area was not private but set up beside the main window overlooking the sea, enabling participants to sit, talk openly and look at the view. An online SurveyMonkey interview was offered to anybody who did not feel like being interviewed. People examined the exhibits, voted and ate cake. A raffle took place for items relating to the exhibition – a very Orkney tradition, the raffle signalled a final gathering and the end of the event. The exhibition was funded through the Scottish Government climate challenge project for the island (Figure 54), also documented in Appendix 4 (excerpted fieldwork notebook: '3rd Nov 2018: IceCapReCap exhibition').

The online interview process

Ten questions were put to participants based on reflection-in-action from the previous interviews and the events (Schön, 1983).

From speaking to participants informally at the event, it emerged that their favourite tool was the Papay Probe project with the shoreline project a close second. Everybody remembered well participating in the making of the tools and the activities. The science fiction costumes and creative problem solving and tool-making were key preferences. Nobody identified as a scientist, or as doing science, but everyone knew that this was about science mixed with creative performance. The events were described by one interviewee as - 'theatre to the issues'. Nobody wanted a scientist there but everyone liked the idea of local experts. Most people spoke about the tools inspiring them to think

about relevant issues and identified with being makers or designers. The IceCapReCap exhibition ended the next day when the exhibition was de-installed. This extra day allowed people to call in and see it following word-of-mouth from those who attended.

4.10 Summary of fieldwork

This chapter discussed and detailed the three-year fieldwork timeline. Key experimental events and the semi-structured interview process were described in the context of the research aims and objectives. The next chapter reflects upon the methods and outcomes and how the context of living and working as a researcher on the island influenced the research outcomes and subsequent contributions to knowledge.

Figure 54: IceCapReCap evaluation exhibition, The Kelp Store, 2018. [photograph]. Source: Saoirse Higgins.

5. Analysis and discussion

Figure 55: IceCapReCap evaluation event, The Kelp Store, 2018. [photograph]. Source: Saoirse Higgins

5.0 Analytical framework

Introduction

Following a social constructivist epistemology, data from two phases – immersion and the final phase – was constructed into findings through a process of thematic analysis to address the following research question: How can PD approaches articulate engagement with the Anthropocene in an island-situated context?

Thematic analysis was chosen, as it is 'a process that can be used with most, if not all, qualitative methods'...(Boyatzis, 1998: 4). It is flexible, enabling cross-pollination of data types, and suitable for findings from more than one source at a time in the island context. Discourse analysis was considered as an alternative analysis method as verbal and text communication was prominent between islander experts, scientists and the researcher throughout the study, but this was not the only form of data collected to address the research question. Thematic analysis was foregrounded – this is flexible for different combined forms of data – in this case, audio-transcribed interviews and 2D and 3D designed artefacts. Situational analysis was also considered, but, as this comes from grounded theory, which uses continuous analyses from the beginning of the study, it was rejected as unsuitable as this case study used a combined PAR–PDR methodology with analysis towards the end of the study. For the discussion of the results of the analysis, the evidence drawn on included the fieldwork notebook, visual tools and images, and interview transcripts (Appendix 2). Where indicated, the reader can refer to these in the relevant appendices and fieldwork notebook.

Two key datasets were analysed with guidance from Clarke (2003) and Attride-Stirling (2001). The first set comes from nine semi-structured interview transcripts within the

immersion phase, while the second comes from analysis of tools and visual material associated with the Papay Probe project (Clarke, 2003; Attride-Stirling, 2001).

5.1 Thematic analysis

Thematic data analysis drew on Braun and Clarke's (2006) process of thematic analysis and Attride-Stirling's thematic network (2001), as well as the theoretical framework of symbolic interactionism, where the community is active in shaping the world around it from the ground up (Blumer, 1969). Lincoln and Guba (1985) define this way of being as data from multiple interactions between research enquirer, and human and non-human sources. Inductive thematic analysis was primarily developed. An inductive approach is normally used in cases where no previous studies deal with a phenomenon, meaning that coded categories are derived directly from raw text data (Hsieh and Shannon, 2005). The themes identified are linked directly to the data in a 'bottom-up' approach (Frith and Gleeson, 2004). Inductive analysis is a process of coding data without trying to fit it into a pre-existing coding frame or the researcher's analytic preconceptions. This form of thematic analysis is thus data-driven. However, researchers cannot completely disconnect from the theoretical and epistemological positioning and background of the research, and a mix thus ensues, starting with deductive analysis categorising initial interview questions and moving to an inductive 'bottom-up' approach to develop an experiential analysis of raw data based on transcripts and designed artefacts (Boyatzis, 1998; Hayes, 1997).

First, twelve key words and associations were gathered from the original research question (Appendix 3). The key words were as follows: relationship, responsibility, entangled, remote, survival, island, community, understanding, Anthropocene, expert,

participation and engagement. Using these key words as a first coding framework, the main set of interview questions was then coded (Appendix 3) and an initial thematic framework with basic themes constructed and used to begin to code nine island interview transcripts (Appendix 3). This framework consisted of eleven basic themes: survival, relationship, indigenous–incomer, balance, infrastructure, expertise, remote, values, seasonal, scale, and participation. The next step was to adjust and refine the coding framework, based on four analytical readings of all the transcripts (Appendix 3). This required detailed readings of the transcripts involving extracting and organising basic themes. A series of seven organising thematic network maps was developed from the initial themes and refined through a final analytical reading into three overarching global themes, reflecting the underlying prominent narratives of the data.

The seven thematic frameworks gathered from analytical readings of the data were as follows: responsibility–value and care; expert–non-expert viewpoints and knowledge; participation in the island community and with larger global issues; scale – micro/local and macro/global – relating to the Anthropocene; incomer/indigenous –referring to participating islanders; infrastructure and balance/tipping point for survival, relating to scale; island environment, referring to weather, physical seasonal environment and viewpoints and multiple local and global perspectives (Appendix 3). The three most relevant global themes developed from the data, influenced by the philosophical background of social interactionism, were as follows: *scale* – micro/macro, geological, real-time; *participation* – indigenous knowledge, value and care related to participation in island life and environment; and *expert–non-expert.* This incorporated balance/tipping point for survival and viewpoints on expertise and knowledge. Interview transcripts were hand-coded for each interview to ensure that dynamics of the Orkney and Papay dialect and local conversation were captured.

The references and nuances of Papay dialect would have been lost in translation if the interviews had been put through analysis software such as NVivo or transcribed by someone other than the researcher. This hand-coded approach was referenced in McAra's single case study PhD with teenage youth in order to capture nuances of language and accent (McAra, 2017: 80). Interpretation required researcher knowledge as an incomer islander of the context and island relationships to make more in-depth sense of the transcripts. The theoretical background of symbolic interaction, together with the researcher's particular island viewpoint, was a factor in the coding analysis of the interviews and tools to effectively identify 'sticky mediations' or knowledge gathered along the way (Bellacasa, 2012: 88).

The same thematic analysis process was followed for the Papay Probe tools, artefacts and visual workshop material (Appendix 3). The three main global thematic networks relating directly to the research question – scale, participation and expert–non-expert – are now described in relation to the interview transcripts and tools and artefacts designed. The sample network can be found in Appendix 3.

Thematic network: local–global scale

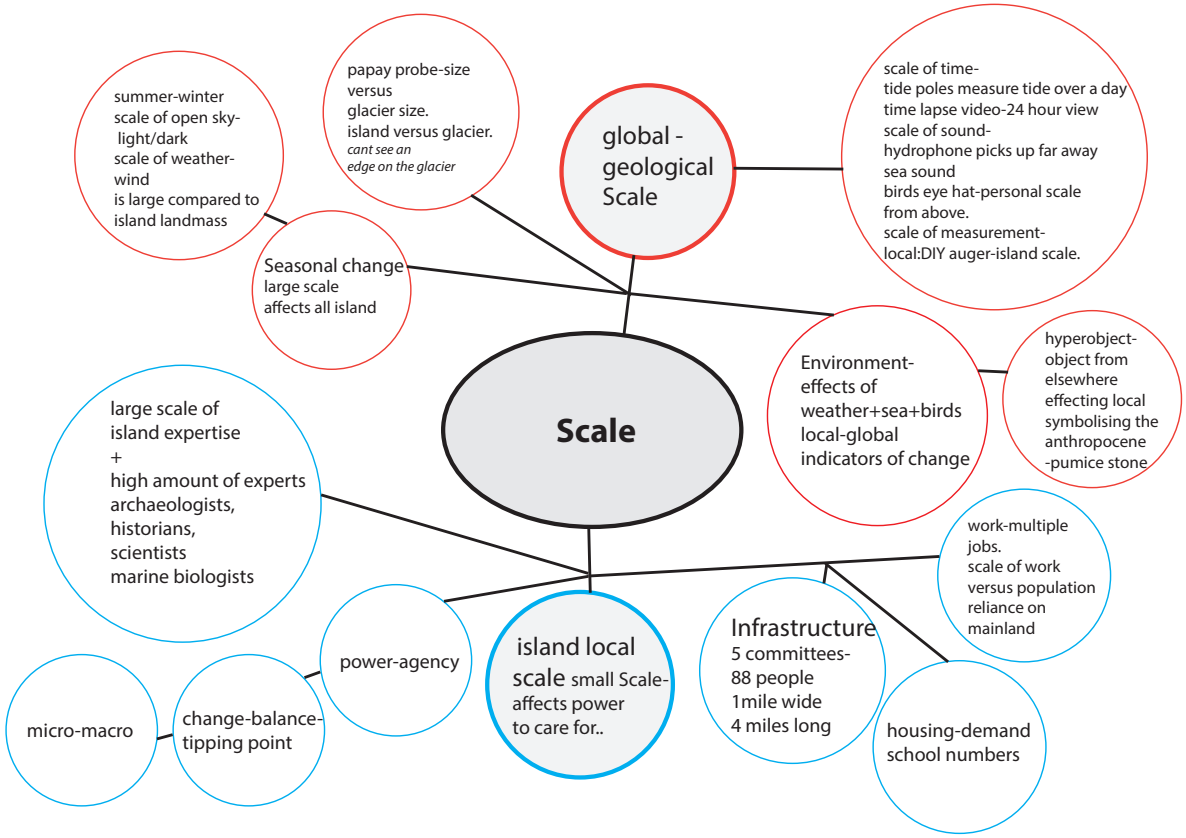


Figure 56: Thematic network: scale, 2018. [diagram]. Source: Saoirse Higgins.

This network comprises two organising themes and thirteen basic themes. It represents the conversation and tools relating to the theme of scale on the island, between the island and mainland Orkney and Iceland, and with the geological anthropogenic timescale.

This network (Figure 56) illustrates key themes on which scale was anchored: local and global–geological scale. The first organising theme – global–geological scale – relates to interview discussions of how the island and islanders connect with larger scale external forces and how these are perceived on the island. This theme was prominent in the Papay Probe analysis of artefacts relating to measuring glacier movement as an indicator of global change, within interview discussions relating to major changes in historic weather and natural environmental indicators such as changes in migratory

patterns of birds returning annually to the island. This theme also appeared in early interviews with Orkney scientists measuring local coastal indicators of change, and with local Orkney weather experts collecting weather data over many years.

The second organising theme refers to 'island local scale'. This theme is referenced in all the interviews, within designed artefacts measuring and examining the shoreline in the Papay shoreline research station and Papay Intrepid Explorers, and in island-scale tools designed to health-check the glacier in Papay Probe. On 'island local scale', basic themes incorporated local infrastructure, how committees and volunteers manage change and adapt to shifting population scales and the balance between incomer–indigenous islanders. Increases in incomer population, for example, mean shortages in housing availability. Weather that affects transportation results in delays in supplies and services. Interviews also involved discussions of local expertise to solve island-scale problems, without input from mainland Orkney centralised systems or scientific expertise. This theme originated in events such as the Caasie sea-defence wall-building, and islanders' design of the Papay Probe tools.

The following excerpt comes from an audio-recorded conversation between the Papay ranger and the researcher on the Mýrdalsjökull glacier directly after deploying experiments from the Papay Probe. The massive scale of the glacier in relation to the island is discussed. On the island, the boundaries and edges are in sight, offering a sense of security, while the boundaries of the glacier are so enormous that the beginning and end cannot be seen. The island and the glacier arguably visually represent the Anthropocene – the local being island human scale and the global being the glacier anthropogenic scale.

> Stoney rocky moving shifting…much harder to grasp the scale…much bigger than you can actually see. In Orkney, you can get an edge to work with…how big it is…how far up the valley…it's hard to comprehend…the groups of tourists look like tiny pin dots…
>
> (excerpt: Appendix 2: 50-53 Papay Probe glacier talk, 2017)

Scale as a thematic network begins with the physical scale of the island itself at one mile wide and four miles long.

> You have to make do with what you have got. You are trapped, so to speak. It makes you get to know what you have.
>
> (excerpt: Appendix 2: 95-96 TD)

This scale combined with a population of 88 people creates agency for change and sensitive and reactive infrastructural balance. Small changes can have large effects on the island.

> Small things that happen really affect everything...it topples things very quickly… the balance…the ripples move much faster when there are few people.
>
> (excerpt: Appendix 2: 156-160 JD)

As a result of the small scale of the island and the time that some families have been there, the island environment is closely connected to the islanders.

> For me, looking out the window and ken[know] that me[my] forebears for generations have looked out and seen the same things…you see the shape of the hill well with the ground, and it's just so familiar, and ken that me history is steeped in that…just yeh, it feels the right place to be.
>
> (excerpt: Appendix 2: 83-86 AH)

Islanders, particularly the older folk, miss the island and the sea when they are not beside it. They often have to move to mainland Orkney into the main town of Kirkwall to be near the hospital. They often never return to Papay.

> I ken [know] a lot of locals when they go to Kirkwall…in Kirkwall someone says 'what's the sea doing.' Lots of folk do miss it…[speaking of older folk]. And some folk have been there for fifty years and they still miss it.
>
> (excerpt: Appendix 2: 338-339 NR)

The size of the island in relation to the population size enables powerful engagement and action. At the same time, a critical mass of islander resources is required to enable action. The scale enables the system to be highly adaptive and reactive, giving the islanders more responsibility and agency than in a larger context. Many incomers come to live on the island for this reason – the sense of agency over one's own life makes it an attractive place to live:

> I decided to come back here…just this feeling of community that you don't get, I don't think, in any kind of big places.
>
> (excerpt: Appendix 2: 100-101 AlH)

Many of the islanders are aware of the effects of climate change on the island and particularly those that work directly with the environment, such as the fisherman and the farmers. The island is not untouched by globalisation- when the Papay fisherman discusses the Chinese market for his Orkney crabs and the process of cryogenically shipping Orkney crab:

> That one is going to China. There is a huge, huge market in China [for Orkney crab]. They put them in special vivia tanks, that slows their metabolism down, and then raise their temperature there.
>
> (excerpt: Appendix 2: 87+143DH)

The theme of weather and its large-scale impact on the island was discussed in terms of effects on environment, transport and infrastructure. Weather patterns and wildlife numbers were noted to have changed significantly on and around the island:

> Weather patterns have certainly changed over the years. When I was young just even the wintertime when the seaweed gets washed up on the beach…it smells. It never used to happen at Cott [name of an island house] you never had the smell of seaweed…
>
> (excerpt: Appendix 2: 225-227 AH)

> The winters have got less harsh. In the 70s we had really heavy snow in winter. We hardly get any now. So that has changed. I don't think we get the storms like we used to. 100-mile-a-gale would have been average in the winter. Now 100 mile-an-hour is in the news, in the local paper. They keep calling every wind and storm a name. In that sense it started to go down across England. You get storms up here…it wouldn't even make the news. You get 90 mile-an-hour in London and it's a tragedy for 10 years after…they still speak of it.
>
> (excerpt: Appendix 2: 27-33 DH)

> Bird life numbers have dropped. The main impact on birds is to do with climate change. It's very hard to see what's going on for sea birds…so when they are breeding they can't succeed without sand eels, and can't breed…that has caused these sea birds moving way from here…
>
> (excerpt: Appendix 2: 54-62 TD)

Weather strongly influences all aspects of island life, especially transport and delivery of essential goods. The haar (fog) in the summer often prevents planes from landing, affecting tourist numbers. Storms and wind in the winter can stop ferries and planes arriving with shop supplies and parts for repairs. This is, however, part of daily life, and the island moves with it. One basic theme explored is seasonal change – the effects of light and dark and how these influence islanders' lives. In the summer, light, and day, is extreme and constant, while in winter it is the opposite and very dark for months. This affects daily routine:

> That transition between summer to winter…there's a wee part of it that I find difficult because you are going from sort of broad daylight to sort of dark, but once it's dark I am quite contented by it. You put, sort of, the wintertime mode on…you are not hibernating, but you are doing certain things...
>
> (excerpt: Appendix 2: 107-110 AH)

Islanders slow down in winter and there are fewer visitors.

> I came back it was in the summer…a completely different place…almost unrecognisable…green and beautiful and sunny and there was lots of farming going on…but the difference was that folk had less time…everybody was busy with, you know, making the best of the season, to do whatever they needed to do. It was quite a marked contrast to the winter…being here when the community is very relaxed and sociable.
>
> (excerpt: Appendix 2: 73-77 JD)

The physical scale of the island and present-day island infrastructure means that there is a strong sense of self-sufficiency, representing a valuable tool for survival.

> Obviously, with wind turbines going up on the island now…that's actually moving back [to the past]. There used to be a lot of houses that had small wind generators…just power batteries they charge batteries, and then they used for lights…and things like that…it's a different scale now, but that's a change that is kind of moving back…
>
> (excerpt: Appendix 2: 437-440 AH)

Connecting theme insights to the research question from the experimental events and artefacts and interview transcripts, the scale of the island and its setup and operation in relation to balancing factors such as weather, population, environment and distance from the mainland means that islanders have a close relationship with their environment. They are therefore in a strong position to respond to changes in the Anthropocene.

> Simplified system, clear boundaries, no fuzzy edges and you get a sense of what you can see physically - goods coming in and out. You cannot get that sense anywhere else…here you can understand and get insights into politics and economics and society. Ecology of islands…a reductionist approach is possible

> [here] to make more sense of the wider world…What you learn in a small place makes sense of what is happening in Shanghai, for example.
>
> (excerpt: Appendix 2: 185-191 JB)

In this thematic network, the global theme of scale has been described and discussed coming from the analysis. A key factor coming from this analysis was that the small scale of the island enabled the local system to react in realtime to change, which affords the islanders a large amount of agency and a resilience for situations of change.

The second thematic network, 'participation', will now be described, discussed in the thematic analysis framework and connected to the research question.

Thematic network: Participation

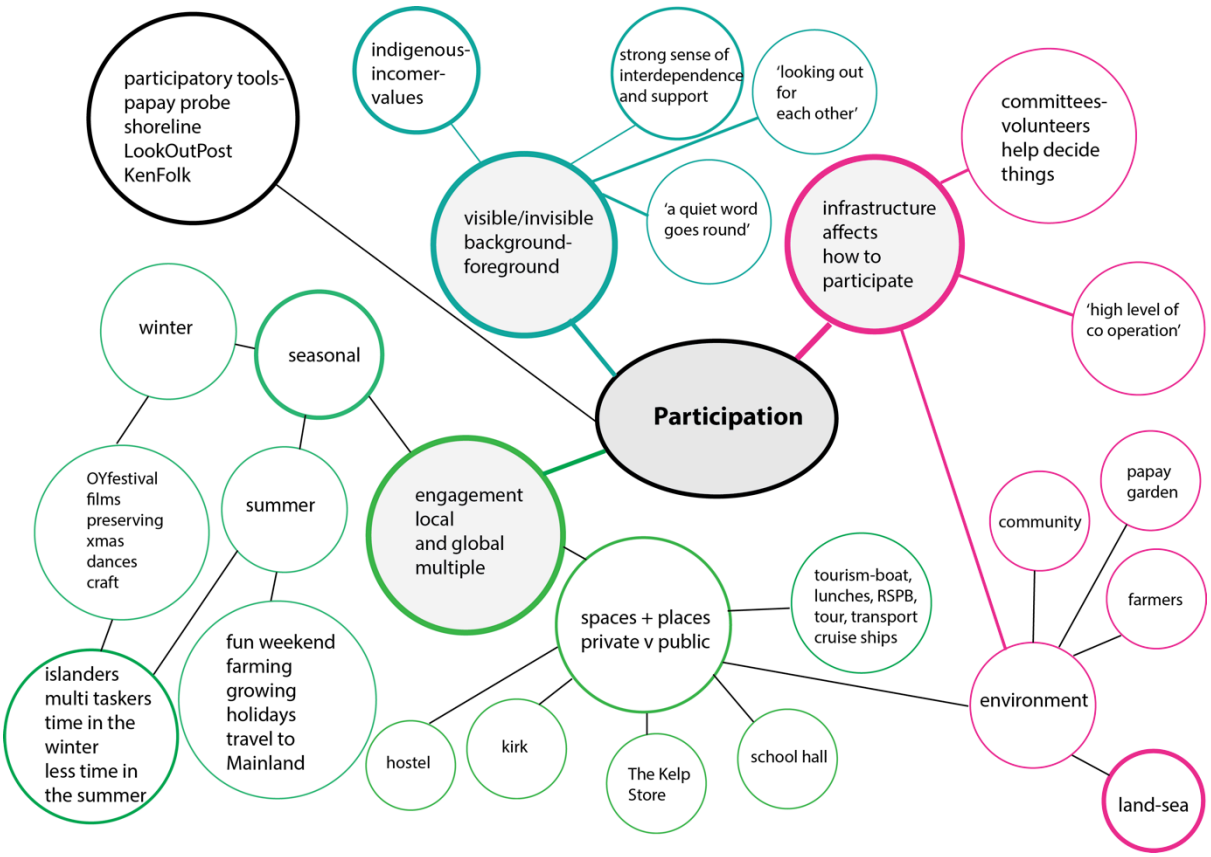


Figure 57: Thematic network: participation, 2018. [diagram]. Source: Saoirse Higgins.

This network comprises three organising themes and eight basic themes, representing conversations from interviews and participatory tools designed for the Papay Probe to encourage multi-layered participation between islanders and external networks. The thematic network (Figure 57) illustrates key themes of participation. There were three organising themes – engagement between the local island environment and global issues, visible and invisible means of participation based on indigenous and traditional values and infrastructure affecting ways of participating and becoming involved on the island.

The first organising theme was engagement between the local island environment and global issues. This emerged from interviews, artefacts designed for the Papay Probe, audio and video material, including time-lapse videos of community events, such as those of planting Lyme grass for sea protection and Caasie wall-building. The second organising theme is visible and invisible participation. Making multi-layered partial and full participation available is a primary concern to encourage engagement in island life for survival. This is particularly apparent for people arriving to live on the island and gradually participate in the island system.

> Most people who have moved here over the last 20 years have adapted, to some extent, to the traditional way of doing things…and yes, there is a lot of change at the moment, but those individuals will also slowly slow down and adapt and take on some of the social values and work values that are or have always been on here…and people who are indigenous to here will also adapt, and they always have done.
>
> (excerpt: Appendix 2: 466-470 JD)

The incoming new islanders learn how to participate in the settled island community, contributing to and engaging with island survival for the future.

> Community-wise it has changed were we have had to adapt a bit…least favourite thing on the island is when folk don't realise what it takes to be community-minded, and [have a sense of] community spirit to make the community work, cause there's a lot of unseen things that folk have to work at to make it work.
>
> (excerpt: Appendix 2: AH)

The third organising theme is infrastructure, affecting how people participate. Five committees and various key venues organise participation in island life. The way the island infrastructure is set up helps make visible opportunities to take part at a range of experience and skill levels.

> Papay is good in the sense that there are active groups, which involve a lot of people in one-way or another. People coming together to make things work. The committees are not (always) solving the problems…they have a big contribution helping the island develop sustainable services and providing the shop…all of those things are the key fabric for the community.
>
> (excerpt: Appendix 2: 8-12 TD)

Participation in island nature tourism is structured and involves a core group on the island providing food, entertainment, accommodation and transport links. Participation can be seasonal with a different calendar of events and tasks from winter to summer as tourism and farming tasks primarily exist in the spring and summer months.
Space is at a premium and is negotiated carefully. Islanders participate in decisions relating to change that affects them. There are multiple private and public spaces to participate on the island in terms of receiving or offering help. The size of the population in relation to the island means that islanders rely on each other to function and develop.

> I remember somebody saying to me you never know when you are going to need somebody else, so there is no point falling out with them…you don't have to like them, but you don't have to fall out with them either…you can just get along…it counts for a lot.
>
> (excerpt: Appendix 2: 196-198 JD)

> Where here, sticking together and working together is 80% the way they think. There is that clear majority that wants things to work.
>
> (excerpt: Appendix 2: 66-68 JB)

Multiple levels of participation help new islanders to navigate from a starting place in the community to full integration at their own pace. The development officer had much to say about this, as her job aims to encourage new islanders to develop and settle in. Some islanders choose to participate but remain invisible in the background. Participation can be visible or invisible, with people participating quietly at a distance, as volunteers, or in the foreground in multi-tasking jobs, on committees or running events.

> …unsung heroes…strong undercurrent of support for lots of things that just isn't visible really on the surface.
>
> (excerpt: Appendix 2: 163-166 JD)

A desire for at least partial self-sufficiency motivates participation.

> There are a lot of people working together to make the place work…I do my bit, and in terms of work, I have very clear boundaries
>
> (excerpt: Appendix 2: 212- 213 JD)

> A quiet word goes round that something needs to be done, or something is not working, so there's a core of people who'll adapt to that…but also there are a lot of things that don't get said, but people see, and a whole team of folk who'll do that and pick it up and run with that…
>
> (excerpt: Appendix 2: 236-239 JD)

Islanders learn traditional values and ways of doing things from indigenous islanders informally. Nothing is demanded formally by the island committees. There is an indigenous way of operating on the island that is not explicit when arriving but learned

by the incomers. Islanders care for their community, as they rely on it for services and survival.

> …is that traditional sense of values…of looking out for each other…but not necessarily being on top of each other you…you're not responsible for everyone but you can be supportive and caring.
>
> (excerpt: Appendix 2: 426-428 JD)

> I think folk can learn it…if you are brought up here it's bred into you, cause you see it happenin since you are knee-high to a grasshopper.
>
> (excerpt: Appendix 2: 260-261 AH)

Committees and volunteers help to solve issues and try to develop agency for islanders to operate locally.

> There is a high level of cooperation…there is a really concentrated effort…the co op is made up of people who are indigenous, and development trusts are often made up of people who have moved to the island, who want to develop and move on and take their experience that they have got from somewhere else…strong sense of interdependence and support.
>
> (excerpt: Appendix 2: 287-293 JD)

Multi-tasking is a particular form of island participation as not enough jobs offer security. Many islanders have multiple jobs and are experts at juggling multiple responsibilities. They become experts in switching spaces from different professional roles to personal and private roles.

> …because the jobs here are…very few of them that are forty hours a week, you just pick and chose what you can and hope it slots together again.
>
> (excerpt: Appendix 2: 130-131 AH)

> …always had a few folk working with me…you got to be flexible, because if you are too rigid you lose your employees [referring to everybody multi-tasking on other jobs].
>
> (excerpt: Appendix 2: 191-195 ALH)

In this thematic network, the global theme of participation has been described and discussed from the interviews and tools analysis. Participation is central to island life and has multiple layers, visible and invisible, within island seasonal living. Participation is adaptable depending on relevant issues and is connected to themes of scale and the roles of experts to produce a participating public energetically engaging with the Pap-øy-cene.

The final global theme of expert–non-expert will be analysed and an overall summary of the global networks subsequently discussed.

Thematic network: expert-non-expert

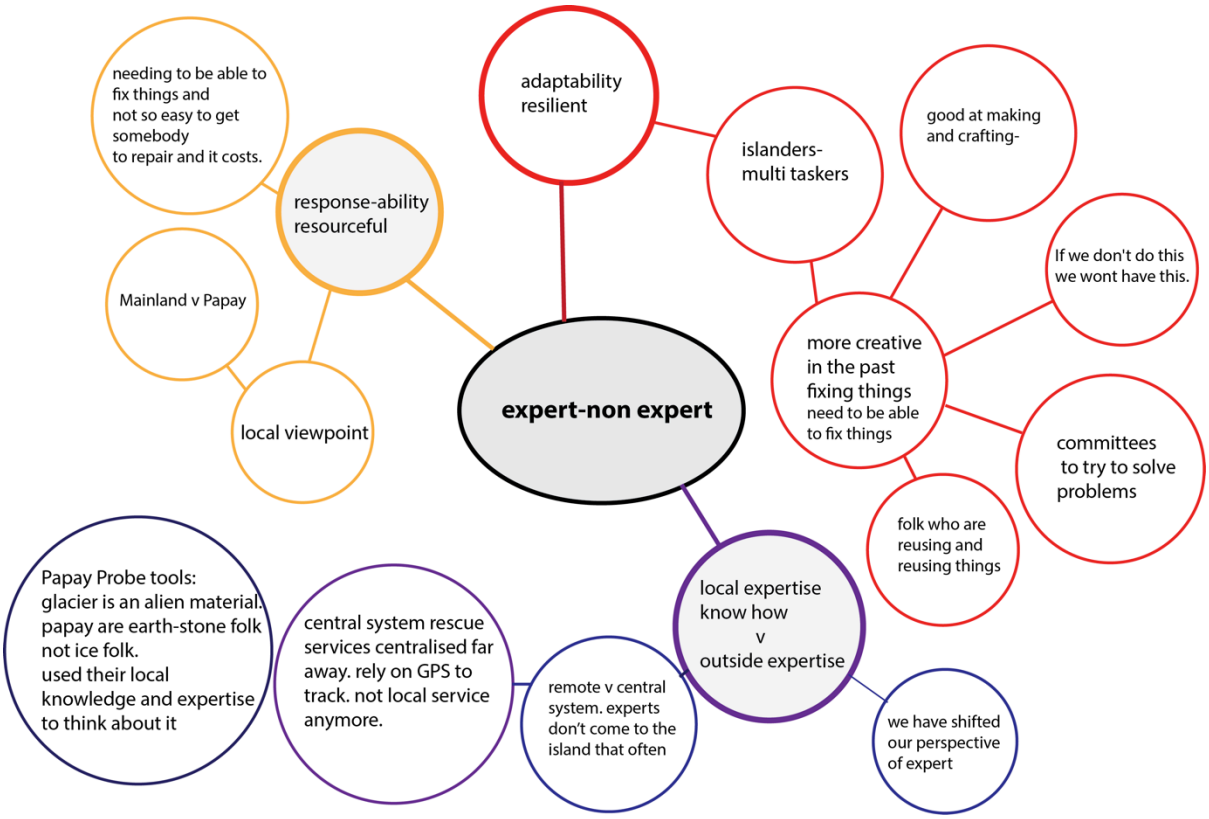


Figure 58: Thematic network: expert-non-expert, 2018. [diagram]. Source: Saoirse Higgins 2016

This thematic network comprises three organising themes and six basic themes. It represents the conversation and tools relating to local and external expertise in island and external networks with mainland Orkney and Iceland. The thematic network (Figure 58) illustrates key expert–non-expert themes. The first organising theme is local expertise versus external expertise, the second is response-ability and resourcefulness, discussed in terms of self-sufficiency and 'getting things done', not waiting for mainland Orkney to solve problems, and the third is adaptability and resilience, linked to factors such as the weather and an infrastructure capable of withstanding local and global issues in terms of sustainable tourism, the environment, remote-central economics and jobs. In this network, the basic themes highlight a propensity for resourcefulness, flexibility and adaptability to sustain and survive island life. For example, multi-tasking is a common form of working to make ends meet on the island and keep the system running:

> …farming does take time…so that's a big part of my life too…beyond that I'm a fireman..theday [today] I was a docker at the pier…so I do that just when there is a need for it…same with the plane, I do fire brigade work at the plane, I'm trained into that…just when it suits, when folks are needing it…I was a special constable until last year. I retired after twenty years. I was coast guard for 20 years. I've done a lot of other bits and bobs…like I say, I am involved a lot in the committees…I know it's not work, but it all adds to the community.
>
> (excerpt: Appendix 2: 202-208 AlH)

Materials washed up by the sea are commonly collected and saved in case they are useful later as supplies from the mainland are often slow and weather-dependent. It is difficult for experts to come to the island as it is on the edge, remote even from mainland Orkney. Islanders therefore learn to be generally resourceful, able to repair machinery.

> If we don't do this we won't have this. There is a difference in Stromness [on the mainland] and Papay [remote northern isles] community doing things.
>
> (excerpt: Appendix 2: CWJ)

> [We] Need to be able to fix things, as it is not so easy to get somebody to repair, and it costs more...if a big piece of wood washes up on the beach you don't just walk past it - you pick it up…either its going on the fire, or you might make something out of it…or it could be used for fencing, or anything really.
>
> (excerpt: Appendix 2: 109-121 TD)

> If a piece of machinery broke down in the past you could nearly make something to mend it…now you got to wait for it…but it makes folk more creative in a way…not being able to access things as and when you want, and some of that is weather-related.
>
> (excerpt: Appendix 2: 244-247 AH)

Islanders are expert at knowing their weather as it is concentrated, affects the island system and is a major factor compared to the small-scale physical landscape. One of the islanders interviewed spoke about how visitors have 'no concept of wind' compared to islanders. Weather does not bother her as 'it is all part of being here' [on the island]. Another islander spoke of the need to be an expert in weather to function at all.

> …whether the boat comes in or not. Whether the plane comes or not…whether you can actually get out of your house and open the door because the weather is battering it down…whether you can take your pram or push chair and take your kids down the road to the farmers market…it's all those kind of things that you have to be aware of with the weather.
>
> (excerpt: Appendix 2: 404-410 JD)

During the interviews, a story was told of an incomer from the city, who lived on the island medium-term but could not deal with the weather:

> I certain mind [remember] there was a man and a boy came to work on a hoose [house] to do it up…sort of October, November coming into

> December…and every day for about a month it was just windy. It was not desperately strong…it was just there all the time…I think folk maybe from the city. You don't notice the wind the same…it was just wind and wind and wind…it just got to him, and, well, they stayed here a good few years…
>
> (excerpt: Appendix 2: 269-276 AlH)

Thick engagement with the island environment to be in a position to design effective tools relies on living long-term through seasonal cycles and experiencing the community and weather patterns. Only then can a sense of the depth of a place be understood.

> But you have enough history to ken [know] it will change its not permanent [the weather being bad]…
>
> (excerpt: Appendix 2: 285 AH)

> …It's nature, you ken [know] exactly what it is [referring to islanders' deep knowledge of it].
>
> (excerpt: Appendix 2: 323-324 AH)

> ...things tend to be built to last…here it's stone-built mostly, it's strong houses…you very seldom get anything that's catastrophic.
>
> (excerpt: Appendix 2: 292-293 AH)

Artefacts particularly reflecting this in the Papay Probe project were apparent in the discussion between the Papay farmers, who spoke about the design of the Papay Probe ice auger collecting ice samples on the glacier. The scale of the auger was much smaller than a scientist expert system but still collected years of history in a small sample and was designed by a group of local experts by experience.

> We talked about various ways of creating an ice drill, and how you would get the core out when you had pulled the drill out. They had all seen the Orkney BBC programme with the cores taken from underwater in the Bay of Firth…Cutting the drill in half…DR was very interested in any technical challenge, the island technician, you can almost see his mind working and trying to figure it all out…He suggested drilling three holes, or at least digging holes at the side of the core hole

> so you could get to the bottom of the core and cut it out. Ideas included using an existing pipe and cutting teeth in that [hardening the teeth], modifying a stone core drill…None of them could imagine how hard or soft the glacier would be… alien material, very much earth/stone folk not ice at all…Suggested filling a bucket and freezing that for something to test the drill on, they have a blast freezer on Westray…
>
> (excerpt: Appendix 2: 16-26 DRPapayProbe)

To summarise this network, expert knowledge comes from a mixture of local islanders and experts from the mainland but begins with bottom-up knowledge. Levels of expertise are strongly influenced by the need for real-time hands-on makers and doers on the island. Expert knowledge has to come from the island first and radiate out to local scientific experts on the mainland for the island to function and survive. Skills come from a close relationship with the physical landscape, the weather and the sea, and indigenous practical ways of operating.

> We have shifted our perspective of expert…for example, an archaeologist will come and interpret things from the past with an idea…the farmer comes along and say that's total rubbish. Westray farmers coming along telling how it was made…archaeologists are good at pronouncing on stuff…although we are slightly better nowadays. At Skara Brae we had a long conversation with the fishermen in the pubs about hunting whales. A ships' captain was revered, but nowadays you wouldn't even know who that was.
>
> (excerpt: Appendix 2: 306-312 CWJ)

The global thematic expert–non-expert network has thus been summarised in terms of the organising themes and basic discussion themes.

> Incomers coming in…no such thing as outsiders. Islands have a history of people arriving…
>
> (excerpt: Appendix 2: 334 CWJ)

From thematic analysis of nine key island interviews, experimental tools used in the Papay Probe project and transcripts of audio conversations, the findings are discussed in

the next section, addressing the research question through a philosophical lens of symbolic interactionism, where multiple viewpoints co-construct reality from the ground up, referencing material discussed in chapter two.

5.2 Amplified patterns: analysis and discussion

To address the research aims and objectives, the analysis looked at the relationship between expert–non-expert islanders' engagement with the environment in relation to the global-scale issues of the Anthropocene and offered a situated framework for the Anthropocene through a critical PD lens, opening up expert–non-expert channels of articulation and engagement. Findings from the analysis offer a situated understanding of islanders' relationships with the environment and each other, positioned from within the island looking out (metaphorically) to the horizon.

Drawing on chapter two and discussing relational viewpoints from 'where you are at' (Ingold, 2011: 230) and from margin and edge to centre (Cottam, 2019; Watt, 2018) as well as Haraway's call for tracing on-goingness (2016: 201), this understanding of local relational viewpoints contributes to a framework for future PD practice emphasising movement and positioning – a key component of future tools and frameworks for survival. The findings demonstrate a strong awareness of the external world and where it fits within the island world. Generative problem-solving and strong practical community initiatives are emphasised, such as the five island committees set up to deal with issues affecting island life and take care of the island network. Some of these committees, according to the development officer and from participatory observation, are naturally more indigenous while others have more incomers, which means that both

important island viewpoints are represented. Evidence of a clear value system of care towards each other and towards the island environment appeared from the themes. Drawing on Bellacasa's concept of care (Bellacasa, 2017: 69-93), showing a notion of doing and looking after each other and the environment, the analysis highlighted a strong sense of interdependence and support on Papay. People 'look out for each other' and a 'quiet word goes around' if somebody needs help, especially older people. This caring attitude and responsibility comes from a traditional set of community values and remoteness from the central infrastructural system, which does not service their daily needs to the same level as on mainland Orkney.

> Looking after interests on the mainland and trying to develop something on the mainland with such limited resources is hard enough, never mind thirteen non-linked isles...and they all might want something a bit different, like a community on North Ronaldsay, you know, which is the furthest away, some of the people there have the same expectations…you know, 'I pay my council tax'…Yes, but kind of, to come and collect your rusty old washing machine it is going to cost £7000. We are not sending a boat for that, I'm sorry. It is very, very different here. It's a challenge. What we need to make people understand, it's not just about cost it's about the environment as well. And so it's not always the best environmental option to recycle all the plastic from Stronsay, for instance, even though they would really like to. Because 1 – the cost, and 2 – we have to go and pick it up from Stronsay, ship it here, and then ship it off again. So, actually, we are double-shipping it, so it's quite different to everywhere else.
>
> (excerpt: Appendix 2: 236-247 JV)

The island is therefore strongly self-sustaining and self-reliant in solving problems. 'Taking care of things' signifies a labour of maintenance and repair and an ethical obligation to look after that being cared for (Bellacasa, 2017: 43; Ratto, 2012). In this case, care is for the island and islanders. From the interview and event tool analysis, and drawing on Bellacasa and Tuhiwai's ethics of care in chapter two, it is evident that islanders demonstrate a care and response system that maintains the community and

the island environment's wellbeing. This ethical system of care is an important element of a future engagement toolkit for the Anthropocene. The Papay Probe asked the participants to 'health-check the glacier' – to check the wellbeing of the glacier as they do their own island, taking 'collective responsibility' for checking the glacier 'beastie's' state of operation without a call for participation from a top-down expert scientist, but instead from BSA support, promoting research into bottom-up grassroots-led solutions. From interview and fieldwork event data, islanders' responses to the environment, particularly in winter, were revealed, showing their reactions to changing conditions in real time. Positioning these insights alongside Haraway's conditions for response-ability (2012) and Escobar, Capra and Luisi's (2014) new framework for transitions, emergence is a key property in producing a new framework. The islanders are aware of their response-ability within familiar, regularly changing Papay conditions. This awareness produces thick engagement (Geertz, 1973) with the environment and a valuable contribution towards a framework for survival.

From the analysis, the global thematic expert–non-expert network looked for experts in local island contexts within the global Anthropocene. Returning to Turnbull's argument for 'establishing equivalences and connections' across places through situated messy science (1996: 62) and Latour's (2011) call for science not to ignore the consequences of experimentation in real life in the current Anthropocene conditions, technology has made everyone experts by experience in any local positions, including Papay. The term expert-by-experience originates in the mental health profession (Rosier and Hadley, 2018). This crisis of expertise puts us in the position we are now in globally – unable to co-ordinate solutions to deal with the complexity of climate change. The classic definition of an expert as somebody with knowledge and authority on a topic to decide for others is fading. In the context of PD in this project, the word expert could be

replaced with co-investigator or co-articulator (Lindström and Ståhl, 2014) or expert-by-experience (Rosier and Hadley, 2018). In relation to tools for survival and the state of the expert in the Anthropocene, the expert is not only the scientist visiting Papay to measure coastal erosion on South Wick Beach and compare the data to reports from previous years, but the expert-by-experience community with situated daily knowledge of the changing parameters affecting the island and ways of living. Islanders traditionally form, and newcomers enter, a community of practical makers and doers out of necessity from being a remote island far from the centralised system and resources. They will 'have a bash at it' using 'stuff that is available from here' (excerpt: Appendix 2: 404-410 JD). They are expert in repairing things as experts are often too far away to travel for services. From the IceCapReCap evaluation questionnaire, participants identified as makers, not expert scientists, creatives, DIY scientists and thinkers (Appendix 2). They demonstrate a sense of their own local 'expert' value in events, and a strong sense that a close connection with nature is an asset for the future.

> Quite a lot of people like nature here. They are interested in it and they enjoy the birds or just general nature around. We know everybody knows that nature is important for tourism here. It is important source of income for the island.
>
> (excerpt: Appendix 2: 18-20 TD)

From participant observation, small island community events and activities openly include everybody wanting to take part, whether visitors or long-term islanders. This multi-access island participation was reflected in the recruitment methods for events using shop noticeboards, word-of-mouth and teaser workshops, with multiple choices of activities and ways of making offered to encourage minor and major ways to participate within the project. With reference to chapter two, Stengers calls periphery participants

'idiots', borrowing from Delueze and Guattari. Idiots are not defined in the normal sense of the word but as periphery sceptical participants who might slow things down and highlight other aspects and perspectives relating to relevant issues in hand (Stengers, 2005: 995; Delueze and Guattari, 2004: 61-2). In line with Stengers' argument for 'the idiot', the research opened up environmental engagement to multiple interdependent participatory voices, both partial 'idiot', full voice 'expert-by-experience' and local expert, as well as slowing down the process of 'knowing-as-you-go' through long-term engagement on the island (Ingold, 2011: 228; Stengers, 2005: 994; Latour, 2014). This allowed for 'matters of care' to be connected to real change (Bellacasa, 2017) The process has therefore led to contribution to the (on-going) development of a new framework engaging with the climate crisis by looking at the Anthropocene. Grounded in a theory of social interactionism, this is connected with Haraway and Dewey's idea that our relationships with humans and non-humans are complex, entangled and messy, requiring 'located accountability', where 'partiality not universality is the condition of being heard to make rational knowledge claims' (Haraway, 2011: 195). A slow, layered located process permitted a 'thick' viewpoint (1973) and, to return to Manzini's (2015) notion, created a 'cosmopolitan localism'. This process was designed into the Papay Probe through science fiction role-playing narrative and making methods and experiments, producing 'partial' knowledge and a 'cosmopolitan local', which the researcher defined as an anthropogenic expert working from situated experiences from a close relational bond with the surrounding moving environment. This is a relationship and definition that feeds into the research question and is discussed in the next section.

Islander expert relationship with the Anthropocene

Within the Papay Probe project, as described in chapter five, participants had to think about the 'see-saw effect' of a remote issue of glaciers retreating, affecting their local

environment through sea levels rising, and articulating the issues within the probe and experiments on the glacier. From analysis of the Papay Probe tools and foregrounding Gauntlett's (2011) idea of knowing through making, Ingold's (2011) knowing-as-you-go, Manzini's communicative artefacts for bottom-up capacity-building (Manzini, 2015: 184) and the temporary gatherings created through making called 'publics in the making' (Lindström and Ståhl, 2014: 140), it is evident that, by using island knowledge and ways of thinking through making, the tools framed the glacier within an island template or lexicon to understand the challenges of global issues. The glaciologists in the project collaborated as co-articulators on the issues after the Probe and experiments were designed and built accordingly. The scientists' positions in the expedition phase were as expedition advisers or 'partial participant experts' as they knew the physical terrain of the glacier and the environment. They shared a care and concern for the glacier together with the community and had experience of working alongside lay volunteers and experts to annually monitor the glaciers in Iceland, thus already possessing a remit to engage with a community to undertake measuring and monitoring activities. This project, however, was different insofar as they did not instigate the data collection or have any control over the overall data or the process, instead acting as a peripatetic part of the engagement framework.

Peripatetic participation to tackle large-scale change in the Anthropocene

Multi-layered and multi-spaced participation featured in the themes of the interviews, which discussed multiple island places, spaces and activities for participation, and within experimental event data in the tools of engagement developed by many islanders in the Papay Probe. Participation had multiple forms, layers and spaces, opening ways for people to engage with events and activities. This method of participation links to Latour's 'socio-material collectives of humans and non-humans', which look at issues of

concern (Latour, 1999b: 212-214). As discussed in chapter two, through designers such as Brandt and Ehn, many examples of PD practice consider 'matters of concern' rather than 'matter-of-fact' situations within social, health and environmental projects (Jeremijenko, 2018; Futurefarmers, 2018; Brandt et al, 2017; Ehn et al, 2015; McAra, 2017; Lindström and Ståhl, 2016). Matters of concern are messy, live and entangled situations that are not clear-cut, contain multiple layers of stakeholders, experts and non-experts, and have no black and white answers. The research question considers how to approach matters of care and concern to engage with future survival in the Anthropocene. The Papay Probe described in chapter four involved a situation that had participant infrastructuring (Star and Griesemer, 1989: 410) to develop a Probe and experiments to measure aspects of the glacier. The results of the analysis reveal that participation exists on Papay through high levels of collaboration and collective responsibility for looking after and running the island. From participant observations on the island, and the interviews and events, a theme emerged of strong island participation as a consequence of climate change issues – an escape to a more simple, traditional, community-led value system and indigenous way of living. The methods of participation in the experimental events, specifically for the Papay Probe project, promoted live engagement with the environment, connecting local viewpoints to geological long viewpoints (Braudel, 1969; Brandt, 2008). The glacier is arguably an anthropological indicator as it retreats and becomes extinct. Islanders became a form of what designers Lindström and Ståhl define as a public-in-the-making. They define this in terms of their Patchwork project as a temporary public coming together with a common 'making' goal (Lindström and Ståhl, 2014). In this research the participants became what the researcher calls 'activated caring experts in the making' through the act of collective intervention and tracings (DiSalvo, 2009: 55), making the experiments and

probe, and sending and deploying it on the glacier. Returning to the research question, in line with Tsing (2015) in chapter two, who describes the Anthropocene as a short slim boundary event, to engage with change and understand the anthropogenic world we must examine the entanglements that this interface presents to us as experts–non-experts, artists and designers, and intervene in its movement. The Papay Probe exemplified this collective intervention in a moving indicator of anthropogenic change. The intervention and tracing were initiated and positioned on the island using local materials and situated experiential participant knowledge. Placing the intervention 'base camp' physically and metaphorically on the island positioned the research question within this island viewpoint, remotely intervening in the glacier environment and learning about its form and its workings (ibid: 337). Articulation of issues relating to the research question happened through co-design of experimental tools on Papay, transporting the Probe to Iceland, travelling to the glacier, deploying the Probe and following the Papay experiment instructions. This resulted in a collective sense of connection with the 'long view' (Braudel, 1969: 725-53) and an engagement toolkit or tracing (Manzini, 2015; DiSalvo, 2009) for survival, highlighting the need for caring skills and multi-level slow participatory viewpoints, similar to islander ways, to help contribute to future survival. The Papay Probe experiments and tools were designed to engage with the environment as it changed, existing performatively within the planning and testing on Papay and live action on the glacier. Outside this, the tools 'switched off' or became inert, 'switching on' when activated by island experts, discussed with glaciologists and actioned by the researcher and ranger on the glacier. The tools could be defined as peripatetic tools of change as they moved along with the islanders, glaciologists, researcher and glacier in a metaphorical and physical slow sense, associated with that icy indicator of change. Latour asked designers where the 'tools to

gather matters of concern' were (2004b: 240). He wanted a means for 'drawing things together', which in this project is the engagement framework comprising tools that draw together publics of concern to engage with the Anthropocene.

The viewpoint offered to the researcher and ranger through the experimental tools on the glacier came from a remote island viewpoint and used their experiential situated knowledge to map onto the glacier. The scale of the Probe was tiny in relation to the glacier size, but the scale of power and agency activated by multi-layered island participation was large in comparison. As discussed in the chapter two, Morton (2013) discusses the Anthropocene and geological scale in terms of hyperobjects. Hyperobjects are non-local large events impacting on other remote places far from their origins (Morton, 2013). The volcanic rock taken back from Papay to Iceland as part of the Papay Probe project and referenced in chapter four was arguably a hyperobject which came from an Icelandic volcano many years ago, landing on the island surface of Papay. To an extent, the Papay Probe was a counter hyperobject on the glacier, moving from the local island community viewpoint to the enormous scale of the glacier. Morton (2011: 19) calls this time the 'age of asymmetry', where individual changes have substantial impact, causing 'hyperobjects'. He calls for a counter-object looking at the local. This Papay Probe was one such new object. The Papay Probe tools picked up micro ice core samples off the glacier, using a DIY auger. The auger could only be twisted down into the ice history by thirty-nine centimetres, but this represented years of history. The project focused on the process of engagement between participants, the island, the remote glacier, scientists and the long Anthropocene viewpoint, returning to Dewey's argument that strange and unfamiliar and entangled objects, such as the Papay Probe, play key roles in involving people actively in politics (Dewey, 1927[1991]). Marres considers where actors such as the Papay islanders are intimately affected by issues,

surviving in the Anthropocene, but are not part of communities able to address this, such as government lobby groups or activist groups (Marres, 2012b: 49). Attention must be paid to the emergence of the system (Stengers, 2005). Similarly, 'relational response-ability' is needed to build a new framework to engage with our environment. Staying with trouble (Haraway, 2016: 12) is to stay with things that are difficult and uncertain, developing entangled engagement in 'matters of concern' for the Anthropocene. This involves messy engagement with our changing, delicately balanced environment. Matters of concern, such as the large-scale geological problem of surviving in the Anthropocene, requires slowing down and 'care-full' engagement with longer term issues, an alien timeframe to the human condition (Stengers, 2005: 994). Uncertainty is necessary as a drive for engagement in relation to climate change. We are uncertain about what will happen next and therefore must understand our contextual surroundings in the present and past tense, relating that viewpoint to our future (Gabrys and Yusoff, 2012: 12).

The balance of a temporal changing environment is closely connected to the Papay islanders' way of living. They have 'enough history to know that the weather and environment changes all the time' and they must therefore be prepared to adapt to the current conditions. The next section explores the relationships between islander and environment in relation to the findings of the analysis.

Relationship with the environment

Although not everybody is a fisherman or farmer, the environment is close to all islanders and 'in your face'. To answer the research question, it matters who participates in an environmental intervention, such as the Papay Probe project. The composition of the actors matters to articulate the issues (Marres, 2012b: 53) From the short interviews and questionnaire activities in the evaluation event – within the Papay Probe

project – the glacier and its effects on Papay resonated with participants, particularly as the central focus was on imagining, creating and bringing a normally remote indicator of climate change closer to the island world to debate. To enable this to happen, the act of making was emphasised and the issues relating to anthropogenic indicators of climate change in real time, linked to Papay, articulated. The real drama involved in expedition planning and deployment ignited energetic action from everybody, creating an activated 'Deweyan public' (DiSalvo, 2009: 49; Dewey, 1929: 15-16) with momentum that became stronger. Dewey's public, as discussed in chapter two, came into being through contending with real-time, present tense issues looking towards the future. The focus and attention to detail to find a realistic pace for project development linked to real-life island schedules, and finding the right people to come together for the job, meant that the Papay Probe was activated and deployed on the glacier and then returned to Papay with results.

5.3 Summary

This chapter presented and interpreted the findings from thematic analysis of mixed media data. This analysis incorporated a theoretical grounding in social interactionism and the Anthropocene, where communities have responsibility for their own environment and the Anthropocene is a contested scientific, cultural and social interface between humans and nature, defined as the current geological era in which humans have caused detrimental harm to the planet's natural infrastructure. A total of seven thematic networks were developed and synthesised down to three global thematic networks, which were examined in relation to the analysis of semi-structured interviews with islanders from Papay and mainland Orkney alongside visual material

and co-designed tools from the Papay Probe project. This data came from within the immersion phase and the researcher's second year of living on Papay.

To conclude, insights are drawn together from the analysis discussion, setting out the contributions to knowledge discussed in chapter seven. The next chapter reflects on the project methods and outcomes and how the context of living and working as a researcher on the island influenced the research outcomes and subsequent contribution to knowledge.

6. Reflections on the ec-øy-system

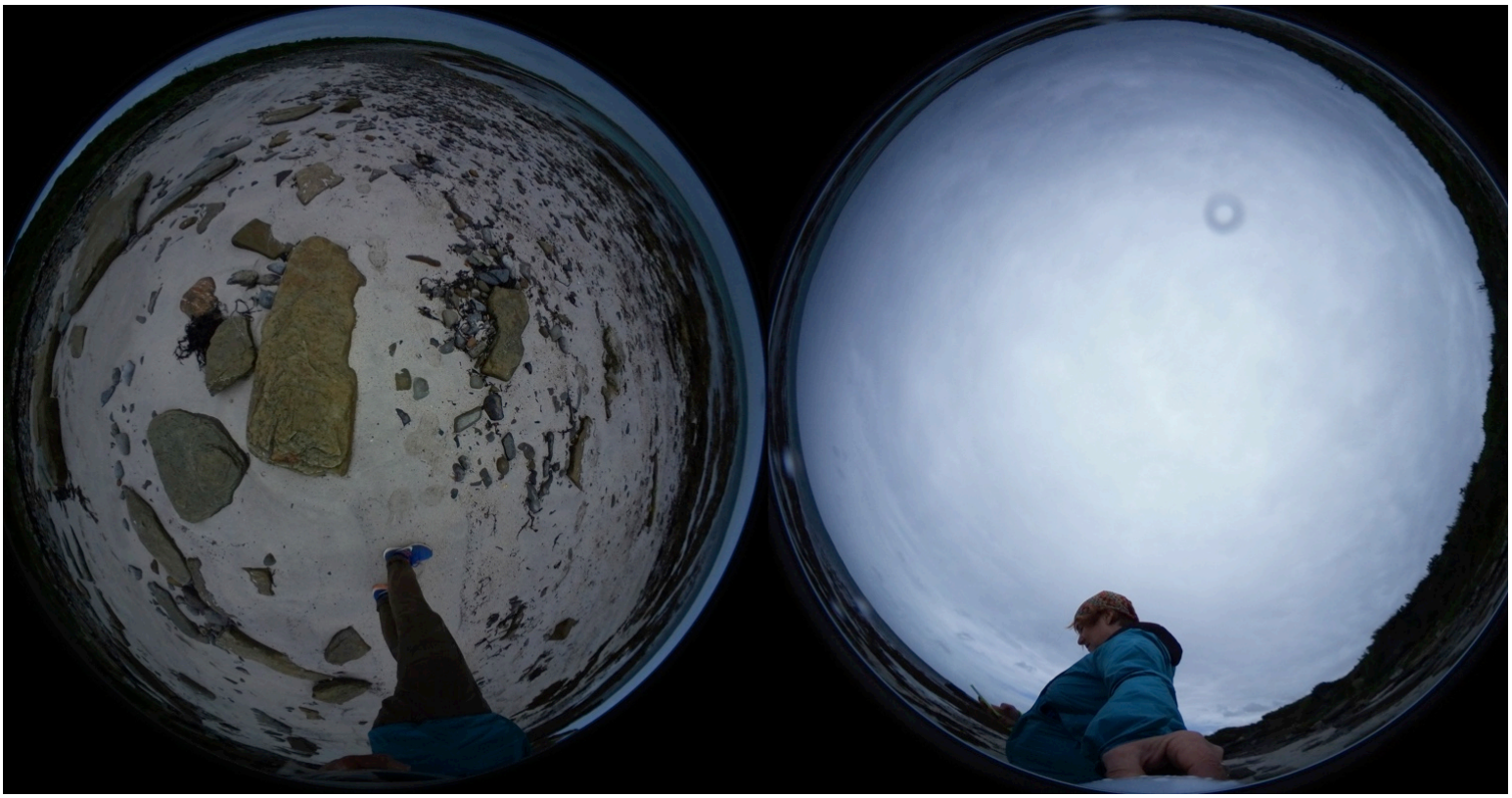


Figure 59: 360 stereoscopic image of reflective practitioner on South Wick Beach, 2017. [photograph]. Source: Saoirse Higgins

6.0 Introduction

'Reflection-in-action', as described by Schön, is the practitioner's process of critically thinking *in* and *from* action and adjusting the action as the process unfolds (Schön, 1987: 56). For the three-year case study, the researcher lived and researched within the island community, which required particular strategies for reflection *in* action and *from* action. However, arguably it is not possible to distance oneself from within the lived situation and reflect until after the action is completed (Ekbergh, 2016). Reflection on the research required a physical shift away from the island to gain perspective in a physical and metaphorical sense. To reflect effectively at each stage of the research process, several interlayered methods were adopted involving locative reflection or 'thinking on my feet' (Schön, 1983: 54). The first moving reflection method was the act of walking or cycling around the edges of the island and spending time sitting or standing facing out to sea. The second method of reflection involved physically taking the ferry or eight-seater plane to mainland Orkney, a short distance away but enough to gain an outside perspective from mainland Orkney looking to Papay. This second mode occurred later in the final year to analyse and reflect on the research. A physical mode of reflection was appropriate, as physicality fitted very well with the island system or 'ec-øy-system'. This phrase refers to island infrastructure in relation to the physical effort involved in living there and surviving. Moving on, off and around the island required a degree of physical effort within daily island life. Travelling by plane, ferry and boat and shifting produce on and off the island by sea and air is normal for islanders.

One of the main purposes of reflection, in Deweyian terms, is awareness of the 'saturation of culture within observations', which feeds the next moves within the research (Dewey, 1934: 6). The word saturated is used here in relation to island cultural

context and from the perspective of a creative practice-based researcher viewpoint. Here, the researcher lived and breathed a highly saturated island context throughout the three-year process. The experience required attention to the present tense and reflection-in-action to move the research forward to the next phase. In this case study, three viewpoints or modes of time were set up as reflective positioning tools for building 'possible forms of new knowledge' (Bellacasa, 2017: 87). These are the real-time, relational view/time and the long dureé or geological time/viewpoint (Braudel, 1969), and are illustrated in the digital fieldwork notebook and in the *Pap-ØY-cene* exhibition of practice, documented in the exhibition catalogue. The next section describes each positioning viewpoint in relation to the study exploring the research question.

6.1 Viewpoints

Exploring the idea of viewpoints, Gibson's 'vision' relates to seeing while moving around an environment on 'paths of observation' (Gibson, 1979: 195–7). Paths of observation are not static situations but change all the time as we move around (Ingold, 2011: 227): 'We know as we go…not before' (Ingold, 2011: 230). Understanding the project narrative as a live ever-changing 'newsfeed', in line with Ingold, Dewey and Gibson, meant the act of moving around the island, and islanders articulated freshly produced viewpoints, which in turn produced new knowledge. As argued by Turnbull (1989) and Latour (1979) traditional scientific knowledge has washed away the messiness and localness of place and people. All knowledge, including scientific knowledge, is produced by particular people in particular places, so must be inherently local (Turnbull, 1989: 61). Diversity of place and people (such as on Papay) is not considered within a

framework of standardised data collection. With reference to chapter two, CLEAR labs attempt to address this in their work with communities, localising and democratising their tools, and Nimmo and Sanderson (2016) also work with communities, tracking limpet movement through time-lapse video and audio.

The key events, especially the Papay Probe project, aimed to develop a sense of responsibility and a moving dynamic connection with nature to produce a form of knowledge that grows and distils from the island, as opposed to coming, in the first instance, from an outside expert to the islanders. The ultimate decision-making process came from the expertise of the islanders themselves to instigate change. Any entry barrier to participation was avoided by making the invitation to engage as unconditional of scientific knowledge as possible. Local 'trans-disciplinary' knowledge was emphasised. This was achieved within the preparatory methods, discussed in the chapter two, via science fiction narratives, dress-up, role-play and references in the PD tools to analogue marine and land tools for measuring the environment. To summarise, to engage with the research question and connect with the island surroundings of the islanders, three viewpoints were put in place to articulate the anthropogenic interface. The viewpoints are reference in the exhibition of practice and the fieldwork notebook (excerpted fieldwork notebook: '27th October 2019: Viewpoints').

The next section describes these three viewpoints in relation to the practice-based research.

6.2 Local viewpoint: *reflective practice-based researcher + island*

From the perspective of the reflective researcher, many visible and invisible layers of the island were discovered: the coastal edge between sea and land, the surrounding sea

to the horizon, the large open sky, the magnified, all-encompassing human scale of a tiny island 'world view'. Early in the orientation phase, using basic measuring tools, the position of the physical island landscape in relation to the 88 inhabitants was reflected upon. Height above sea level was measured in a two-day expedition, walking to all the houses, abandoned and inhabited, around the island, placing the shoreline DIY tide movement pole vertically at the lintel of each main door, taking height readings with the phone, calibrated locally to the Papay airport and taking colour images of each house. This two-day process enabled an investigation and reflection on the physical contours of the island, and the islander's physical position within it, as well as the researcher's position in relation to both. Within this local viewpoint, the researcher's reflective process was mediated with particular 'off-the-shelf' technological tools – GPS readers, compasses, audio field recorders, time-lapse cameras and wearable 360 cameras. Corresponding to Braudel's relational viewpoint (1969) these instruments produced a particular viewpoint for the research, affecting the way it is understood and interpreted. Towards the end of the three-year cycle, a series of seasonal time-lapse videos and 360 VR viewpoints were developed to map and reflect upon the island and the close relationship between islander and island on Papay. Time-lapse, as a visualising method, effectively reflects the changing seasons and documents large-scale environmental change over time. The IGS has used this as a tool to show the retreating force of glaciers, alongside stereoscopic images in slide format of Icelandic glaciers through history taken from low-flying aircraft (Luckhurst, 2019). Time-lapse was used as a constant medium throughout the study to document events and islander community work. The audio-visual work developed from the research, reflecting and monitoring the island environment and island movement from the researchers and islanders' situated 'ambulatory' perspectives (Gibson, 1976: 195-7).

Long durational remote practice-based research is difficult to express to external, distant 'secondary' audiences (Bishop, 2012: 19). This aspect was reflected upon in exhibitions in Orkney and Glasgow. The exhibitions emphasised situatedness by 're-appropriating the persistence of vision as a way of engaging with its dominant inheritance' (Haraway, 1991d: 191). These reflective practice methods show the close relationship between the researcher, Papay island, Papay islanders, and the global scale - a central research theme. The researcher calls this the Pap-øy-cene, or reflection on the local Anthropocene on Papay - ØY meaning 'island' in old Norse. The Pap-øy-cene exhibition catalogue will document these reflective viewpoints, alongside the full digital fieldwork notebook in Appendix 4 and selected entries in the excerpted fieldwork notebook (excerpted fieldwork notebook: '27th June 2016: Island Benchmarks'; '12th May 2016: Measuring sea levels-benchmarks'; '29th June 2019: Physical nature+birds'; '29th Dec 2016: Extreme wind'). The next section describes the intermediate relational viewpoint in the context of the research aims and objectives.

6.3 Intermediate or relational viewpoint: *in situ researcher + islanders*

Using this relational viewpoint, the outcomes of experimental events, audio-recorded conversations and interviews are reflected upon as part of the PAR–PDR process. A website visually documented every experiment and event relating to the research as the process developed (Higgins, 2016). The digital fieldwork notebook documented the reflective process with dated diary entries and related images of the research development and events.

In the first year, Papay life was observed and reflected upon from an incomer perspective, the researcher learning to participate in island community activities. This

informed the planning and design of events introducing and developing the research question. The aim was to integrate as a new islander and embed the research into island life, organising points of research activity and exploring potential, but also slotting into the rhythm of life and becoming a more useful community member as the project developed.

To magnify the Papay island voice, time-lapse GoPro video, photography and audio were used to document and reflect on island events and official island talks. The researcher acted as a time-lapse video documenter for the community, particularly whilst building a traditional caasie sea-defence (Figure 12-15). This documentation method fitted into an existing island archive of documentary images and film of Papay life past and present, stored at The Kelp Store. The Caasie wall time-lapse film acts as a visual reference for future traditional methods of collaborative community wall-building, especially to new incomers with no prior connection to local culture ('North Isles Landscape Partnership', 2019).

On Papay, the researcher was part of the community, participating in local collaborations. Island culture required full commitment to two-way participatory life to undertaken meaningful participation in return. If an islander on Papay wanted to opt out of participating in communal island tasks, this was also preserved as an option. The balance between giving and taking is delicate in a small community and requires careful management. Taking part in island life as an incomer meant that, gradually, the researcher earned a certain amount of island agency and could ask for participation in return, although this did not always mean that this happened. It depended on how the workshop or event was introduced to the islanders and what they saw as the benefit from it, and also when and where the task was physically placed. To gradually build up participation and develop a new framework, the researcher took part in island events

throughout the year,] enabling the research momentum to continue, and promoting engagement as a longer-term endeavor (fieldwork notebook: '7th July 2016: Light+island tourism+funweekend'; 4th August 2016: Benchmarks2'; '2nd May 2016: Papay map of house names...mapping sea level'). The next section reflects upon the geographical long view in relation to island–islander and the external world.

6.4 Geological or long view: *island + islander + island network–external world*

Through observation, experiments and participating in island life from 2016 to 2018 and beyond, the researcher learned how the community dealt with and connected with, their island, and from there to the external network. The process produced a body of experiential knowledge through embodied reflective practice (Kolb, 1984: 41). Experiential knowledge is gathered from experiencing and living within a situation and learning through doing rather than learning before doing, as referenced in chapter two with ornithologist Lockley's pioneering twelve-year study of shearwaters on the island of Skokholm, and writer Nan Shepherd's work about the Cairngorm range, based on her long-term experiential and embodied sense of place in the mountains (Lockley, 1930; Shepherd, 2011). Embodied research emerged as a result of reflecting upon and transforming experiences of island life, in conjunction with organising experimental events, interviews and conversations with key members of the island community. This viewpoint is apparent in diary entries in the digital fieldwork notebook and also within the Pap-øy-cene exhibition. A key example that set up the conditions for collecting 'situated sticky' knowledge took place through designing the ØY festival for island identity. Sticky knowledge is knowledge that is very close to the context it comes from (Bellacasa, 2012: 88). It is inseparable from the context, hence the stickiness. Through

designing the Papay Probe project, and also in creating and developing the three-day ØY festival, a space was created for 'long view' reflection (Braudel, 1969: 25–38) on the positioning of islanders, or 'islønauts' (researcher's word for islander astronauts) within the broader context of the Anthropocene. The Papay Probe physically emphasised reflecting on the global situation in relation to Papay by comparing and contrasting the island–glacier relationship and looking at the changing balance between the two contexts. With reference to Mortons hyperobjects (2013) erasing any thing described as truly local - the repercussions of a volcano erupting in Iceland, for example, affected the air over Papay with the Eyjafjallajökull eruption in 2010 producing air quality issues over Scotland (Simkins, 2016). The local is affected by a global event or phenomenon and this means we cannot cut ourselves off from the issues no matter what remote island we move to. The relationship with nature is close and personal even to those not asking to be close.

This local-global relationship in the project was further emphasised when the Probe project was presented to a larger cohort of islanders at the hostel, showing the process evolving from the start on the island to the Iceland glacier expedition. This expedition process reached completion when the main glaciologist came to visit the island in 2018 and connected the Papay–Iceland narrative to the global Anthropocene narrative in his presentation.

In the IceCapReCap project evaluation event, many of the tools, images and documentations of project methods from the study were presented in audio-visual format. Past participants were invited to view and comment, with a selection interviewed on-site and online, to reflect upon and evaluate the events and tools. This is discussed in detail in chapter three. The next section examines the island conditions in relation to the Anthropocene.

6.5 Reflections on island conditions

From observations and interviews on Papay, 'papayisland time' centres on the seasons and landscape. Island time is directly connected to the land, sea, weather and seasons. Repairs are affected by boat and plane deliveries, which change depending on the time of year. The plane comes in and out three times every day, weather-dependent. If there is fog or haar, the plane is cancelled. This can happen a lot in summer as there is less wind, and atmospheric conditions mean fog can stay for days. Wind over 50km an hour means that the plane is cancelled. This can happen frequently in winter. The boat comes in and out twice a week with supplies and goes to the mainland from Westray twice a day in summer. Boats and planes are fewer in the wintertime so maintenance and infrastructure slows down if it relies on mainland supplies or is dealt with locally with available local materials. Jobs are prioritised depending on the season – boats are fixed in down time, mainly in the winter, and tools are designed and repaired. Mobile phone signal and the internet are not completely reliable, so digital life is not foregrounded and work is multi-layered and prioritised depending on communication, which can be slower. In summer, there is almost constant light, so time feels stretched out as the day becomes longer, while in winter darkness descends from 3.30pm with sunrise at around 8am. Conditions for 'innovation' and 'articulation' occur more in winter as resources become tighter and time for design and repair becomes longer (Bhatti, 2016; Jackson, 2014). The next section considers the difficulties and strengths of participant recruitment and reflects on island participation throughout the study. Island reflections are described throughout the fieldwork notebook in Appendix 4 (excerpted fieldwork notebook: '12th December 2017: Papay plane flight').

6.6 Reflection on participation and participant recruitment

Participant recruitment changed as the researcher's relationships developed and the communication system on the island was understood. Island studies scholar Elaine Stratford acknowledges that living on an island can be complicated to master (Stratford, 2008: 160). At first, knowing very few people, the recruitment primarily took the form of visual citizen-science posters in the shop and surgery, and at The Kelp Store. This had to be timed just before the event, giving people enough time to understand the logistics and to ask questions face-to-face. Recruitment progressed as the researcher became more familiar with islanders and mainland Orkney networks. Participation was high for every event and feedback was communicated directly regarding whether events worked or not from the islander perspective. Face-to-face communication is important on the island, alongside islander-to-islander phone calls. As phone signal is poor, landlines are common and island numbers are short. People pay social visits to each other's houses, which was initially difficult as an outsider, as the only evidence of this was apparent in cars driving from house to house around the island. It looked like a secret system not accessible until more time was spent living there. The one time houses are officially open is New Year's Eve, when Papay has its 'first footing' and people declare their houses open or not open for visits (first footing is an historic Scottish tradition involving being the first person to cross the threshold of someone's door on New Year's Day). Generally, there was a sense of order to the forms of participation with various events aimed at different age groups and mixed age groups. Community activities such as 'bag the bruck', Lyme grass planting or the Caasie wall-building event gather whoever is around and willing to help for the good of the island. Prior knowledge is not a major requirement for participating, and there is an openness and patience to sharing

knowledge and learning how to do tasks potentially for the first time. The next section explores island conditions that result in experts-by-experience and draws conclusions.

6.7 Reflection on island experts-by-experience

For an island with the size and population of Papay, the infrastructure for survival and thriving is in the control of the islanders, and environmental issues are dealt with through their direct efforts. There is a lost ethic of care within design, where natural systems and communities are sustainably looked after (Bellacasa, 2017).

The island development officer speaks of this as follows:

> I think there is a shared responsibility, and there's a very traditional sense of caring, and values that I recognise from when I was growing up, but that aren't in the place where I grew up anymore…that I recognise here.
>
> (excerpt: Appendix 2: 422–423, JD)

Frugal innovation and the ethics of care and repair have existed since the invention of Neanderthal hand tools from stones and bones. This is evident on Orkney, where there are many key national sites of Neolithic tools. Frugal innovation is about innovating using local available materials and local experts-by-experience, reducing the cost and complexity of designing tools (Bhatti, 2016; Radjou and Prabhu, 2015). One of the key islanders interviewed spoke about the need to be able to fix things, as it is not easy for somebody from the mainland to come. It costs more to transport materials and workers and feed and board them (excerpt: Appendix 2: 109-121 TD). A late well-known islander and past island ranger spoke about when the island functioned without mains electricity, before the 1980s, using individual house 'twirlies' – mini turbines fixed to slate roofs. Scrap metal and old machinery is hard to remove from the island and is therefore used

in new configurations to repair and re-model equipment. Overall, the interviews generated a rich amount of data about the Pap-øy-cene, helping with understanding of island conditions and instincts for survival and aspirations for the future connected to the external world. The interviews are discussed in detail in chapter five and the interview transcripts are available in Appendix 3.

The role of the expert has advanced with the internet and Web 2.0, making tools and methods accessible to a broader public. Latour refers to the community as co-researchers in the environment and discusses how this affects our understanding of nature, questioning the role of experts (Latour, 2011: 1–17).

Islander experts, or experts-by-experience, are continually 're-calibrating' the ways in which things are done to maintain and look after their changing island. Being good at calibration and the ability to move around a local axis is a valued trait (Boyer, Cook and Steinberg, 2013: 16). For example, in the Papay Probe project, the Papay farmers did not know anything about ice coring, but discussed the process from their own particular expertise in stone and soil. They applied this experience of stone and soil to the new glacier ice material, which is similar to stone in structure and hardness.

6.8 Reflections on Pap-øy-cene exhibition

> Reflective practice…attempts to unite research and practice, thought and action into a framework for inquiry which involves practice, and which acknowledges the particular and special knowledge of practitioners.
>
> (Gray, 2004: 22)

Carol Gray (2004) discusses how reflective practice is the synergy between thought and action – in this case between aspects exhibited and what is in the thesis. The exhibition of Pap-øy-cene practice explores three reflective viewpoints – local, relational and the

long view described earlier in this chapter, presenting an audio-visual interface with these viewpoints and illuminating the broad reflective aspects of the research, emphasising the island-situated context. Through the exhibition, the work promotes reflection on possible future steps, presenting an engagement framework to activate new publics of concern in the Anthropocene. The exhibition is being shown initially on mainland Orkney at the Pier Arts Centre in Stromness, which shows many external artists coming from outside the Orkney Islands, along with many local Orkney artists – both contemporary and historic. This exhibition will present the research work in an external context to Papay, but within the larger Orkney Island network. Many of the people involved in the study – both from Papay and the local science community - will come and view the work, along with many island tourists that may not venture as far as Papay. The space chosen has a large creative network both locally and further afield, that places the research within a national and international network and opens up a broader engagement with the study. Through the Pier Arts, it will access an audience that may not be an islander, promoting a wider call for action and engagement rooted in an island Pap-øy-cene HQ. The exhibition will be documented in a printed publication. Preparation and reflections are documented in Appendix 4, and in selected entries in the excerpted fieldwork notebook (fieldwork notebook: '27th Oct 2019: Exhibitions Iceland+Glasgow+Forres').

6.9 Summary

In this chapter, reflection *in* and *from* action is discussed in the context of the three-year island study. To practise, research and interact on the island, the researcher needed to understand the particular island rhythm, infrastructure and communication system over

a three-year timespan. This took time and sensitivity to the delicate balance within the island system. Through constructing a three-viewpoint reflective lens – local, relational and geological long view – the researcher developed an understanding of the situated research position in relation to the island, islanders and external influences affecting the island.

Islanders have a strong connection to their land, even if they are not farmers. They multi-task to earn a living, and keep the island system operational, thus have a good understanding of how the island survives and thrives. They understand how to react to change, as this is a strong factor in island living, and are resourceful and resilient with a close connection to the environment, which is direct and reactive. Weather and the proximity of the sea particularly affects how the island functions, including its infrastructure, producing a particular set of conditions that islanders work within to live and participate on the island and with their fellow islanders. An enterprising 'maker and doer' frugal innovator spirit develops for the island to operate well.

With reference to the geological long viewpoint reflective lens and philosopher Morton's hyperobjects (2013), discussed in chapter two, the local is affected by global events or phenomena, meaning that we cannot cut ourselves off from such issues even on a remote island. The relationship with nature is close and personal even to those who do not ask to be close.

The next chapter re-positions the research in the design field by unpacking its original contributions to knowledge. The thesis concludes in chapter eight with a summary of the study's achievements and limitations, and potential future directions.

7. Contributions

Figure 60: Bird watching event for all islanders, Papay, Spring 2016. [photograph]. Source: Saoirse Higgins.

7.0 Introduction

This chapter draws together insights from this study based on the research question – How can PD approaches articulate engagement with the Anthropocene in an island-situated context?

The contributions to knowledge emerging from these insights are each unpacked and mapped back into the field, while the limitations of this study are discussed in chapter eight alongside project work that has developed from it and suggested future research directions for practice-based design researchers to continue the work.

The original contributions to knowledge link to the fields of PD, science engagement and island studies, with an engagement framework that articulates between three viewpoints – the local view within the island ecology itself, the relational view (islander–island–inter-island) and the global scale view of the Anthropocene – as well as contributing to opening up relationships between experts and non-experts.

The engagement framework coming from the research study emphasises six key factors - slowing down and spending time with what is emerging and not the emergency (Stengers, 2005: 995); resilient, multiple-scale thinking - articulating between human-local environment and global network; relational positioning - calibrating, adapting, pivoting and adjusting from the island of Papay looking out to the rest of the world; a radical emphasis on context - in this case a specific island context, and as Ingold describes a distributed 'meshwork' (Ingold, 2011: 84-6) with local island as the core position or interface to the rest of the world; an ethical care and response system that helps to develop our response-ability for change; and a co-construction of viewpoints expert and non-expert, building a situated public of concern coming from Lindström and

Ståhl (2014: 160) 'publics in the making', and Bellacasa (2010: 88), Latour (2004b: 246) and Binder et. al (2011) matters of care and concern.

The research links to the field of island studies from the extended time the researcher spent living as a practice-based researcher and islander on Papay. The contributions come from a three-year single case study using a situated reflective PAR–PDR methodology (Schön, 1991; Brandt and Eriksen and Binder and Redström, 2015). This methodology was developed and iterated throughout the three-year process to answer the research question and contribute to fresh approaches in PD engagement with issues relating to the Anthropocene (McFarlane, 2016; Law, 2004).

The main research question was addressed in iterative phases, from the first year living on the island, using participatory methods of observation and reflection (LeCompte, 1999; DeWalt and DeWalt, 2002: 210), to orientation and immersion phases, and the final action and evaluative third year. Exploring the research question was a multi-faceted endeavour, reflecting the complex issues and non-human geological scale of the Anthropocene. The question was positioned deliberately in the context of a small island with its complex island community identity (Péron, 2004) and contained and bounded scale that is easy to grasp, conceptually and practically (Edmond and Smith, 2003). The framework for survival that this research revealed involved many stakeholders, scales of time, and levels of participant engagement, as well as a core emphasis on Gauntlett's (2011) idea of 'knowing through making', Schön's (1991) reflection-in-action, along with Ingold's (2011) idea of understanding through 'knowing as you go' and DiSalvo's (2009) and Lindström and Ståhl's (2014) construction of temporary publics.

Here, each contribution is explained and discussed in relation to the engagement framework and the research question within the theoretical framework of social interactionism that this study is based upon.

7.1 Contribution A: PD

This contribution examines PD approaches, looking at the long-term and large-scale issue of climate change. An engagement framework to deal with this moving context emerged through the creation of carefully constructed peripatetic tools. This allowed space to reflect on the relationship to scale and the issues and concerns of engaging with the environment. These tools for survival were constructed to adapt with changing conditions and focus on issues of the Anthropocene. The construction process articulated multiple scales and layers of engagement and a critical sensitivity to local–global participation, creating moving publics of concern (DiSalvo, 2009; Lindström and Ståhl, 2014). As described in chapters three and four, through the use of imaginary science fiction narratives, role-playing famous non-scientist data collectors in Papay Intrepid Explorers, for example, coupled with contextual positioning and tracing (DiSalvo, 2009) tools such as the Papay Probe facilitated participants' live entanglement with relevant issues, embracing the complex nature of relationships with the environment. The methods slowed down the thought process via the act of making to 'mobilise a different awareness of the problems' (Stengers, 2011: 194) within a small-scale, remote island community. The framework was a flexible, adaptable system, with multi-layered collaboration and contexts (in Papay and Iceland), coming alive in the interaction between humans and their surrounding environment within a temporary 'public of concern'. The active 'expert-by-experience' methods revealed the delicate balance of the large-scale issue of the environment.

The process of division of time into three areas (Baudrell, 1998) helped emphasise the importance of the 'reflection-in-action' process and encouraged more than one viewpoint and co-production of more ways of participation, evolving as the project developed and not before, thus highlighting that all data is messy, changing, partial, live

and 'peripatetic' within the Anthropocene. It is necessary to deal with this particular on-going relationship with change as we go about our lives.

7.2 Contribution B: Island studies

The difference between outsider and insider is pronounced and complex on a small island archipelago: 'There is an art to living on an island and it is a complicated one to master' (Stratford, 2008: 160).

Against the background of personal mobility and globalisation in this research, the concept of an island can be considered the perfect secure physical space (Gillis, 2001: 78). The small scale and boundedness of an island in comparison to the large-scale global issue of climate change enables a culture and agency over change. From the researcher's extended time living on Papay and also subsequently as an embedded artist with the Scottish Government island plan consultation to forty inhabited Scottish islands, insights were gathered into the island sense of place, connected to islanders' resilience and power over change. Semi-structured in-depth island interviews spanning the three years of the study contribute into Island Studies, gaining insights into islander connections with each other, the islands, and sea. A newly developed three-day ØY island festival, started in 2016, contributes to island studies by looking at models of engagement with the topic of 'islandness' or nissology – the study of islands. This incorporates both traditional and contemporary sides of island life and a space to reflect on many aspects from several thematic perspectives – magnetism of islands in contemporary life, networks of islands, and 'islands as laboratories' with natural systems that develop separately from centralised models. Documentation of this festival

is gathered on the festival website and within the fieldwork documentation notebook (Higgins, 2017).

7.3 Contribution C: Expert–non-expert engagement

This contribution feeds into engagement with science, considering the role of experts within the framework of the Anthropocene. The three key events that took place as part of this research collaborated with the BSA, which supports projects encouraging research into new models of science engagement with communities, especially under-represented and small-scale periphery communities (see chapter four). This contribution looks at the role of the expert within the community and links this to an ethics of repair and care of the environment, calling for emphasis on experts grown from sticking with problems and surroundings (as Haraway (2016) recommends and as discussed in chapter two) to get to know developments and iterations and necessitating staying long enough to understand the patterns of change, as, in this case, across the seasons (discussed in chapters four and six). This research and its alignment with Descola's (2013) break from disciplinary boundaries, led to re-grouping to form an expert temporary public of concern in a world of change. DiSalvo, Lindström and Ståhl argue for a need to address this gap in expertise, referenced in chapter two (DiSalvo, 2009; Lindström and Ståhl, 2014). This contribution to science engagement highlights the importance of creative experiments developing principles and tools from a constructive PAR–PDR design approach, not originating from an expert top-down 'objective' science method, and allowing for exploration of new spaces of engagement and articulation with science. Designing participatory tools for survival means understanding a context that is relational and heterogeneous producing sticky

knowledge (Bellacasa, 2012: 91) that surrounds us, and engaging with our environment and community experts to develop response-ability for the future. Control of infrastructure and agency is likely to result in confidence to effect change.

7.4 Summary

This chapter has set out the contributions to knowledge and linked these to the PD and island studies fields and to science engagement. The first contribution presents a PD approach engaging with the long-term and large-scale issues of the Anthropocene. As argued in chapter two, gaps in knowledge exist surrounding designs for the Anthropocene and the need to develop relational PD approaches that address this context directly (Escobar, 2016; Slavin, Bannon and Ehn, 2012). This gap is placed within Haraway's call to stay with the trouble and Ingold's notion of 'knowing as you go' (Ingold, 2011: 230) as a principle for gathering original knowledge, along with Lindström and Ståhl's (2014) construction of temporary publics that enable development of new tools for engagement. The methods developed in the fieldwork facilitated an action-based entanglement with the issues involved, embracing the complexity of micro and macro environmental scale by slowing down the process enabling articulation of multiple scales of engagement and local–global participation, thus creating peripatetic 'publics of concern' – the researcher's description of a response-ready action-based public.

The second contribution links to a practice-based template for future island studies research from participatory observations and semi-structured interviews within the study. This contribution was developed from insights from the researcher's life on Papay. These were documented through exhibitions, diaries and work-in-progress

entries in the digital fieldwork notebook. This contribution was also shown in the design of an island festival – ØY – developed within the three-year study and continuing to take place each year. The third contribution looks at the gap in knowledge surrounding the role of experts within the framework of Anthropocenic survival. This expert is placed within Stenger's (2015) argument to slow processes down to mobilise diverse viewpoints within an art of critical making (Ratto, 2012) in response to change, alongside having the ability to re-calibrate and pivot on a local–global axis as issues move and change. The new expert within a 'public of concern' emerges from Bellacasa's (2010, 2012, 2017) ethics of caring and repairing, together with a response-ability towards macro-scale environment issues developed through Anthropocenic resilience and adaptative island tools (Bellacasa, 2012; Mol, 2008; Haraway, 1997; Latour, 2005). Finally, having positioned the contributions and discussed the gaps in knowledge, the researcher concludes by reviewing limitations of the study and future potential research, finishing with an overview of what this study achieved.

8. Limitations, impact, conclusions

Figure 61: Researcher view to the Holm of Papay from South Wick Beach,
wearing a 360 time-lapse camera attached to a modified *Birsay Farmer* hard hat, Papay, 2018.
[photograph]. Source: Jonathan Ford.

8.0 Introduction

This chapter discusses the limitations of the three-year study and then the impact in terms of continuing engagement with people and projects, as well as developing potential directions for future research by other practitioners within the context of designing in the Anthropocene. Some of the project work that has been initiated as a direct impact of the study is discussed as a form of practice-based validation of the findings, and future directions suggested that address possible next steps. The chapter concludes with a summary of the study process and what the research has achieved.

8.1 Limitations

This research was specifically about placing a decentralised, northern island-scale context and grass roots experts at the heart of matters of concern, examining the effects on types of knowledge and engagement with the major global issue of climate change. An Orkney-wide study was assessed as a potential site at the beginning of the process (discussed in chapter one), but it was decided that the single island of Papay would suit the research better in terms of gaining deep incomer, in situ knowledge; rather than multiple studies across the island archipelago within the practical limitations of a three-year funded timespan. The knowledge of a diverse, interconnected relationship between the islands of Orkney emerged from the researcher's island viewpoint. This completed single case study is expanding in 2020 to explore island oral history in the Northern isles network, working with the Orkney Oral History team, funded by North Isles Landscape Partnership (Grahame, 2019). This allows for comparing and contrasting the diverse nature of inter-island relationships and identities, along with their engagement with the Anthropocene. Similar to PD researchers such as McAra (2017), whose single

case study deals with young people, this research also looks at context-specific knowledge from practice-based participatory methods with a specific participant cohort. As highlighted by McAra (2017), discussing design theorists Rittle and Webber, measuring the success or failure of this type of case study is difficult in terms of the scale of this 'wicked problem' – our relationship with nature and plans to solve climate change (Rittle and Webber, 1973: 162). The complexity of the issues is within the long duree (Braudel, 1969) geological scale, as discussed throughout the research. Limitations exist in terms of time for the project, considering the subject matter exists in anthropogenic time. A marine biologist from Heriot-Watt University – AW – who took part in this study, spoke about the limitations on funding cycles to embrace the scale of the issues and at the same time action results within that scale:

> Ultimately, to have a proper understanding you need decades for this type of project, as you know, one of the big issues of climatic change is that it is working on a different timescale than political cycles, or even careers of politicians, or even lifetimes of humans. That's a bit of a problem. Long-term monitoring…don't usually get funded so easily…you often have to find other ways of doing it.
>
> (excerpt: Appendix 2: 41–48, AW)

Often, the way round the time-limited funding problem of actioning results on this scale is to rely on volunteers to take part in long-term monitoring. Long-term involvement may be beyond the scope of normal funding models but can promote more grass-roots and new innovative agency, bypassing normal models to develop new ones to steward the environment and take control of work for long term 'sustainment' (Fry, 2012: 61).

8.2 Impact and the future

The validity and impact of the findings is demonstrated through the development of a number of longer-term projects looking at island survival skills in the context of climate change. These projects come directly out of the study's PDR–PAR experiments and engagement framework, developed in the study. The projects collaborate with the North Isles Landscape Partnership, BSA, UK Antarctic Heritage Trust and Papay Development Trust.

In 2019, the North Isles Landscape Partnership supported and funded a second Caasie wall two-day event to complete another section of the Caasie wall along the east coastal area on Papay and develop a new skills-based model from the new Papay Ken Folk project (Higgins, 2016).

The BSA set up a pilot programme to develop community leadership in new forms of science engagement. It aimed to develop long-term sustainable projects for under-represented communities that go beyond science week. With the legacy of 2016, 2017 and 2018 – the Papay shoreline research station, Papay Intrepid Explorers, Papay Probe to Iceland and the Papay LookOut station – the 'Papay Ken Folk' project was launched, with support from the BSA and Papay Development Trust. The project theme had its origins in the Global Tools, Woodcraft and early Kibbo Kift movements that sought to bring about a cultural re-connection with nature in the face of social and environmental change (Pollen, 2017; Ross and Bennet, 2015). 'Papay Ken Folk' is about folk with the 'island ken' to survive and thrive well into the future. Ken is the Scottish dialect word for knowledge. The 'Papay Ken Folk' project links island 'expert-by-experience' skills to future survival. An initial selection of eclectic Papay skills has been chosen by the researcher and the ranger, with a mix of traditional and contemporary skills for the future, beginning with documenting and passing on the skills to build a traditional sea

protection wall. Using the methods and processes developed within this research, the skills will be demonstrated by the island 'ken masters' and documented and passed on to another generation of indigenous and incomer islanders on Papay and further afield on Orkney and other Scottish islands. The issues of climate change and environmental engagement evolved over the three-year study cycle and has become a much more prominent topic in the Orkney Islands. Since the study, the Papay schoolchildren have become interested in the work of young climate activist Greta Thunberg and set up their own school climate strike, despite there being only seven pupils. As part of one of the international days of school climate strikes, they prevented the Papay school minibus from transporting two of the pupils to the school. This was a small protest symbolising a larger connection with the global youth climate change movement. The schoolchildren regularly organise beach-cleaning trips outside the already established annual 'bag the bruck' (bruck is Orkney local dialect for rubbish or mess) event that calls on all Orkney islanders to choose a section of coastal edge to collect plastic and rubbish and then document the bruck. Since 2019, Extinction Rebellion has also set up an Orkney-based group ('XR Orkney', 2020).

In terms of practice work for this research, several work-in-progress exhibitions have taken place between 2016-2020-referenced within the excerpted fieldwork notebook (fieldwork notebook: '31st Aug 2016: e Kelp Store: work in progress exhibition ', '25th June 2018: work in progress exhibition: SGSAH showcase', '27th Oct 2019: Exhibitions Iceland+Glasgow+Forres'). Two exhibitions of practice work from the study are being shown – one exhibition- *Pap-ØY-cene*- has taken place within lockdown at The Kelp Store on Papay in 2020 - documented within the interactive catalogue. Another will take place at The Pier Arts in 2021, and one collaborative exhibition commission entitled, '*On Steady Ground/Unsteady Ground'* will be shown in Dublin, Ireland, in 2021 ('Visual arts

commissions,' 2019). In addition, the researcher has been an embedded research practitioner for the Scottish Government team on the National Islands Plan consultations, travelling to forty Scottish islands ('The National Plan for Scotland's Islands', 2019). This culminates in an exhibition of work examining islands in the context of the Island Plan legislation, in collaboration with the UK Ordnance Survey team and funded by Creative Scotland and Glasgow School of Art. This exhibition will travel around the western and northern Scottish islands and is planned for 2021.

Also in 2020, the BSA and UK Antarctic Heritage Trust teamed up and collaborated with the researcher on a creative environmental engagement project looking at the Papay–Antarctica relationship with the South Orkney Islands in Antarctica ('UK Antarctic Heritage Trust', 2020).

With regard to the transferability of the results to other contexts and groups, the engagement framework developed in the study is already being applied in these new projects discussed in this chapter, and can be transferred to other distributed contexts, where communities engage with the environment in a saturated and direct way, as examined in the fieldwork in chapters four and six. This study called for particular strategies to reflect *in* and *from* action while the researcher was living and researching on the island. Methods were developed to manage this balance to reflect on the research as it was developing. Three reflective positioning viewpoints were used to separate, engage and reflect on the research in situ. Future research focusing on developing the contextual reflective engagement framework would enhance this type of study in other island and remote community contexts.

8.3 Conclusions

The main goal of the island-situated study was to offer a framework to articulate engagement with the Anthropocene through a PD approach and within a philosophical background of social constructivism – where knowledge is co-constructed and has multiple viewpoints. The study succeeded in this by foregrounding critical context, a local–global Anthropocene timescale and the construction of local expert 'publics of concern' to produce what the researcher has named peripatetic survival tools for the Anthropocene. By situating the research on Papay, the research question was positioned within the small-scale bounded conditions of an island context. It aimed to look at a 'far from central' model, taking the design research lens away from urban- and technology-rich frameworks to focus on a remote island context and developing reflective tools to explore multiple viewpoints, real time, relational time and geological time. The study sought to answer the question: *How can PD approaches articulate engagement with the Anthropocene within an island-situated context?*

This question was developed in response to the urgent need for a fresh approach to interact with the current entangled state of the Anthropocene. This was explored in chapter two by drawing on interdisciplinary fields including design, anthropology, ethnography, philosophy, island studies and history, looking at the complex nature of the Anthropocene, design of new environmental scales, PD tools and methods, and embodied, place-based, convivial design practice conducive to care (Manzini, 2015; Ehn, Nilsson and Topgaard, 2014). In chapter three, the particular relationships between the island, islanders, the practice-based researcher and the Anthropocene context were examined and developed through a PAR–PDR design methodology lens. This process inscribed particular new forms of engagement and constructed a type of what Lindström and Ståhl call 'public-in-the-making' (DiSalvo, Lindström and Ståhl, 2014) or

what the researcher calls 'publics of concern' within the large-scale issue of the environment. The methodology examined a relational response-ability (Haraway, 1997: 12) that is essential to take our selves as anthropogenic participators into a more sustainable position on our planet. The fieldwork that went into addressing the research question on Papay was divided into three viewpoints in line with the three-year study, as detailed in chapter four: local, relational and global viewpoint. The fieldwork involved research into the relationship, scale and participation spaces between island environment, islanders and experts in response to change through experimental events, making and tracing, and semi-structured interviews, alongside multiple viewpoint participatory action leading to local expert 'knowing as we go' knowledge (Ingold, 2011: 230 Bellacasa, 2016; Dewey, 1927).

> …thinking from and for particular struggles requires us to work for change from where we are rather than drawing upon others' situations for building a theory and continue the conversations.
>
> Bellacasa, 86, 2016

By developing new tools and processes to magnify and scale up a dialogic relationship of participation between community (expert and non-expert) and environment, this produced forms of action, gathering messy data within a politics of care. The key events and tools developed in the fieldwork are illustrated and described in this chapter and documented in the fieldwork notebook. Chapter five describes the framework and process of thematic analysis used to inductively examine the data from the fieldwork interviews and event artefacts and images. Themes and insights were constructed from the data analysis and gathered to use as a framework to answer the research question. Chapter six unpacked methods for reflection *in* action and *from* action examining the positions of the researcher and the expert. These methods were put in place to reflect

effectively on the 'Pap-øy-cene' or Papay Anthropocene, as shown in the exhibition of practice, developing a sharp sense of response-ability (Haraway, 1997: 71).

As set out in chapter seven, the contributions to knowledge from these insights deal with approaches in PD practice looking at long-term issues relating to the anthropocene. A framework was developed that deliberately slowed down and reflected upon the process of engaging with the environment. This framework included several themes from the research – resilience and multiple-scale thinking, relational positioning, radical emphasis on context, ethical care and response systems and co-construction of viewpoints.

The second contribution looked at feeding into island studies with the time spent observing, interviewing and reflecting about and on the island as a practice-based researcher. This was evident in the interviews with islanders and the development of an island festival looking at the topic of islandness from a practice and theoretical point of view, within the Scottish Island Plan consultation project work and through the Pap-øy-cene exhibition looking at reflective island viewpoints. The final contribution aimed for new science engagement through design, breaking out of disciplinary boundaries to re-group as co-participants and experts-by-experience in a world of change. The importance of this lies in changing the role of the expert and co-constructing new spaces for 'publics of concern' in the environment. From this island-based study, the researcher aimed to open up a PD framework that enables engagement with environmental issues, developing an approach that is peripatetic and adapts to survive the changing relationship with the Anthropocene.

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