Appropriating Interaction

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A thesis submitted in partial fulfilment of the requirements of Edinburgh Napier University, for the award of Doctor of Philosophy.

July 2016

Abstract

This thesis is concerned with the fact that people routinely appropriate interactive technology. Much of the work in this project was conducted at The Public, an interactive art gallery in West Bromwich. Examples of appropriation that are presented range from interactive art, the game Minecraft™, to mundane objects encountered in daily life.

Research Questions posed in this study are:

- What are the dynamics of appropriation?
- What is the relationship of appropriation to affordance?
- How do individuals experience appropriation?

Appropriation is the mechanism by which we make objects in the world relevant and personal. This PhD has revealed three dimensions of appropriation namely:

- Control: both in terms of ownership and virtuosity.
- Ensoulment: the mechanism through which we ascribe personal significance to artefacts.
- Affordance: the experiential relationship to artefacts concerned with action on and with them.

Appropriation is revealed as a mechanism through which people understand potential action with technology. A traditional view is that people learn how to use a system and once its canonical use is established new uses or appropriations are discovered. What is revealed in this study is that appropriation is bound to our perception of action with technology, commonly explained through the concept of affordance. Appropriation is revealed as the initial act in human encounters with technology.

Acknowledgements

I would like to take this opportunity to thank my supervisor Phil Turner, without his generosity and patience this work would not be possible.

This study relied on the generosity and support of a number of people, particularly Graham Peet of The Public, Mark Daniels of New Media Scotland and Matt Wright of Edinburgh International Science Festival. Thanks are due to collaborators Tommy Dykes and Yann Seznec. Grateful thanks are also given to all participants.

My thanks go to all my colleagues in the School of Computing at Edinburgh Napier University but specifically to Gregory Leplatre, Bill Buchanan, Sally Smith, Jessie Kennedy, Ian Smith, Susan Turner and David Benyon for their support.

I would also like to thank my family, Debbie Bentley, Sam Flint and Josh Flint.

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1 Introduction

This thesis specifically addresses the appropriation of technology. Appropriation is the process by which humans endow objects with significance, it is how technology is personalised and made relevant and useful within everyday life. Relationships humans have with computing technology have become increasingly personal and there has been a recent turn in research toward the experiential.

In traditional computing literature appropriation is believed to occur toward the end of a period of adoption after establishing the designed use of technology. Appropriation is commonly understood as using an object in a manner contrary to its designed purpose. What this PhD reveals is appropriation's key role in the experience of technology. Appropriation is exposed as how we make sense of technology when we first encounter it.

1.1 The questions addressed by this study

What are the dynamics of appropriation?

This thesis reveals appropriation to be composed of a complex relationship between control, ensoulment and affordance.

Control can be understood as the deft manipulation of an object. Experience and an ability to have control over an object is a means of exposing alternative affordances of that object. Ownership of an object also allows control over its use. Ensoulment is the establishment of a specific relationship between a person and an object. Affordance is the perception of potential action on and with objects.

"What is the relationship of appropriation to affordance?"

This thesis reveals an intrinsic relationship between appropriation and affordance. Appropriation is shown to be a method of revealing and communicating affordances. Affordance is revealed to be a contextual experience of objects and there is a distinction drawn between affordances that are directly perceived or simple and those that are complex or coupled (cf. Dourish 2003, Turner 2005). Appropriation is the process by which complex affordances are perceived through coupling.

How do individuals experience appropriation?

Throughout the studies conducted in this PhD members of the public are revealed taking pleasure in understanding the technical nuances of computer mediated work. Coupling affordances is revealed as a fundamental part of the pleasure of interacting with technology. Appropriation occurs when a person perceives an alternate affordance of an object. Once this affordance has been perceived it is transformed into use. The moment between appropriation and use is fleeting and hard to establish but appropriation transforms the experience of objects.

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1.2 The contributions of this thesis

This thesis has contributed to the understanding of both appropriation and affordance and a clear link is established between these two phenomena. The discovery and communication of affordances is revealed as an essential component of the experience of aesthetic interaction. A dynamic relationship between appropriation and action with and on the world is exposed. Appropriation occurs when people perceive new affordances of an object and transform them into use. The act of appropriation is revealed as the end result of coupling complex affordances; the example in this thesis is the transformation of an artwork named Animo, on display at The Public art gallery, from the individual affordances of its components to a means for taking group portraits.

From studies of Animo, the notion of distributed affordances is introduced where the ability of people to appropriate complex affordances distributed across space is revealed. Not only are opportunities for action reliant on the manipulation of objects in other areas of the space but there is also a social cooperative dimension of this activity. The notion of distributed affordance makes it possible to reconsider action in environments as well as across complex systems.

The composition of appropriation has been shown to include control, ensoulment and affordance. Control is as much to do with the ability to use or deny use of a resource, as it is to do with skilful manipulation of that resource or artefact. Ensoulment is the internal manifestation of personal significance to an external object. Ensouled artefacts can take many disparate forms including artwork that is on public display, architectural space and mass-produced objects. It is affordance that is revealed as the dominant principle of the composite of appropriation. Appropriation is concerned with intentions toward and exploitation of external artefacts. Without perceiving the affordances of these artefacts it would not be possible to exploit them.

1.3 Publications informed by this thesis.

Copies of publications have been attached as appendices.
2016 *Enactive Appropriation* AI & Society Journal Volume 31, Issue 1, pp 41-49.
2014 *Looking at Technology with Parkour Eyes* Paper presented at Design for Repurposing Workshop Interaction Design and Children 2014 Aarhus University.
2011 *The Role of Appropriation in the Design of Engaging Artefacts* Paper presented at Re-Thinking Technology in Museums 2011, University of Limerick, Ireland.

1.4 The structure of this thesis

The structure of this PhD starts in Chapter 2 with an introduction to relevant literature exploring a phenomenal point of view of interaction. The literature examines treatments of appropriation from various disciplines exposing its relationship to affordance. Interactive art is established as one suitable arena for study and this field is briefly explored. Chapter 3 introduces the various methods used to gather data. The work in this PhD has been informed by fieldwork, drawing from observation,

interviews and video data. Repertory grids have also been employed and these are discussed in detail.

Chapter 4 highlights initial studies made during this investigation. An extended visit to The Public in July 2010 exposed appropriation as a major theme demanding study. Appropriation was revealed in the permanent artwork Animo, the focus of further studies in Chapter 6. Chapter 4 describes the work displayed at The Public moving on to discuss observation conducted on the art work #unravel at Inspace gallery and an interview with a couple who had endowed this piece with personal significance. Finally, this chapter concludes with a repertory grid study examining the experience of personal appropriated artefacts.

The experience of appropriation in a computer-mediated environment, namely the game Minecraft, is examined in Chapter 5. The discovery and sharing of new affordances is discovered as a key element in the experience of pleasurable, aesthetic interaction. Chapter 6 describes a repeat visit to The Public in September 2013 with the purpose of performing an extended study on Animo. In this study the nature of distributed affordance and interaction across space is revealed.

Chapter 7 introduces three pieces of work that have been produced in the course of this investigation and explores their contribution to an understanding of appropriation. Chapter 8 concludes the PhD with a discussion of the dimensions of appropriation revealed in this study. The chapter moves on to discuss the research questions in turn, taking into account the studies undertaken. Chapter 8 concludes with a discussion of further work afforded by this investigation.

1.5 An introduction to The Public

Much of this PhD has involved The Public in West Bromwich and an attempt will be made here to provide some necessary context to the building. The Public was a purpose built art gallery that focused specifically on computer-mediated art. It is Chris Salter (2010) who grounds the investigation of fully immersive spaces in Wagner's Festspielhaus, completed in August 1876. Salter (ibid p.2) tells us that by taking careful control of every aspect of an audience member's sensory perceptions, Wagner aimed to communicate "exclusively to the emotions." A relationship can be

drawn from Wagner to the work of Brecht who, reacting against Wagner's "sordid intoxication" (Brecht in Willett 1964 p.38), developed what he termed 'Epic Theatre;' experimenting with emerging media, such as film, on stage.

Figure 1-1 The Public

Brecht is introduced here mainly because of his performance aesthetic and desire to produce theatre for working class people. This desire to produce theatre for working people is reflected in the work of Joan Littlewood, the first person to produce a Brecht play in Britain (Holdsworth 2006). It is Littlewood's collaboration with architect Cedric Price on the Fun Palace that focuses this discussion firmly toward construction of The Public. The Fun Palace was designed as an improvisational architectural space that could be reconfigured according to how people wished to use it. The planning and execution of this project was a collaborative undertaking including input from cyberneticist Gordon Pask, meaning that computer mediated interaction was planned for the building at its inception.

Though never physically realised, The Fun Palace is cited as a major influence on many successful architectural practices and as a specific model for the Centre Pompidou in Paris (Matthews 2006). The Fun Palace was always designed as an inclusive space in which visitors could view, experience or take part in various

cultural activities. The Fun Palace was specifically designed to encourage participant interaction and encourage a sense of ownership through adaptive use. The building afforded appropriation by being fully adaptive, responding to the needs of its audience.

It is Will Alsop, a former apprentice of Price, who was chosen as architect of The Public. It can be argued that the combination of a visionary architect with an active producer of artistic activities, templated in The Fun Palace, was reflected in The Public. The Public was a realisation of the 'Big Dream Project' (King in Kennedy 2004) proposed by Jubilee Arts Trust led by Sylvia King. Jubilee Arts Trust worked to provide community access to the arts in Sandwell, initially travelling the area in a bus and operating from a renovated office. For the millennium celebrations, the project received a significant grant to develop what was initially titled C-Plex. Sandwell Council approved the construction of the arts centre on land that was once occupied by a bus station and the project was developed in the centre of West Bromwich.

The Public has received a great deal of criticism, particularly in the printed media, for its alleged failures. The Arts Council put many of the problems with the project down to the fact that "The Public was unable to meet its specification, which proved fluid, imprecise and unachievable." And "It [The Arts Council] was too keen to meet Ministers' social agenda and it had ample funds to do so" (Blackstock 2011). These statements are clarifying indicators to the context of the building. Local politicians hoped to create a regeneration catalyst and the developers hoped to create a radical building that encouraged public participation in the arts. The centre was closed in November 2013 and the building was altered to house a branch of Sandwell College.

2 A Review of the Literature

The challenge in this chapter is the presentation and synthesis of a wide range of related but disparate topics, each of which would have merited an individual study. What is attempted is a focused discussion of broad concepts with a view to offering an understanding of an accepted concept of appropriation. This chapter will synthesise several areas, and will highlight their connectedness and their relevance to the studies reported in subsequent chapters.

The chapter begins by examining experience as a phenomenon; this is in direct response to a current cultural emphasis on experience as a consumable product and its impact in the field of Human Computer Interaction (HCI). After discussing the concept of mediated experience, this chapter will present some guiding principles from HCI that have directly reviewed the relationship between people and technology. HCI's reliance on mental models and schemata to conceive action on and with technology is discussed. This leads to a presentation of the phenomenon of affordance where it is argued that any object a being comes into contact with only makes sense in the projected uses for that being and that this property is affordance. Literature is discussed that presents the example of skateboarders and Parkour practitioners; here appropriation is presented as an ability to perceive alternative affordances of architectural artefacts. The discussion then highlights the relationship between appropriation and ownership and the traditional view of appropriation from computing studies. Next, is a view of appropriation from the art world where it is seen as a method of contextualising ideas and communicating them, this leads to a discussion of User Experience (UX), a field of study that directly responds to personal mobile computing.

The discussion on UX leads to an examination of interactive art, an area that draws directly from HCI and UX. Before introducing interactive art, it is necessary to examine the relationship between interaction and art.

2.1 Experience

An experience is "a state, condition, or event that consciously affects one" (Oxford English Dictionary 1993). This section will begin by distinguishing between "lived experiences" and "mediated experiences." A lived experience is one that is directly encountered; lived experiences can be understood as the product of an holistic relationship between mind and body acting on the world. To mediate is "to form a connecting link between one thing and another" (Oxford English Dictionary 1993), in this way it is possible to understand the medium of a documentary film as providing a link between the experience of sailing a ship around the world and the viewer. Mediated experience always involves choice, one can leave the cinema or put the book down at any moment, what cannot be escaped is the reality that is lived experience.

Experience can also be thought of as a consequence of the temporal progression of events as individuals perceive them and it is perception that is key here, experience is the sense a person makes of the world from the data provided by their senses. Phenomenological approaches (Giddens 1984, Valera et al. 1991, Davis 2003, Gallagher and Zahavi 2008, Dourish 2003) bring together the separate constituents of human reasoning and the processing of sense data. Rather than attempting to describe experience, phenomenology attempts to expose its underlying structures. There is a modern cultural bias toward marketing experience over product (Pine & Gilmore 1999), examples are Apple who in 2011 claimed that buying their products will "upgrade your entire computer experience" and visitor attractions such as BBC Worldwide's Doctor Who Experience.

To argue that any experience is encapsulated by lived experience seems an obvious statement but it is important to understand this when attempting to mediate experience. Thompson (1995) describes mediated experience as experience removed from encountering; when experience is mediated, direct encounter is contextualised in order to translate its meaning. In this way lived experience can be considered as directly encountering the world as it reveals itself to an individual's senses whereas mediated experience places a conduit between the world and sense making mechanisms.

Forlizzi & Ford (2000) present three ways to examine experience, namely:

- Experience as the constant stream that happens during moments of consciousness (phenomenology).
- Experience as a contained event with a beginning and an end. These kinds of experiences - whether seeing a movie or surviving cancer – change the user (like a journey).
- Experience as a story (cf. Schank and Abelson's (1977) work on frames and schemata). Stories are used as vehicles that we employ to condense, remember and communicate experiences.

2.2 Technologically mediated experiences

The ubiquity and low cost of technology has increased mediation of experience through computing and it is mediated or designed experience that is given particular focus in this study. Mediated experience of this form often involves encounter with and through media with lived and mediated experience closely intertwined. This is specifically true of ubiquitous and personal computing devices such as smart phones and tablets. Experience is often presented as a product to be consumed (Shedroff 2001) but it is clear that experience is a process (Davis 2003, McCarthy & Wright 2004, Hassenzhal 2010). It is the consumer who produces the mediated experience from data that is afforded them by the producer. This intangible process only exists within human minds meaning that experience is not something that can be archived or transmitted. Drawing from Dewey (1934), McCarthy & Wright (2004) argue that people play an active part in their interpretation and construction of any experience.

To accept the premise that experience is intangible and a phenomenological internal event has impact on design. Rather than directly design an experience, one can only provide the data for consumers to construct it themselves. This would suggest that the construction of experience is unpredictable making design impossible. However, it is relevant to look to some guides for designing for experience where it is possible to offer data, context and guides for consumers. It is useful to look to Benford and Giannachi's (2009, 2011) discussion of their many projects with theatre company Blast Theory. These projects can be described as hybridised theatre, multimedia and interaction design; producing an all-encompassing mixed reality experience. They

introduce a trajectory framework whereby the ideal designed experience is referred to as the 'canonical trajectory'. Actual participant trajectories tend to be divergent from the canonical trajectory and it is through careful management of 'transitions' that these trajectories can be managed. This discussion now turns to Human Computer Interaction (HCI), which has addressed the relationship between humans and technology for some time and offers important guidance to the study of computer-mediated experience.

2.3 Schema Guided Interaction

Traditional HCI draws from cognitive science, ergonomics and human factors with a specific focus on ease of use and efficiency. The mind of the user is understood as a processing device with separate areas dealing with perception, cognition and action (Hurtienne 2009), intimating that the mind could act separated from the body. With this processing device individuals perceive the world. Once the world is perceived it is made sense of. The sense making process allows the person to decide how to act. This view has been described through the use of 'mental models' (Lidwell et al. 2010) where users' navigation of technology is through a conceptual model they store in memory.

Hurtienne (ibid) discusses the use of image schemas to help conceive users' interaction with computers and provides many practical examples where this approach has positively affected interface design. Accepting schema as a method for users to interact with systems follows an adaptive structurational model of technology (Orlikowski 1992) drawing from Giddens (1984). Structuration treats social systems as a product of the relationship between existing systems and the human agents that create them. The rules and structures that people live their lives by simultaneously shape people as people shape them. To apply structuration to the understanding of how technology is used is to accept that technology is recursively developed, responding to the actions of those that use it. Technology becomes embedded within the systems (structures) that are using it. Technology's development and the manner in which it is used are strongly associated within cultural, social and institutional norms. IT artefacts are 'social actors' and interactions with them are interpersonal, forming relationships (Al-Natour and Benbasat 2009). Technology has structures

embedded into its form (DeSanctis and Poole 1994) and technological media should be treated as 'texts.'

By appropriating Neisser's (1976) perceptual cycle, Salovaara (2009) presents a recursive act of exploration and revision of an artefact's usage schema. Usage schemata, he claims, inhabit perception of technology. Tensions encourage individuals to work around the problems in a system, developing appropriative practices to deal with them. Magnani and Bardone (2008) present a concept of cognitive niches, named after ecological niches. Gibson (1979) defines ecological niches as a "setting of environmental features that are suitable for an animal" arguing that organisms adapt the way they live to take advantage of particular affordances in an environment. Cognitive niches are methods of distributing cognition into the environment; the most basic example of this is the shopping list. What is notable of Magnani and Bardone's view is that they approach the adaptation of use of technology from the perspective of affordance, arguing that affordances are signs, semiotic in nature, inscribed in the physical shape of an object. This leads directly to a discussion of affordances, famously introduced by Gibson (ibid) and having an important impact on HCI.

2.4 Affordance

The concept of affordances was initially coined by Gibson (1979) and introduced to the HCI community by Norman (1988). For a full history of the relationship of affordances to HCI and its varied treatments, see Kaptelinin (2013). Affordances are an important concept for this study and can be described as properties of the experience of objects; affordances are specifically concerned with action on and with objects. When encountering a cup, it can be perceived from its form that it has the propensity to be used as a drinking vessel, a desk tidy or in a variety of ways.

The concept of affordance has its origins within the Gestalt School of psychology. The Gestaltists working in Europe in the 1920s and 1930s argued that a person perceives the function of a thing as quickly as its colour or shape. Gibson quotes Koffka, who publishing in 1935, makes the following point, "Each thing says what it is … a fruit says eat me, water says drink me", Gibson (ibid, p.138). Koffka used the

term demand characteristic to describe these (directly perceived) properties of objects, while Lewin, again quoted by Gibson, preferred the term Aufforderung-scharakter (invitation character). These properties were seen as being phenomenal in nature and not the physical properties of objects – that is, we see directly what these objects are for and how to use them - no one taught us to drink water. Affordances exist as opportunities for an animal in terms of their bodily relationship with the world and it is through interaction with the world that affordances reveal themselves. In humans, particularly in the use of tools, is the action of what can be perceived as a grouping together or bundling of affordances, for example using an axe affords easier breaking up of wood, which in turn can afford better fires or shelters. The perception of these 'complex' affordances (Turner 2005) can be brought together through 'coupling' (Dourish 2001). Turner argues that it is an understanding of the world through significance and familiarity (Heidegger 1927) that allows people to cope with interaction with the world. Perceiving affordances makes interactions 'ready-to-hand' (Heidegger ibid, Winograd and Flores 1987) and instinctive.

Dourish (2001) encourages us to accept that individuals are a body first and foremost; human relationship with the world is through the body and is how people make sense of experiences. The world reveals itself in terms of embodied reality and all objects are understood in relation to the body, the relationship with objects in the world is concerned with action and what individuals are able to do with those objects (Gallagher & Zahavi 2008). Any object a being comes into contact with only makes sense in the projected uses for that being and this property is affordance.

2.5 Parkour eyes, appropriation and alternate affordances

In an exploration of the relationship between the body and external objects, the field of architecture provides rich examples. Architecture fills space with symbols and markers that delineate projected use of that space, this language of architecture does not prescribe how the space is used but expectations of how it should be used (Childress 2004, Whyte 1988). In this way it can be argued that when an architect plans a concrete bench in a plaza, this bench affords sitting and has been designed to do so. Perhaps the most romantic view of people exploiting and exposing alternative affordances of street furniture is the skateboarder who will perceive the affordances of

the same bench as a ramp or object on which to perform tricks. This appropriation of space plays a central role in skateboard culture (Herring 2009), particularly prominent is the historically antagonistic relationship between London's South Bank Centre and skateboarders who have appropriated an unused space known as the Undercroft since the mid 1970s. This tumultuous relationship has resulted in a case in the High Court confirming that architecture is highly politicised, conforming to the needs of commodification and ownership (Debord 1967, Childress 2004, Borden 2001, Luis et al 2006). Appropriation of space is in fact a mundane activity practiced daily by many people. This mundane appropriation is visibly apparent in Desire Lines. Desire Lines are straight lines across green space worn into grass by persistent use, often in conflict with delineated paths, highlighting the routes people actually take. Many architects, when building large campuses, will not lay paths for several months in order to allow natural activity highlighted by desire lines to determine their routes (Lidwell et al 2010).

The relatively modern phenomenon of Parkour and its sibling practice Freerunning claim a specific philosophical approach to understanding space. Traceurs (those who practice Parkour) are concerned with effectively moving through space, vaulting walls and skirting across rooftops. Movements are highly athletic and demand rigorous training to perfect. Traceurs claim to develop what are known as 'Parkour eyes,' an alternative perception of urban environments (Ameel and Tani 2011). This perception is described as childlike, with those having this attribute taking almost no account of the prescribed use of the space around them. Walls become obstacles to be transgressed rather than barriers to be negotiated. The sense of place and understanding of spaces by Traceurs, skateboarders and everyday occupants highlight appropriation as deeply contextual and a matter of perception; the space or piece of street furniture exists merely as an object made of steel or concrete. It is at the moment of perception that it becomes a ramp, a vault or somewhere to sit. Berthoz (in Berthoz and Christen 2009) argues that perception of objects is only manifested in action and it is through intention toward that an object is perceived.

Affordance has been effectively employed in the design of user interfaces and has helped create more instinctive methods of interaction, Kaptelinin (2013) gives examples from popular products such as tabs in website designs and sliders that

emulate physical objects. However, the relationship with objects is not only concerned with immediate use, there are cultural and social values, perceived and implied, future use, ownership, a vast connected myriad of influences on sense making.

In the literature, appropriation is linked to alternative perception of affordance although the case of the skateboarders at the Southbank demonstrates (Blayney 2014) that appropriation is also linked to ownership and customisation (Blom 2000, Blom and Monk 2003, Dix 2007, Wells 2000). Pens afford writing, but an expensive fountain pen on someone else's desk has specific implications on use (Heft 2003), this is also true of computing technology, a PC in a University laboratory is free for anyone with an access code to use but a lecturer's personal laptop, although ostensibly belonging to the University as well, is not. The pen and the laptop have been appropriated and in this way appropriation directly disrupts the affordances of this artefact. This then is one issue that stands out in an age of ubiquitous, personal technology.

2.6 Appropriation of technology

Across computing literature, appropriation is presented as a phenomenon occurring at the end of the practice of adoption, a result of long-term use. Past studies of technology adoption have focused on a functional perception of technology use; this utilitarian point of view is born from a time when computer systems were expensive and typically for business. Much of the examination of the appropriation of technology has been centred on organisations, software or management information systems (Delaney et al 2008; De Sanctis & Poole 1994, Orlikowski 1992 and 2000; Stevens 2009). This type of study focuses on adoptive practices of people in organisations that have had systems or technology introduced as part of their work practices. The focus here is on a finished product that is then adapted for use by human agents. Jennie Carroll (2004) presents appropriation as a process that relieves the tensions between technology as designed and technology in use but the increasingly personal nature of technology has revealed appropriation as a social, collaborative practice (Dourish 2003, Bodker 2012). A fashion for social appropriation can be seen in the prevalence of hacking communities (Postigo 2008)

such as Make, Hackspace and Ikea hackers (Rosner & Bean 2009). This social aspect of appropriation comes in tandem with the lowering cost of technology.

2.6.1 **Control**

According to Borgman (1984) individuals are constantly appropriating the world around them. People perceive the use of technology as a method to "bring the forces of nature and culture under control, to liberate us from misery and toil, and to enrich our lives" (ibid p.41). This control or conquest is not without issue and leads to what Borgman presents as the device paradigm. The device paradigm makes a distinction between artefacts that are 'things' and artefacts that are 'commodities.' One example used to explain this difference is that of a meal. If a person takes great care in producing a meal investing time and energy and using quality ingredients, then the meal they produce is a thing. If the person decides to heat a frozen ready meal, the meal produced is a commodity. A commodity avails itself without burdening people in any way; it is "instant, ubiquitous, safe and easy" (ibid p.41). Borgman describes the production of a thing as "appropriation through care, repair, the exercise of skill and bodily engagement." It is possible to perceive whether an object is a thing or a commodity from simply experiencing it. This perception of things and commodities has implications in our lives; humans can and do metamorphose commodities into things, a process termed attachment (Turner and Turner 2011) singularisation (Ahde 2007) and ensoulment (Blevis and Stolterman 2007, Jung et al 2011) and stretches far into the environment. Depending on personal experience and significance, people perceive the same spaces and public products such as street furniture differently. This 'thingness' can be artificially constructed as demonstrated in the ToTem series of projects (de Jode et al 2010, Speed and O'Callaghan 2011). The ontology of the word appropriate is evolved from the Latin word appropriare; appropriare is derived from proprius, meaning "one's own" (Schneider 2003). Proprius is also the root of the word proper, the meaning of appropriate as an adjective.

To understand an idea, to appreciate art or to possess an object, are all acts of appropriation (Sartre 1943). This dimension of appropriation can be understood as extension of the self (Belk 1998). The relationship to the appropriated object is such that, although it exists in its own right, it is justified by its relationship to 'me.' Only through this relationship does the object have meaning. McLuhan (1964) takes the

notion of the extended self literally, stating, "All media are extensions of some human faculty – psychic or physical," wheels are extensions of the foot and clothing an extension of the skin. Merleau-Ponty (1945 p.165) discusses the blind man's stick as incorporated into the body; he makes similar claims for hats adorned with feathers and sense of intentions when driving a car, for him it is 'intentional threads' (ibid p.121) that link people to objects. Inanimate objects, the people around us pet animals and objects in our environment; even the letters in our name, all contribute to a sense of what is 'me' (Allport 1937). These objects are related to the self in terms of control (Prelinger 1959). Dyadic in nature, related to the control these objects have over us; the external object is subject to the motives of the person's ego. Aside from the appropriation of objects, the appropriation of images and concepts is prevalent in art history and this is where this thesis will now turn.

2.6.2 **Appropriation in art**

For Graw (2004) appropriation is a precondition of artistic work. Apprentices have consistently copied their teachers in order to learn their craft. Many renaissance painters are valued because of the studios in which they were taught, direct copying and appropriation was accepted practice. Appropriation in art since the early 20th century has used direct adoption of artefacts and other people's work, these acts can be defined as the practice of "taking something out of one context and establishing it in a new one" (Schneider 2003). The works of Levine, Lawler and Prince are often cited (Schneider 2003, Graw 2004, Falzone et al 2011) in discussions on appropriation art. These artists specifically work with images and reworking of other artists' work or with repurposed images from well-known advertising campaigns. One of the most famous acts of appropriation in the modern sense was Marcel Duchamp's Fountain (1917), a standard manufactured urinal, named as the most influential piece of modern art in the 20th century (Jury 2004).

Appropriation, in the sense of re-contextualising, is seen as a method of having dialogue with other works of art and or important cultural concepts. Picasso is attributed with the quote "good artists copy, great artists steal" (not sourced) and appropriation was a key theme within his work (Anglin Burgard 1991). When street artist Banksy produced a series of screen prints of Tesco 'value' soup tins, his work

would have had little meaning without Warhol's famous depictions of Campbell's soup tins, an act of appropriation itself. What can be learnt from the art world is that appropriation is important cultural practice. Adapting and repurposing the world and artefacts is a way of holding cultural discourse and extending the meaning of an image or artwork. Trisha Ziff (2006) highlights the appropriation of imagery to communicate ideas. By concentrating on the history, use and appropriation of a single image she discusses the ability of artists and designers to employ this image as a short hand for a concept. The image she discusses is the well-known portrait of Che Guevara taken by Alberto 'Korda' Diaz on 5th March 1960. This image has become an icon used across the world to represent revolution and non-conformity "The familiar image can be customised to suit any individual, any protest, and can disseminate a message that's instantly recognizable and has an ever-potent visual currency" (ibid p.14). This example of the Che Guevara image is an example of what Dawkins (1976) refers to as meme replication.

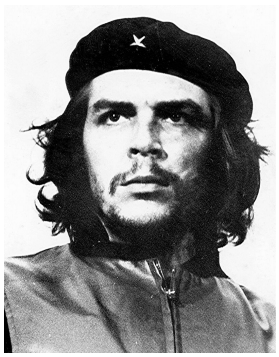

Figure 2-1 Che Guevara, Korda's original image, available from http://en.wikipedia.org/wiki/Che_Guevara#mediaviewer/File:CheHigh.jpg (public domain).
Figure 2-2 The form in which Korda's image is most familiar available from http://en.wikipedia.org/wiki/File:Che_Guevara.gif (copyleft).
Figure 2-3 An example of the appropriation of Korda's image, copyright Scott King used with permission.

This sense of ownership and the ability to communicate ideas with appropriation challenges the traditional HCI view of appropriation as adoption. HCI responds to available technology and within the personal computing industry technology change is rapid. As a response to the paradigm change in personal computing a 'third wave' of HCI (Bodker 2006, Hurtienne 2009) has adopted a phenomenological, embodied

approach to technology use. From this approach has developed the area known as User Experience (UX).

2.7 User Experience

As a discipline, UX champions the user and accepts the idea of technology use 'in context.' The underlying principle in the text is that experience itself is a continuum, personal to the user but the knotty problem is designing systems that are personally relevant whilst also being generic enough to afford economic production. There is a formal ISO (2010) definition of UX, which reads, ''A person's perceptions and responses that result from the use and/or anticipated use of a product, system or service" however it is reasonable to argue that no one really agrees on what constitutes UX. For example, Law and her colleagues (2009) have reported the results of a comprehensive survey of academics and practitioners that, while the term is in wide use within human-computer interaction, "it is not clearly defined nor well understood" (p.719) though most respondents agreed that it is "subjective, dynamic and context-dependent". UX is most often related with those experiences that include interaction with computing technology.

2.8 Experience or an experience

It is tempting to try to break human action with the world into composite parts but Giddens (1984 p.3) points out "Human action occurs as a dureé." That is to say, people exist in a continuous flow of experience and do not break down or aggregate action. When employing technology or acting upon the world then actions are bound together as a process and to attempt to isolate specific actions from their relational causes and reactions negates much of their meaning. Experiences tend to be accumulations of lesser experiences; individuals are able to frame experiences in context with each other and are able to make sense from their disparate parts. Understanding a 'scalability' of experience (Forlizzi 2004) enables the consideration of any mediated experience as part of a larger meaning, something that is key to aesthetics in mediated experience (McCarthy and Wright 2004). In computing, an interruption of the continuity of interaction with a system is termed a 'breakdown' (Winograd & Flores 1987, Wright and McCarthy 2010). Norman (2005) links

breakdowns to a personal appraisal system through emotions however Riva et al (2004) describe these phenomena as "breaks in presence" claiming them to be a change in the locus of presence. Benford and Giannici (2009, 2011) present participants as co-constructors in mediated experience willing to engage their sense of disbelief to enable them to maintain their own continuity and avoid breakdowns.

2.9 Memory of experience

Understanding of the present is inherently involved in making sense of the past and anticipating the future. Gallagher and Zahavi (2008) offer Husserl's structure of time consciousness, constructed of a primal impression accompanied by a retention and protention, or anticipation of what is about to occur. Roto et al (2011) point out that the effects of experience with technology reach out before and after the actual moment of encountering; this is represented in Figure 2-4 and Figure 2-5.
A linear, causal understanding of time seems intuitive and in reflection, this is how people relate the progression of events to others (Labov 1972). Experiences can have a distinct effect on the perception of the flow of time; time flies when you're having fun. McCarthy & Wright (2004) present experience with technology as a complex act built out of a series of four threads namely sensual, emotional, compositional and spatio-temporal and six processes, anticipating, connecting, interpreting, reflecting, appropriating and recounting. These threads and processes are a useful way of considering and discussing experience with technology but it is important to accept that they are apparent simultaneously rather than in convenient succession. Making sense of an experience involves a complex understanding of time as a holistic entity making bearing on the moment. Echoing Husserl's structure, McCarthy & Wright (2004 p.122) state, "we must see all time –past, present, and future- in terms of what we bring to and take from an experience and the continuity of experience". There is evidence (Mandler & Johnson 1977) that individuals have greater recall of stories related to them that conform to specific structures, implying stories and memory are linked. It is argued (Schank and Abelson 1995, Hassenzahl, 2010) that experience itself is made sense of and stored in memory as stories.

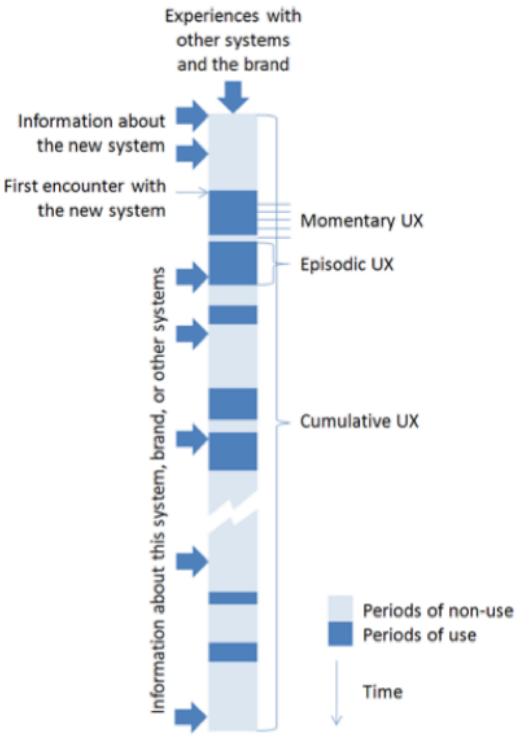

Figure 2-4 UX over time with periods of use and non-use from Roto et al (2011) available from http://www.allaboutux.org/files/UX-WhitePaper.pdf

Roto et al (2011) give user experience four time spans namely, anticipated, momentary, episodic and cumulative.

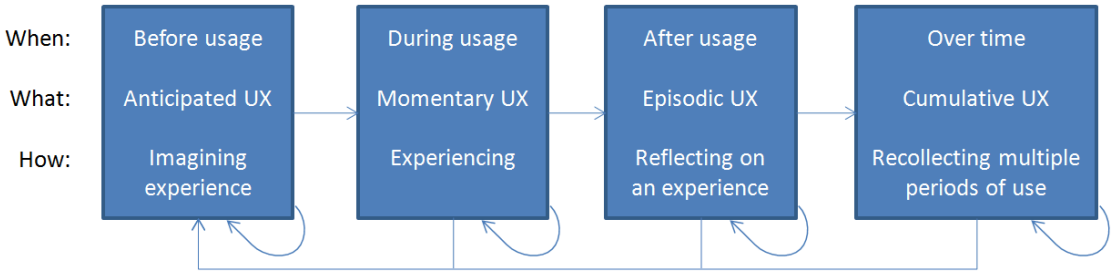

Figure 2-5 Time Spans from Roto et al (2011) available from http://www.allaboutux.org/files/UX-WhitePaper.pdf

For some (Hassenzahl 2010, Karapanos et al 2010), experience of the moment is unimportant. It is the memory of experiences that guide reflective understanding and is what will be communicated to peers. Experience is a collection of malleable phenomena that change over time, making memory and reflection key components in a phenomenological study of experience. People concurrently reflect on and interpret

an experience whilst it is happening; this process being key to making sense of the experience. By understanding participants' reflective recollection of experiences it is possible to transform the experience into an object for study. Through conscious reflection, people are able to describe feelings and understandings of actions and events at the same time as describing them in a linear temporal order. Reflection is a way of framing and discussing experiences.

One of the more esoteric arenas in which HCI and specifically experience with technology is investigated is that of interactive art. Interactive art has the advantage of a lack of commercial constraints, allowing interaction to be treated as the main focus of work, interactive art also explores interaction with and through technology that is removed from the traditional desktop configuration. However, interaction as an aesthetic form has a history that demands some investigation before tackling current interactive practice.

2.10 Interaction in Art

It is beyond the scope of this document to give a full history of influences on interactive art. A comprehensive timeline of digital art history can be found in Candy and Edmonds (2011) detailing works of art, innovations and events that have influenced digital art. Salter (2010 Chapter 8) offers a history of computer-mediated interaction in art specifically concentrating on the transformation of performance by technology. Salter's discussion starts with the inclusion of cybernetics and direct machine interaction into large-scale public exhibitions moving onto individual and personal interaction with machines in the work of, for example, Myron Kruger. Salter then discusses distributed and group interaction, later focusing on alternative forms of interaction. Salter's chapter concludes with a discussion of urban interaction and the fashion for reinterpreting public spaces through computer mediated technology. What this document will attempt is to give a brief overview of the importance of interaction to art.

Though the demand for interpretation can be traced back much further in time, for the purposes of this thesis a line is drawn at the DADA movement of the early twentieth century. DADA was a movement that deliberately worked against accepted notions of

what art itself could be interpreted as. Often irreverent and satirical in nature, DADA is accepted as an important influence on modern art (Tate 2014). Within DADA practice, production of collage and presentation of 'ready mades' demanded that the audience interpret the work. These concepts of collage and interpretation through montage were used to great effect by soviet artists such as Alexander Rodchenko and Dziga Vertov. Both these artists and their contemporaries used technique to impart meaning to the viewer. Along with the surrealists, much work was done to reinterpret the new forms of media that were available such as photography and film. It is experimentation with new media that is a relevant topic here, what is meant here by new media is a medium that has not been previously used for aesthetic expression. As a subject area, New Media is seen to be synonymous with computer-based media. This has caused some problems with interpretation i.e. if New Media is digital what is a previously unused medium that is not digital? Fashion for subject names has moved to the subject area being known as Digital Media or Interactive Media. There was also a period in the early part of the 21st century where computer based media was referenced as Multimedia.

The term Multimedia has its own interpretative issues and its use in art has its roots in work of the nineteen sixties such as The Exploding Plastic Inevitable (Warhol 1966-67). In this series of events Warhol used a variety of media such as film, lighting and dancing combined with a live band, The Velvet Underground, to create an overall performance piece. These multimedia events drew much from what were known as Happenings (Kaprow 1961) and it is happenings that can be argued as being culturally relevant to interactive art and digital media practice. Happenings are unscripted events where the audience is expected to take an active part. Often improvisational and spontaneous with little direction, happenings usually have no plot or obvious message and with no absolute medium. Simply by attending one is participating and becoming involved. What is key for interactive art is the role of the audience as participants; by interacting with the environment, participants' actions alter the diegesis of the piece.

Including the actions of participants in computer-mediated artwork has been an important part of computer arts practice since the late sixties. Issues raised by Kruger's (1977) experiments with what he termed Responsive Environments are still

relevant today. Although computers have long been of interest to artists it is only fairly recently that the necessary computing power has become widely available. The important point here is the transition of the art gallery visitor from a passive viewer to an integral part of the work. Saltz (1997) firmly places this type of interactive work in the realm of performance art. For him, the visitor becomes a performer within the piece. As he points out, "not all kinds of participatory interactions are performative" and "participatory interactions are performative to the extent that they are *about* their own interactions" (italics from original). The work that this study concentrates on is computer mediated performative participatory work where the visitor or participant is an integral part of the aesthetic. There are, of course, blurred distinctions and it is not possible to have emphatic delineations. What is fairly common in this type of work is that without participants the piece has little meaning.

2.11 Interactive Art

Edmonds (in Candy and Ferguson 2014 p.12) tells us "Issues relating to Human-Computer Interaction (HCI) could be considered to be as important to interactive art creation as issues relating to the colours of paint are to painting." HCI has a specific interest in interactive art as borne out by special interest groups such as SIGCHI Creativity Cognition and collaborative conferences like Reactor(3) at British HCI 2008. One of the advantages of studying interactive art is that it concerns itself specifically with interaction, countering the constraints of functionality (Bullivant in Rodgers and Smith 2010 p.196).

There is much literature that specifically deals with computer mediated art but the majority of texts are narrative in style, offering a view of different projects, concentrating on the artefacts themselves. What is more difficult is finding a theoretical approach to the production and evaluation of this type of work. Much of the approach to computer-mediated art is exposed in exhibition. Catalogues from recent exhibitions are useful resources for some indication of historical approaches. In the exhibition Decode, Digital Design Sensations at The Victoria and Albert Museum (2010), work was categorised into three sections Code, Interactivity and Networks. Interactivity concentrated on reciprocal relationships between the work and the viewer. The exhibition Digital Revolution at The Barbican (2014) categorised this type of work in the section State of Play, highlighting the playful nature of interaction.

Snibbe (2009) offers guidelines on designing aesthetic interactive work. Snibbe is of note because his work is both prolific and successful in terms of public commission. Snibbe presents a model (see Figure 2-6) that looks something like an onion with philosophy at the core and exhibition content as the skin.

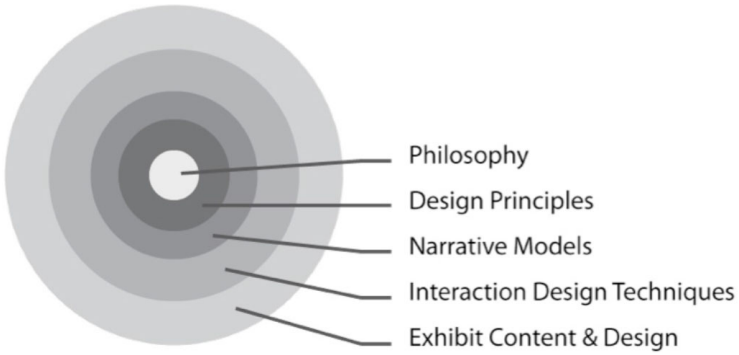

Figure 2-6 Snibbe's model for designing users' interactions with socially immersive media, used with permission.

Edmonds (in Candy and Edmonds 2011) proposes that work should be considered in terms of Attractors, those phenomena that make people want to interact with the work, Sustainers, phenomena that maintain interaction over time and Relators, phenomena of the work that cause reflection and create a desire for repeated experience.

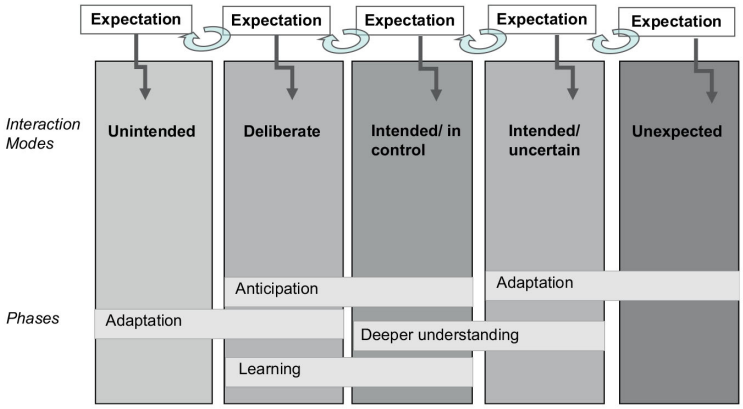

Figure 2-7 Bilda and Edmonds (2007) Creative Engagement Model used with permission

Work from the Creativity and Cognition Group (Bilda and Edmonds 2007, Edmonds and Candy 2011, Candy and Ferguson 2014) locates engagement and experience at the heart of interactive work. Bilda and Edmonds (2007) offer a model (Figure 2-7) for designing for creative engagement where they break participant interaction into modes and phases. Much of the work from this group is focused on interaction in the

moment over and above over reaching experience. These models are aimed at artists and designers in order to facilitate the production of new works.

2.12 Synthesis of the literature

This study draws specifically from a phenomenological approach, accepting that all encounters with technology are subsumed and as designers it is only possible to produce constituent parts that enable participants to construct their own experiences. More traditional HCI describes interaction with the world through mental models and schemata and studies of appropriation of technology have followed this approach. Examining appropriation, Magnani and Bardone (2008) attempt to argue an association between structuration and affordance, however close examination of the nature of affordance does not corroborate this point of view. Affordances are directly aligned to the bodily experience of objects and are linked to perception of the world. It is clear that there is a connection between existing knowledge of the world and affordances; people are able to perceive complex affordances or a connected set of affordances acting together as being a single affordance. What is important to accept is that affordances are directly perceived; a chair is perceived as a thing to sit on (or stand on or tame a lion etc.) as well as a collection of wood, fabric and fixings.

Current literature fails to fully account for the role of appropriation in the experience of technology. The literature discusses the ramifications of the effect of personalisation and customisation but there is no real examination of how robust these dimensions are in the experience of technology. In art, appropriation is exposed as an essential method of communicating ideas and used as a type of shorthand to quickly establish accepted meaning in work. Appropriation in this sense is prevalent in visual art but can also be traced through the history of interaction design. Apple famously designed their Macintosh interface influenced by what they had seen at Xerox Parc (Farber 2012). Although graphical user interfaces (GUI) and peripheral devices differ in detail and form, their overall functionality tends to be similar and it can be argued that this is a manifestation of appropriation. The challenge is to align the various interpretations of appropriation with a phenomenological approach to technology.

Computer-mediated interactive art is an area that takes many forms but has the distinct advantage of not being driven by functionality. Although function and ease of

use are important in interactive art, these are tools to aid expression rather than the overall aim of the artefact. This lack of functional constraint and willingness to experiment with varied forms of interaction points to interactive art as a potentially ideal arena in which to examine and expose alternative means of experiencing technology. The next chapter moves on to discuss the various means with which this study explored the nature of appropriation and how data was elicited and interpreted.

3 Methods of Data Gathering

This investigation benefitted greatly from forming a relationship with The Public in West Bromwich. Because The Public was a permanent exhibition, it afforded opportunities for longitudinal study. Ethnographic practices in gathering data from fieldwork, specifically employing a grounded approach are presented and discussed in terms of the data they have produced for this study. This is followed by a discussion of the Repertory Grid Technique, used in the scoping exercise discussed in Chapter 4. Interviews and observation played a key role in this investigation but perhaps the most important data was from video. Practice also played a role in this investigation and is discussed here as a method of data production.

3.1 Capturing Experience

It has been argued in chapter 2 that experience is an intangible psychological event, this causes serious issues when attempting to capture or archive it. The field of social science, particularly anthropology has developed methods that are of use to those trying to understand personal experience of culture. Rather than design an experience it is possible to produce data for the participant to construct their own experience. Similarly, rather than store experience, data can be captured of composite parts of an experience and of people participating in the experience. This study relies heavily on qualitative data for interpretation. Qualitative data seeks to understand action in context (Morse & Richards 2002).

Being adaptive and taking a mixed method approach is in line with current experience research practice, Wright and McCarthy (2010, p.86) encourage an open approach utilising various methods stating "bear in mind that each method is designed to do a different job, and that different researchers, depending on their own dispositions and interests, may bring quite different approaches to working with them." Candy (in Candy & Edmonds 2011 p.46) believes that finding appropriate methods is only the first step; the second step is "learning how to adapt and customise to suit the particular context."

Initial investigations for this study were grounded in nature; a grounded approach to data (Bryman 2008) is an open approach allowing the investigator to become immersed in the activity. This approach is ethnographic in nature seeking naturalism, understanding and discovery "free of hypothesis" (Genzuk 2003). This approach enables hypotheses to present themselves from the data.

3.2 Ethnography

Ethnographic methods of data gathering have become popular in HCI, particularly in Computer Supported Cooperative Work; see the influential study by Heath and Luff (1992) and the work of John Hughes at Lancaster University, particularly Hughes et al (1994). Ostensibly, ethnography means fieldwork and it is fieldwork that has been conducted in this study. It is not possible to argue that one specific approach has been undertaken though this study has drawn from ethnomethodological (Garfinkel 2002) approaches to data gathering.

Initial studies in this investigation adopted the position of participant observer. What this means is that the researcher becomes fully immersed in the activities of the group she or he is studying (Laurier 2010). In this case, acting as a volunteer at The Public. Data gathered in the initial ethnographic study were in the form of informal interviews, recorded interviews and observational notes. Another distinct approach was visual ethnography (Pink 2001) involving the gathering of archive material such as photographs, videos, promotional literature and souvenirs.

One of the most difficult aspects of adopting an ethnographic approach is the problem of bracketing. It is difficult to attain a truly objective point of view free from previous knowledge and assumptions. Suchman (2000) argues that it is not possible to attain true objectivity and encourages the adoption of what she terms 'Located Accountability'. Valera et al (1991) agree, encouraging researchers to accept the duality of in the moment investigation. Cousin in Savin-Baden and Howell Major (2010) states, "The self is not some kind of virus which contaminates the research. On the contrary, the self is the research tool, and thus intimately connected to the methods we deploy."

Candy (2014) discusses the need for "In Vivo" research in evaluating interactive art, meaning evaluation within a real world setting. This is the approach taken in studies performed at The Public. This PhD was conducted after designs and installations had been tested and established, meaning that they had been subject to development evaluation. The view this thesis was able to provide was the evaluation of work post installation, at a point when it was "bedding in." This approach revealed the tensions involved between designed intended use and pragmatic daily management of the building.

Data gathered from The Public in the scoping study was transcribed and coded allowing themes to present themselves. Initial grounded studies detailed in Chapter 4 highlighted the importance of appropriation. Once this was ascertained, a more focused approach was taken to data gathering. The effect of this was to produce a more detailed and designed understanding of the nature of appropriation in human experience of technology. A participant observer approach has also been adopted at several exhibitions and festivals of digital art. During the period of this study the approach taken has been to actively engage in the interactive art community. Data gathered has been in the form of photographs and videos of work.

3.3 Repertory Grids

Linked to Kelly's (1963) Personal Construct theory, Repertory Grids are a method that highlights participants' experiences. Personal Construct Theory considers that people perceive the world according to bipolar constructs (Jankovitz 2004). Constructs are contrasts allowing individuals to categorise and navigate the world according to expectation and pattern recognition. These constructs take the form of rating something as fitting on a scale with, for example, good at one pole and bad at another. It is important to understand constructs as axes and one needs to be aware of both ends, for example good/bad can be a very different construct to good/evil. Constructs are personal and participants will produce their own, for example, in a case study of mobile devices, the final set of ten constructs elicited from a group of participants included 'social-individual', 'sender-receiver', and 'new-conventional ' (Fallman and Waterworth, 2010).

Repertory grids are a statistical means to highlight these constructs and they reveal a great deal about personal understanding of external phenomena. Methods of employing repertory grids more commonly follow guidelines produced by Fransella and Bannister (1977) and this technique has previously been employed with success within the field of User Experience. Fallman and Waterworth (2010) employed repertory grids to understand participants' experiences of mobile telephones. Turner and Turner (2012) used the technique in order to study attachment to digital artefacts. Repertory grids were used in the scoping study of this PhD to elicit personal experience of appropriated artefacts. This study and the data gathered are discussed in detail in chapter 4.

Employing repertory grids elicits two dimensions from participants, those of elements and constructs. Elements are the individual artefacts that are discussed with participants. Constructs are the bipolar constructs humans use to categorise their understanding of individual artefacts. The standard approach for eliciting constructs is as a participative effort between investigator and participant. By employing already established elements a triadic approach is used to elicit constructs. Participants are shown three elements at random, they are then asked to consider which two are similar and which one is different. This similarity and difference is noted as a construct.

Data from Repertory grids are produced statistically and presented in the form of Prin Grids (see Figure 3-1). Prin Grids detail elements and their relationships to each other. In Figure 3-1 the statistics demonstrate that bed and greenhouse are considered by Participant 6 to have a similar experience. They are relatively close to jewellery, separated by the experience of the constructs 'private me-public me' 'out of doors-indoors' 'on the body-outside the body' and 'actively bought-gift.' The other form of presentation from the data is in the form of Focus Grids (see Figure 3-2). This is the image of a grid produced from the same data relationships between constructs. These particular data demonstrate a specific duality where the constructs 'actively bought–gift', 'factory made-crafted', 'everyday-decorative' and 'functional-pleasurable' are considered highly similar but distinctly separate from the constructs 'private me-public me', 'on the body-outside the body', 'out of doors-indoors' and 'made for me-inherited'. These data are discussed in greater detail in chapter 4.

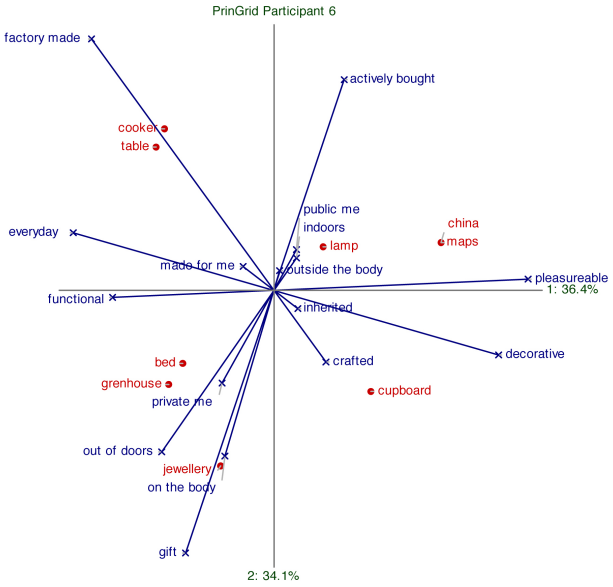

Figure 3-1 Prin Grid using data from P6 in chapter 4

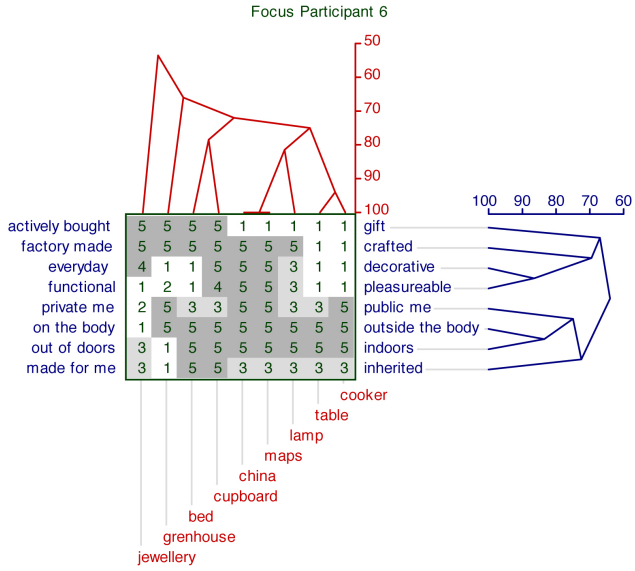

Figure 3-2 Focus Grid produced from P6 data in chapter 4

3.4 Interview Data

Work in chapters 4 and 5 employ interviews as part of their data gathering. The study in chapter 5 relied specifically on recorded and transcribed interview data. The interviews were exploratory in nature and participants were encouraged to discuss their experience of the game Minecraft. The approach taken was to transcribe the data, relying on self-transcription allows an investigator to become fully immersed in

the data. These interview data were then coded with emergent concepts highlighted. Once this process was completed, coded data wass gathered to expose recurrent themes. For Saldaña (2013) themes are an outcome of coding; the themes developed in the studies were employed to produce hypotheses to examine.

3.5 Observation and notes

This investigation relied on observation on the part of the investigator. The approach taken was to take short notes in situ, which were then expanded upon as quickly as possible. For example, in the initial study at The Public, a small notebook was used during the day; in the evening these notes were expanded on and made more verbose. This approach follows guidelines from Morse & Lyn (2002) and Laurier (2011). Observation was also conducted when visiting external galleries and events, informing the investigation as a whole. Notes have informed the final document and are referred to when appropriate.

At times autoethnographic approaches had to be employed. Autoethnography is a way of analysing the investigator's own personal experience. The decision to employ autoethnography was a pragmatic approach simply because the nature of the investigation was visiting and experiencing works of interactive art. This approach was useful in the initial visits to The Public. By bracketing any former knowledge, an investigator attempts to account their experience of an event. These autoethnographic notes can form a useful snapshot of thoughts and feelings that occurred at the time of interaction.

3.6 Video Data

Video data played a key role in this study, particularly in terms of the work in Chapter 6, drawing specifically from methods discussed by Gjedde and Ingemann (2008) and Candy and Edmonds (2011). The interpretation of video data is not a trivial task and it was felt important that strategies were learnt and developed for this study. Two workshops on interpreting video data were attended; the first was an internal workshop at The Mixed Reality Laboratory (MRL) in Nottingham. The MRL discussed a large amount of video data that had been gathered on their installation

Flypad in The Public and the role taken at this workshop was as observer. The session was recorded but not transcribed. The second workshop was a SICSA (Scottish Informatics and Computer Science Alliance) sponsored workshop on qualitative data, this was held at Edinburgh Napier University's Merchiston Campus in November 2012 and was organised specifically to help inform the methods used in this study.

Gjedde and Ingemann deal with capturing data from museum visitors. Their concern is to try and interpret a visitor's experience as it happens. One method they developed was to place a small video camera on a participant's head, attached to a cap. This enabled the data to reflect where the participant's head was pointing and capture conversations. This method has a number of advantages in capturing a true picture of the participant's experience but relies heavily on pre arrangement and effective recruiting.

Candy and Edmonds also rely on video data for their studies. Again they are able to take advantage of recruitment, particularly as they had a dedicated area within the Powerhouse Museum in Sydney known as Beta Space. They term the method they employ most as video cued recall. This is when they record participants engaging with interactives and ask the participants to watch the video of their own interactions. The participant is then recorded commenting on their in the moment thought processes. This method draws from Thinking Aloud, a usability test.

The mixed camera method developed for the study in chapter 6 draws directly from a method developed by Gjedde and Ingemann (ibid) known as the quarto video. They employed four cameras to record interactions with a large touch screen, each camera focused on a different aspect including two that recorded the researchers. The reason for recording the researchers was to highlight any effects their behaviour may have on proceedings.

Taking all the approaches into consideration, a method was developed for recording interaction with Animo at The Public. This study is discussed in detail in Chapter 6. Issues to consider were that this was a working art gallery and it was necessary to record participants in situ. Because the investigation was trying to understand

everyday interaction, it was important that members of the public were recorded. Recruiting volunteers was considered problematic in that with informed consent, it was unlikely that they would act without considering the aim of the study. There were also time and geographical issues, the study had to be conducted before the building was permanently closed and the potential volunteer base was in West Bromwich with the investigator based in Edinburgh.

Another consideration was creating a study that could be performed by one person. The studies discussed above rely on teams of researchers coordinating both in the capture and translation of data. This investigation was a sole operation; admittedly it could not have been performed without the cooperation and help of the venue. The main video investigation employed four cameras placed across the space of an interactive artwork called Animo, discussed in detail in Chapters 4 and 6. The four cameras afforded a full view across the space, allowing interpretation of intra group discussions and interactions as well as action in all areas of the space. Cameras were moved around the space at different times in order that they gave different views. Participants often mistook cameras as part of the exhibit and sometimes turned them off and cameras would sometimes stop working. Never the less, there were usually at least two cameras working producing relevant data for study.

3.7 Interpreting the Video

Gjedde and Ingemann (2008) provide explicit instructions in the interpretation of video data. They state that a written transcript should be made of any dialogue and this should be used to help interpret the video. They argue that the transcript should be used sparingly on the visuals themselves. They recommend the use of screen dumps (screen shots) that condense the visuals into small expressions. They also argue that selecting editing and preparing short pieces of video for presentation is a major part of the analysis process.

Video data gathered in this study was edited into short vignettes that demonstrated specific interactions that were coded in transcription. Transcriptions were placed on the video in the form of subtitles. Because participants were moving around the space, different cameras captured their audio. When the images were amalgamated into one the audio was difficult to edit successfully and subtitles made the audio easier

to ascertain when viewing. Screen shots were gathered to demonstrate specific activities that were coded. An example of a screen shot is shown in Figure 3-3, this figure shows a family engaging in an activity that was coded as 'shadow play' in the study. In this example, only three of the cameras were working and the subtitles were placed where a fourth image would be shown. Subtitles also aid in demonstrating some codes in the screen shots.

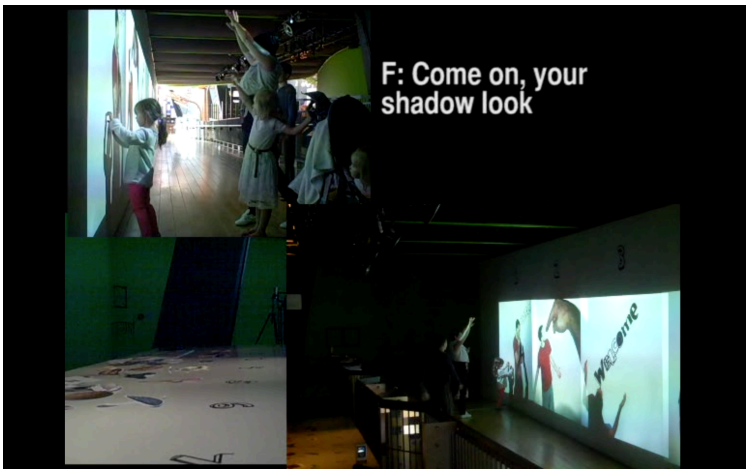

Figure 3-3 Data screenshot demonstrating the code shadow play

3.8 Exploration through Practice

Throughout the progress of this investigation a method of exploration in action has been adopted. Chapter 7 details three case studies of artefacts produced during the pursuit of these studies. These were the Aide Memoire, Homesick Aliens and Giant Eyeballs. Schön (1983) argues that tacit knowledge produced through practice is important in terms of gaining new understanding of a subject. This type of knowledge has a different form and structure to typical empirical evidence and can be difficult to impart successfully. Lizzie Muller (in Candy and Edmonds 2011) argues that we need to consider reflection in action and reflection on action. The former occurs as an undocumented activity occurring during manipulation of materials and the latter is able to be documented at opportune points in the activity, allowing the practitioner to reflect on the process in hand.

Muller tells us (ibid) she used reflection to discuss curatorial practice in digital arts in her PhD thesis for the Creativity and Cognition Group. This alludes to this approach being accepted practice in the interactive art community but it can be demonstrated

that this approach is in use across the fields of Interaction Design and HCI (Fallman 2008, Zimmerman et al 2007). Sengers et al (2005) tell us that reflective practice is linked to critical reflection allowing a "truly experience focused approach."

Dalsgaard and Halskov (2012) offer a framework for reflective design documentation, this framework records events and sub events in a linear manner, attempting to expose the questions responded to in the practice of design. Design knowledge is revealed in action (Schön 1992) and it is the artefacts themselves that are the output of research. Simply presenting artefacts is insufficient; work needs to specifically address research questions in context that are to be explored and questions of impact have to be justified.

Zimmerman et al (2007) offer a framework for Research Through Design specifically aimed at HCI. This framework focuses on Process, Invention and Relevance.
In terms of process individual technologies and collaborative design were explored in The Aide Memoire and Giant Eyeballs. Homesick Aliens explored the notion of storytelling to increase engagement with technology. Invention was demonstrated through the production of working prototypes, in the form of rapid collaborative prototyping. Relevance is concerned with impact and communication. Researches Councils UK (2014) define impact as "The demonstrable contribution that excellent research makes to academic advances, across and within disciplines, including significant advances in understanding, methods, theory and application." Impact can be considered to be a contribution to knowledge and only those artefacts produced during this study that have had significant impact are discussed. The first, the Aide Memoire is an aesthetic piece exhibited at an exhibition in Slovenia. Homesick Aliens are presented which have been used as a tool for engaging children and young people with computer programming. The final piece, Giant Eyeballs was produced for the Edinburgh International Science Festival as part of the exhibition Making It at the National Museum of Scotland.

3.9 Conclusion

This study has adopted a mixed methods approach, obtaining data where it was available. The approaches used draw from established methods used in the fields of interactive art and HCI research.

The use of interviews observation and video are challenging but rewarding. The use of video in this study is specifically enlightening allowing a comprehensive view of interaction across a distributed space. This approach has enabled a true picture of social in situation understanding of interaction with aesthetic technology.

The production of artefacts has helped the investigation into interactive art, particularly focusing on appropriation. What this leads to is a variety of data that has to be processed and discussed. The real challenge is the production of a theoretical framework from the data gathered.

4 Scoping Appropriation

This chapter discusses the adoption of appropriation as the central theme in this study. Specifically studying acts of appropriation 'in the wild,' initial investigations were conducted at The Public in West Bromwich. This chapter discusses The Public, arguing a case for interpreting The Public in terms of appropriation. A brief account of each work in the permanent collection at The Public is provided. This is followed by a discussion of fieldwork conducted at The Public in 2010. Fieldwork highlighted the nature of appropriation and its key role in engaging with interactive artworks. On establishing appropriation as the central theme of this study, the challenge was to gain understanding of the experiential qualities of appropriation.

Two further studies are discussed, the first was undertaken at Inspace Gallery in November 2012. The study at Inspace made it possible to establish appropriation of an artistic artefact that was not in the collection at The Public. This investigation revealed a dimension of understanding to peoples' relationship with interactive art. This chapter concludes with a description of a study employing the Repertory Grid technique. The repertory grid study specifically investigated the experience of significant personal artefacts. These artefacts have been appropriated and this final study made it possible to establish some insights into the relationship between people and appropriated objects in their everyday environment.

4.1 The Appropriated Public

This section expands on the historical context of The Public discussed in Chapter 1. It is argued here that Will Alsop and Sylvia King constructed the building with community appropriation in mind. Alsop claims that his practice now involves greater discussion and development with community groups as a direct result of his extensive consultancy work on The Public (Kennedy 2004).

The desire to construct a large building led by public participation is argued here as the desire to create a form of community appropriation. Having appropriation at the core of the building design is manifest in initial designs of the interactive art

throughout the building. The art initially responded to a profiling system that ran through the core of the building; this is discussed in detail in the next section of this chapter.

This theme of appropriation is evidenced in subsequent use by the tea dancers who organised a regular community event because of the suitability of the sprung floor. Tea dancing became a celebrated regular activity at The Public and it was the management's willingness to allow public appropriation that meant this could be established as use.

Figure 4-1 Office pods viewed from the ramp

4.2 Inside The Public

Ben Kelly Designs' (BKD) interior was conceived around the concept of an 'interior landscape' (Ben-Kelly-Design Date unknown). The Top floor contains office pods (Figure 4-1) meant to take the appearance of clouds in the sky. Much of the interior furniture holding the art pieces are representations of trees (Figure 4-2), and a representational model of an indoor park runs throughout the building .

The core software and interfaces for The Public, developed by Digit and AllofUs were designed specifically with personalisation in mind. Visitors were expected to initiate their visit at a profiling interface (Bullivant 2006 p.106). It was intended that these data would be transferred to the art works and used to customise each piece according to who, determined through RFID, was participating with the work. This personalised work was planned to become available on souvenirs to buy in the gift shop at the end of the gallery. The profiling interface was never fully realised. It was tested and installed in the gallery but was weather damaged during a period of hiatus.

Figure 4-2 BKD Trees

4.3 Studying The Public

The Public was particularly relevant for study because it housed a permanent collection of interactive art. These pieces rarely changed and their hardware was fixed. This permanence afforded longitudinal study and, for the purposes of this study, a number of site visits were undertaken. These visits are listed chronologically below and are described in greater detail later in this thesis.

March 2010 – Scoping Visit at The Public.
This visit involved a guided tour with Graham Peet, the exhibitions manager.

August 2010 Mixed Reality Lab workshop.
This workshop at Nottingham University's Mixed Reality Lab specifically discussed video that had been collected for an ethnographic study of Flypad. Flypad was an interactive installation built by the group for The Public. The purpose of this visit was to act as a "fly on the wall" and gain knowledge of how video study was used in practice. It was also an opportunity to meet and engage with designers of one of the major installations in the gallery.

5th to the 11th of July 2010 participant observer visit to The Public.
This visit involved conducting fieldwork and is described in detail in this chapter.

August 2012 family visit to The Public.
This visit is mentioned because it confirmed some of the findings and assumptions made during the initial visit in July 2010.

28th August to 1st September 2013 a focused study of Animo. Animo was an installation in The Public. This final visit involved gathering large quantities of video data and is discussed in Chapter 6.

4.4 The Ramp and its artworks

The majority of the work in The Public was arranged on a ramp that ran from the third floor to the ground floor. This ramp was meant to be analogous to a river running through the indoor landscape. What became clear through numerous visits was a

tension between the ramp as designed and the building in use (cf. Flintham et al 2011).

It is important to initially consider experience of the ramp as a whole (cf. Trajectories Benford & Ginaicci 2009). In initial designs, entry to the ramp was to be through purchase of a ticket and the ramp was specifically designed in response to this. The ramification of this was that some of the work was designed for approach from one direction downward from the third floor. On entering the building, a visitor encountered a large atrium (Figure 4-3) affording a view of the majority of the ramp. On a busy day, visitors engaging with interactives on the ramp, particularly Flypad (Section 4.4.5), were highly visible. Output from Flypad extended onto what were known as the Tall Trees, large displays that extended from the ground floor to the second floor. The ticketing and profiling system was abandoned and free entry was established. This meant that visitors often traversed the ramp the "wrong" way experiencing a mirror of the designed route. Subsequently in this text, key pieces on the ramp will be discussed in order of encounter if a person traversed the ramp in the canonical direction.

Figure 4-3 The Atrium

4.4.1 **Animo**

Animo was designed for creating series of images. The images created were an amalgamation of enlarged objects placed on the interface mixed with images of people standing directly in front of the output. A diagram, describing interaction with Animo is presented in Figure 4-5. The interactive is the subject of an extended study described in chapter 6.

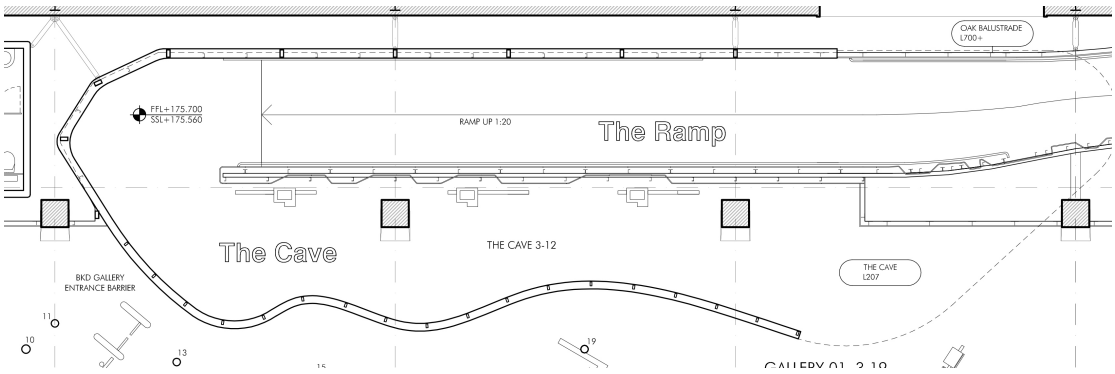

Figure 4-4 Edited plan demonstrating physical position of Animo

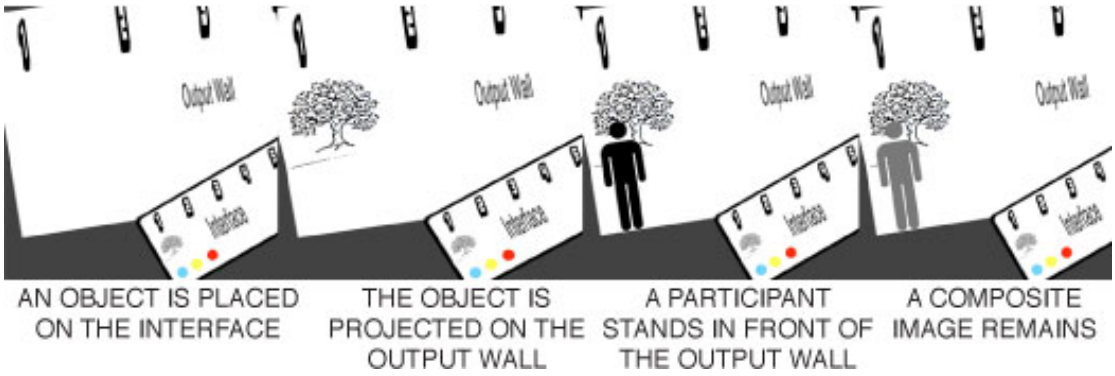

Figure 4-5 A diagram describing interaction with Animo

The canonical operation of Animo is by a minimum of two people termed the "director" and the "actor" on The Public's website. The director has control over a

table in the high level and the placing of images. The actor stands at the output wall. The director composes images on the table that are enlarged and projected on the output wall. The actor then poses with the enlarged image and a composite image of actor and image remain on the wall. The operation of Animo is automatic, following a sequence and audio instructions.

Figure 4-6 An example of output from Animo

4.4.2 **Datafall/Wonderfall**

Datafall (Figure 4-7) was output from projectors onto a large expanse of wall covered with several rectangular white panels. The panels were interspersed with screens that displayed changing patterns of horizontal lines of various colours and thickness. The original content known as Datafall was replaced by new commissioned content and renamed Wonderfall. The output was affected either from three touch screens placed at the bottom of the output wall or from a touch screen situated up the ramp roughly ten metres from the output. The full nature of each interaction was hard to determine and was never fully ascertained.

4.4.3 **Audio Bounce**

Audio Bounce was a sound based exhibit designed by researchers at Coventry University. The interface was a small panel where visitors were offered choices such as “horse” or “car,” there was also a “record” option. The selections were of various sound samples that subsequently played on a series of speakers. Interface and output

were physically separated with the speakers situated around the corner from the interface; they were not visible to a person using the interface. The sound was played in a manner that took advantage of distributed, surround sound. This distribution produced the effect that the sound was bouncing around the corridor. The piece also used effects produced by changing the pitch of the sound samples.

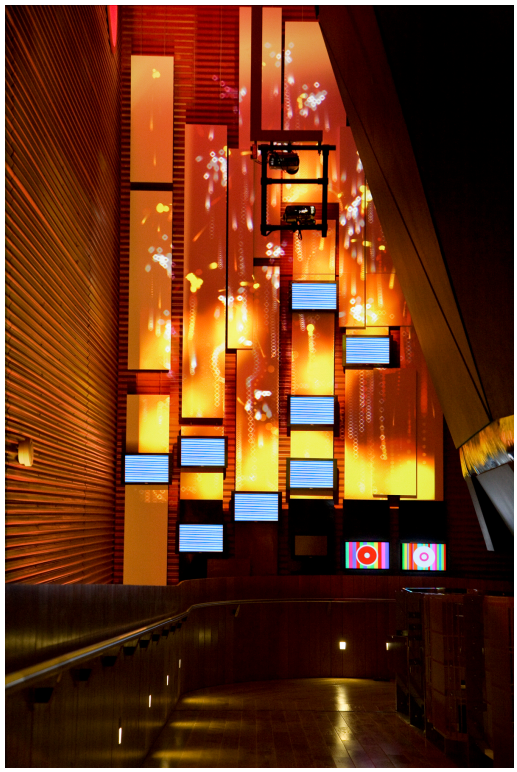

Figure 4-7 Datafall, copyright G.Peet used with permission.

Figure 4-8 Audio Bounce Interface

Audio Bounce suffered for being designed for the canonical route from the top of the ramp downwards. The canonical route (see Figure 4-9) meant that visitors encountered the interface and then walked round to the output. If a visitor walked up the ramp, they encountered the output first and then the interface. Visitors that took the reverse trajectory were often confused and simply continued to walk up the ramp.

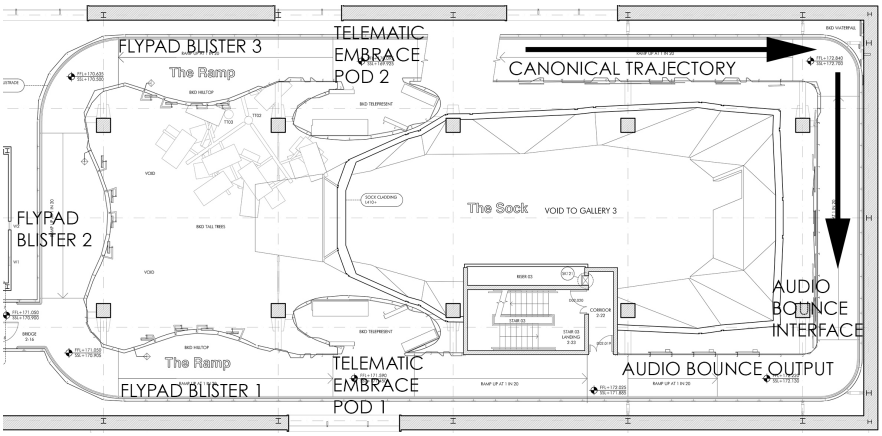

Figure 4-9 Annotated building plans of the second floor

4.4.4 **Telematic Embrace**

Paul Sermon's Telematic Embrace consisted of two concave areas, or pods, on either side of the building. Each pod was a mirror copy of the other; containing two benches facing directly at screens with embedded video cameras. A visitor sitting on either bench on one side of the building would be projected into the corresponding screen on the other side of the building.

4.4.5 **Flypad**

Flypad was a mixed reality game produced by Blast Theory in collaboration with the Mixed Reality Laboratory, University of Nottingham. Flypad was composed of three interface stations arranged across "blisters" in a horseshoe shape on the ramp. These stations held a dominant position and afforded a view across the atrium of the building down to the ground floor.

The three blisters were identical, each containing three foot controls and one hand control. The controls were pressure pads with a screen directly in front of them, pressing on the pads controlled the direction of flight of an avatar displayed on the screen. The image of the avatar was mixed with live footage from a video camera directly beneath the control pad. This mixed image gave the impression that the participant was controlling their avatar in real time as it flew across the atrium. Direction of approach from the ramp had little effect on the experience of Flypad because it was identical across its installation.

Figure 4-10 Flypad hand control, note the output on the tall trees behind

Figure 4-11 Content Pools

4.4.6 **Content Pools**

Content Pools were thematically linked to Datafall (Figure 4-7). As Datafall was meant to represent a waterfall, Content Pools represented pools at the bottom. Placing one's hand directly into a rectangle in front of the installation created coloured ripple effects in the pools. When the content of Datafall was altered to Wonderfall, Content Pools was not altered.

4.5 Initial extended exploration of The Public

This section is an account of findings from an extended visit to The Public from 5th to 11th July 2010. Mr.Peet was contacted and an offer of volunteer help was made and accepted. Data was gathered on two portable video cameras and a high quality digital SLR camera. Short notes were taken during the course of the day which were adapted into more verbose notes in the evening.

The Public had taken on work experience students who were undergoing training within the building. This training involved taking part in creative workshops. The students had this study explained to them and all signed informed consent forms, in line with University ethical guidelines. This study proceeded by shadowing and working with the work experience students.

The morning of Thursday was spent with Fran, the technical manager of the building. This afforded detailed understanding of the technical workings of the exhibits. Friday was spent working on one of the building's touch screens in order to demonstrate how members of the public could be encouraged to produce their own work for the building. The main barrier to conducting observational studies was low visitor numbers. In fact there were few opportunities to observe beyond the students until the Saturday when there was a community day. On the Saturday, the building was full and it was possible to observe the ramp at capacity.

4.6 Studying Animo

During the course of this visit, it became apparent that Animo made for particularly interesting observation. Its significant placing at the top of the ramp meant that it was often the first exhibit that people encountered. The piece also demanded cooperation, it was possible to operate Animo alone but this was difficult. Two interviews were conducted with the work experience students, initially two participants were interviewed together and the group were then interviewed as a whole.

The interviews were recorded and transcribed. Personal transcription afforded full immersion with the data and codes were established through listening and editing the transcriptions down to relevant sections. It was during these interviews that the appropriative nature of the experience of Animo was highlighted. Interviewees specifically discuss ownership of the final output. Edited sections of transcriptions are presented in Appendix i.

In the first interview, interviewees highlight the fact that "you can put your own props on" (line 9) and that the interactive works "for you" (line 11). P1 was resistant to the installation stating "I don't like having things like that done" (line 37) but P2 was enthusiastic "I'll just go up and do it." (line 40). Spontaneous activity with Animo by P2 was observed on numerous occasions. Despite her ambivalence to Animo, P1 highlighted that she can see other people enjoying the installation and that she gains pleasure from viewing their participation. Animo is "the ice breaker" (line 52) and "brings personality out." (line 54).

In the group interviews the participants discussed personalisation almost immediately. "You can put anything personal to you on there." (line 4) The output was described as belonging to the participant "It's like being in your own little movie" (line 14). Much of the dialogue refers to personalisation and ownership of the final artefact. There was discussion on how the interactive is engaging and enjoyable though not immediately intuitive.

These perceptions of Animo as a customisable artefact are interesting and point to the discussion of control discussed in 2.6.1. Many participants would use their first

interaction as a way of becoming familiar with the workings of Animo and then repeat their attempt, having gained virtuosity through practice. The final output of the interactive is a series of composite pictures of the participant that 'acted' with enlarged versions of props placed on the table by the participant who 'directed.'

The Public provided a variety of props for people to use, often incorporating a theme. As an example various signifiers of local culture such as letters spelling out the phrase "Bostin," a local slang term and the coat of arms of the local football club. It is on repeat attempts that participants took ownership of the interactive and appropriated the interface to create their own personal outputs. This was particularly pronounced during observations on the Saturday of the initial visit when the building was at capacity.

4.7 Active Appropriation

A group of four young people entered Animo and went through the interactive in its prescribed and intended manner. It was clear that these young people enjoyed their experience and they made several repeat attempts. During these attempts, as well as employing the props provided for them, they emptied their pockets and began to use the personal items they carried with them. These items included packets of cigarettes, mobile telephones and cigarette lighters as well as other items.

Figure 4-12 Output from a group of young people.

As well as using their personal items, the group used the opportunity to create a series of group portraits, posing and genuflecting. Many of the poses they struck were

reminiscent of record covers by popular hip-hop groups. By adapting the interface and output of the interactive, the youths exercised control over the environment.

An example of appropriation through personalisation of Animo was on display in the offices of The Public. Members of staff there had created a wall of images of each other utilising props that describe their daily activities. For example, the accountant was pictured with a giant calculator and the technical supervisor with a network cable.

Figure 4-13 The Office wall

Animo provided users with an environment in which they could create their own content. The design of the product encouraged and rewarded appropriation and it is this appropriation that created engagement. A consistent request after using Animo was whether users were able to get a copy of the final output. Animo afforded the production of highly personalised content and the desire for souvenirs demonstrates a high level of engagement.

The temporary nature and small audience of interactive art means that finding a statistically significant number of people who have ensouled interactive art is a challenge. Sartre (1943) claims that to enjoy art, to possess an object or to gain knowledge is an act of appropriation. For him, appropriation is to lay claim to an artefact or an idea and make it a distinct part of the perceived self. This chapter moves on to discuss the experience of the art piece #unravel displayed at the Inspace gallery in Edinburgh.

4.8 An evening with #unravel

This section discusses a study conducted in November 2012. The study involved observation of public reaction to an interactive art piece on display at Inspace gallery in Edinburgh. The piece #unravel was developed with funding from New Media Scotland's Alt-W fund. Created by Found, #unravel is a collection of musical devices, each driven automatically. These pieces consist of a drum kit, a keyboard and a set of Diatonic Chimes. Interaction with the piece is through a modified record turntable. Adjacent to the turntable is a box containing a selection of 7-inch vinyl records. To interact with the piece, participants are expected to choose a record. Placing the record on the turntable and putting the needle on the record brings the piece to life. The musical devices begin to play a composed piece of music, while a recorded narrator relates a story. Embedded within the turntable's surface are four circular meters. These meters convey four dimensions namely 'Time' 'Audience' 'Opinion' and 'Pressure.' Measurement of these dimensions determines the context of the story told. Each of these dimensions will be addressed in turn:

Time marks its parameters as being between 'early' and 'late.' The content of the piece has a watershed, ensuring that bad language is not used before a certain time. Audience parameters are 'quiet' and 'busy'. The piece measures the environment to gauge how crowded the venue is. Opinion parameters are 'insecure' and 'confident.' #unravel continually accesses social media and uses semantic analysis to judge public opinion of the piece. Pressure parameters are 'stormy' and 'fair.' This measurement is a standard barometric measurement.

The stories told are written and narrated by Aiden Moffat. 10 stories were written and multiple variations of each were recorded. The musical devices are able to play 160 accompanying soundtracks. The story told is determined by the record that is played on the turntable. An algorithm taking into account the four dimensions described above determines the version of the story and its accompanying soundtrack.

The nature of the study was to attend the press launch of the piece simply to observe members of the public acting and engaging with it. Studies were conducted with the permission of Mark Daniels, the gallery manager. A digital SLR camera was used to

collect visual data in the form of photographs of people interacting. Images have been stored securely and any communication of photographs will disguise identity.

Figure 4-14 Pictures of participants explaining #unravel to each other, pointing actions highlight this activity.

Observation revealed people taking great care to explain the nature of the work to each other. This is complemented through the photographic data that reveals people pointing at various aspects of the piece whilst engaged in explaining the work to each other. During the evening one specific couple were observed being particularly engaged in the work and describing the piece to other visitors. The couple were approached and agreed to partake in a follow up interview about their relationship with the work. The couple completed informed consent forms according to University ethics guidelines and the interview was conducted in a local café. The interview was recorded and transcribed. Analysis was in the form of repeated listening and hand transcription. Editing and singling out relevant passages allowed themes to be extracted. An edited transcription is available in Appendix ii.

In the interview the couple seemed proud of the fact that they knew certain 'secrets' about the work (line 22). The secrets that they are aware of are all related to technical aspects of how the piece works. P2 particularly felt that understanding these technical aspects helped him enjoy the piece (line 26). P2 stated that it is important to give people contextual understanding of the piece, taking into account their existing knowledge without revealing too much.

Some of the discussion alludes to the participants viewing themselves as guides to enable other participants to understand the work themselves. It can be posited that participants may be attempting to couple complex affordances (Dourish 2001, Turner 2005) and that this may be one composite part of the appropriation of digital technology begging further investigation. For this couple part of the pleasure they attained from #unravel was an understanding of its technical workings as well as the overall aims of the piece. P2 was particularly considered in his appreciation of the piece.

This study reveals a successful piece of art that has enabled this couple to consider the notion of authentic narratives. For this couple, understanding the piece on a technical level augments enjoyment. From the observation and photographic data, we gain a sense that understanding and explaining interactive art is an important composite part of a satisfying experience. It is revealing that the interviewed couple feel that understanding is an important part of the pleasure of the work.

So far this chapter has explored interactive art where appropriation and understanding have been revealed as important dimensions in engagement with aesthetic work. In the literature, a key dimension of appropriation is personalisation and ownership. To help explore the relationship between ownership and appropriation, a study of personal objects was devised. Csikszentmihalyi and Rochberg Halton (1981 p.17) tell us "The objects of the household represent, at least potentially, the endogenous being of the owner." People surround themselves with man made objects that have often gone through several processes of selection or rejection. Artefacts that survive this selection process are those that have greater personal meaning. These artefacts are important parts of personal identity and have been appropriated or taken through a process of ensoulment. In order to establish a set of man-made artefacts that had been appropriated, a number of participants were interviewed. Utilising the repertory grid technique, it was possible to expose some of the anatomy of appropriation.

4.9 Relationships with appropriated artefacts

This study employed the repertory grid technique, discussed in Chapter 3. Repertory grids are based on Personal Construct Theory (Kelly 1991) and interrogate personal understanding in terms of contrasts. One of the aims of this study was to ascertain what types of objects were appropriated and what, if any similarities there were. To achieve this, it was necessary to allow participants relatively free reign on their choice of artefacts or elements. The chosen elements were then used to elicit constructs from participants. Eliciting constructs enabled the gathering of data pertaining to the experience of appropriating these items. Eleven people took part in the investigation. Participants were from a varied population with ages ranging from 26 to 75. All the participants were adults, from a variety of backgrounds. Interviews were either conducted in offices or in participants' homes. Eliciting elements in participants' homes was easier as artefacts on display could be pointed to and discussed.

4.9.1 **Procedure**

Interview equipment consisted of adhesive notes and pencil and paper. Elements were chosen by participants and written on the adhesive notes. These notes were then chosen randomly in sets of 3 and participants were asked to state, of the three which two were similar and which was different. Participants were asked what the difference was and their answers were used to establish constructs. Once constructs were established participants were then asked to rate each element on a scale according to each construct.

Once gathered, elicited elements, constructs and participants' ratings were input to the software Repgrid IV. Provided by the Knowledge Science Institute at the University of Calgary, this software produces statistical data from participants' ratings. These data are visually represented in structures termed Pringrids and Focus Grids. Grids produced from the data are available in Appendix iii. Participants will be referred to as P1 (participant 1) and P2 (participant 2) etc.

Participants were asked to name eight man made artefacts that they thought were an important part of who they were. If participants struggled to think of artefacts, they

were either prompted by examples given by previous participants or asked to consider which artefacts they would rescue in the event of a fire.

The study was revealing in that participants often took a long time to choose their objects, over twenty minutes in most cases. Participants were given ample time to discuss and expand on the items chosen and their reasons for choosing them. This approach was key to the coding exercise undertaken later. By understanding both what the objects chosen were and the reasons for choosing them greater consideration could be made whilst coding.

4.10 Results

4.10.1 **Principal Component Analysis**

In order to describe how coding was undertaken in this study, this discussion will proceed by isolating and discussing data from P1, however all data are available in Appendix iii.

A Pringrid is a visualisation of a principal component analysis of the elements provided by a participant. Jankowitz (2004) describes principal component analysis as a method of eliciting the variance of data provided by participants' ratings. He tells us the process is iterative with the pattern which accounts for the largest variability removed in order to identify the next pattern and so on. The principal component analysis was performed by the RepGrid IV software, which also produced the grids. The Pringrid (Figure 4-15) is useful for gaining a sense of close relationships between elements (shown in red). For example, we can visually understand that, for P1 the experience of penguins and elephant are very similar, separated only by the construct personal-someone else's. However, the most pertinent data is found in the Focus Grid (Figure 4-16).

At its most basic, a Focus Grid is simply a matrix listing the elements and constructs with their scale values. The Focus Grid also visualises the statistical associations between elements and constructs. The red vertical lines (dendograms) at the top of the grid and corresponding scale (from 50-100) represent the statistical associations

between elements. The blue horizontal lines and scale to the right represent the statistical associations between constructs.

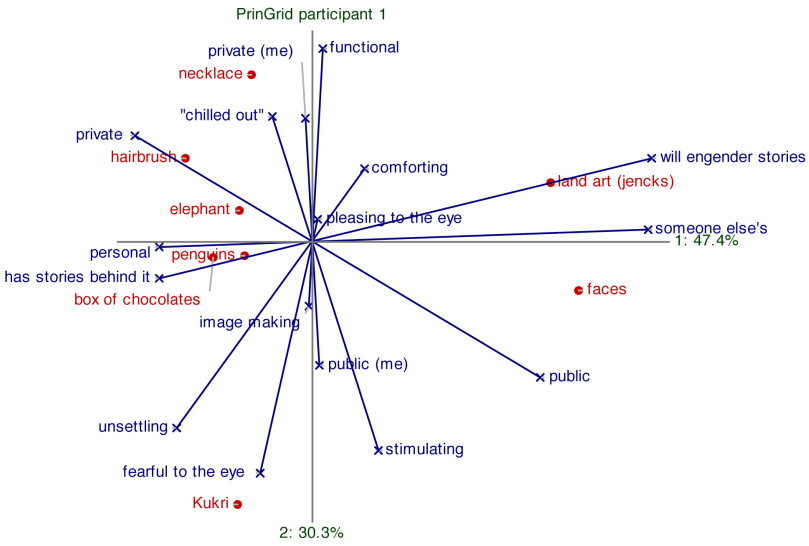

Figure 4-15 PrinGrid from Participant 1

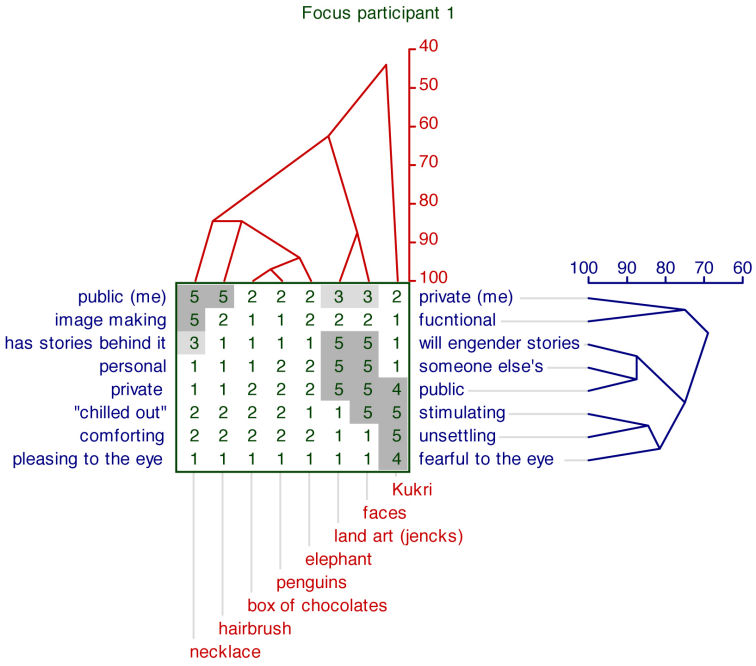

Figure 4-16 Focus Grid from Participant 1

It is important to impart that it is the participants who establish both the variance visualised in the Pringrids and the statistical relationships between constructs and elements in the Focus Grids. During the analysis participants reveal which elements they find similar by rating them on a scale according to constructs. The software produces the numerical and visual representations. The similarity of constructs is revealed through cluster analysis.

4.11 Coding Elements

The elements named by participants were grouped by considering each participant's responses in isolation. Elements were grouped according to statistical association. Common properties of elements were drawn from artefact similarities between participants' responses. These similarities were established through repeated data interrogation by the investigator. Each element was considered by both the similarities exposed in the Focus Grids and according to statements participants made about the element and whether the investigator could reasonably group it with other elements. Once similarities were established for each participant, these categories were then considered across participants.

By comparing groups highlighted from all participants' data it was possible to ascertain commonalities between participants. In the case of P1 we can see from the Focus Grid that Elephant, Penguins and Box of Chocolates have statistical similarity of well over 90%, these three elements have over 80% similarity with Hairbrush and Necklace. This is enough similarity to group them together. By looking across other participants and taking account of their personal discussions; it is possible to ascertain other grouped items that have similar experiential properties. Using this knowledge, it is possible to couple this property to distinct items that have been described as having similar experiential properties. Where this coupling was not possible, they were listed as distinct. The table below highlights P1's elements; a complete table is available in Appendix iv.

Participant	Element	Common Property
P1	Kukri	Distinct
	Faces	To Look at (3D)
	Land Art (Jencks)	To Look at (3D)
	Elephant	Keepsakes
	Penguins	Keepsakes
	Box of Chocolates	Keepsakes
	Hairbrush	Keepsakes
	Necklace	Keepsakes

Five recurrent themes were extracted from all participants' data namely To look at, To use, Keepsakes, Cognitive and Skill item.

To look at

The common property 'To look at' drew from objects that were not regularly handled but were kept in prominent positions. These objects were split between Three Dimensional objects such as sculptures (P1,P3) or a necklace and fountain pen that were rarely handled but on display (P4) and flat objects such as paintings and photographs (P2, P3, P7).

To use

The common property 'To use' was drawn from a number of functional items discussed. Elements in this common property included items such as handbags (P3, P9), a USB stick (P2) and a cooker (P6). These were items that were often handled and were often carried by participants.

Keepsakes

The common property 'Keepsakes' was a group of items that were either gifts from people or were discussed in terms of being about someone specific. This common property not only contained items that were gifted from people but also items that could potentially be gifted to people as keepsakes of the participants themselves. Items in this common property had strong connections to memories and were discussed by participants in terms of their association with people.

Cognitive

Only two participants, P9 and P11, highlighted the common property 'Cognitive'. These were artefacts such as books and a radio. These were distinctly grouped by the participants but did not fit within groups evident across participants. It is tentatively suggested that artefacts such as this may well create a third dimension in 'To look at' thereby fundamentally altering the common property. This would require further investigation.

Skill item

The fourth common property 'Skill item' was from elements mentioned by just two participants. P5 named a piano and P10 a guitar and juggling clubs. These were all distinct enough to separate from other elements and, in the case of P10, similar enough to group together. 'Skill item' was not a prevalent common property because it is associated with items such as musical instruments. Not all people play an instrument or juggle and may not immediately consider a skill item without prompting.

4.12 Coding Constructs

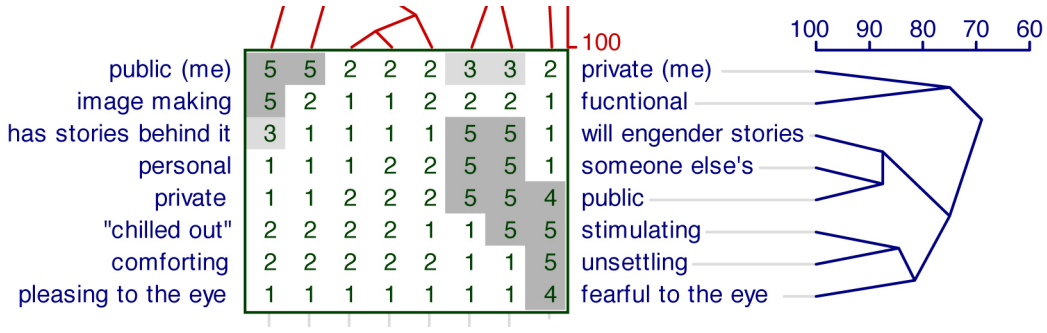

Figure 4-17 Detail of Focus Grid from P1 highlighting constructs

The horizontal blue lines in the Focus Grid represent statistical similarity, to the participant, of constructs. For P1, the constructs public (me) – private (me) and image making – functional have just under 80 % similarity; has stories behind it – will engender stories, personal – someone else's and private - public have 90% similarity and are distinct from others. "chilled out" – stimulating, comforting- unsettling and pleasing to the eye – fearful to the eye have over 80% similarity. These are displayed

in a table below; the full table detailing all participant data is available in Appendix iv.

Common experience between participants	**Common experience across participants**	**Source**
'proximal-distant'		
'has stories behind it-will engender stories'	Memories/Stories	P1
'personal-someone else's'		
'private-public'	Public-Private	
'commodity-thing'		
'private me-public me'	Public-Private	P1
'image-making-functional'	Functional	
Distinct Constructs		
'stimulating-unstimulating'		
'chilled out- stimulating' 'comforting-unsettling' 'pleasing to the eye-fearful to the eye'		P1

As this study was looking at individual experience and personal interpretations it was to be expected that constructs with semantic similarities would be referred to that actually have different meaning to the individual. Treating each Focus Grid as a separate case and then making attempts to look at both semantics and consider the meaning of the construct to the individual was the approach taken to manage this issue. Across the participants, there were several commonalities within elicited constructs. The first of these common experiences was named Functional; there was also a common experience of Public-Private and a common experience of Memories/Stories.

9 of the 10 participants chose a construct within the common experience Functional. This is to be expected if elements selected are objects such as asthma inhalers (P9) and mobile phones (P5,P8,P10.) What is of interest is what was perceived as the polar opposite of functional. For 3 of the participants, the polar opposite was 'not

functional', and for two it was ornamental, but there were also responses of artistic, pleasurable, emotional and image making.

Participants' differences in the polar opposite to functional created some challenges in grouping. In 6 cases, the functional construct was grouped into the common experience 'commodity-thing.' These constructs were 'image-making-functional' (P1), 'functional-not functional' (P2), 'functional-pleasurable' (P6), 'ornamental-functional' (P8) and 'not functional-functional' (P10).

2 instances of the Functional common experience, 'functional-emotional' (P4) and 'ornamental-functional' (P7) were grouped with the common experience 'proximal-distal.' 1 instance of Functional 'artistic-functional' (P5) was grouped with the common experience 'thinking-doing.' The semantics of the polar opposite gives indication to how participants perceived these constructs.

There were 7 instances of the common experience 'Public-Private. In fact, P1 highlighted 2 instances of this experience, once as 'public me-private me' and once as 'public-private.' P1 had low association between the 2 constructs, demonstrating that semantic similarity does not necessarily relate to exactly the same meaning. This also demonstrates that common experiences naturally occur both between and across constructs

Where constructs were common between participants, they were grouped and then examined. The three most evident common experiences derived from the data were termed 'proximal-distal,' 'commodity-thing' and 'thinking-doing.'

Proximal-distal

Constructs in the 'proximal-distal' common experience refer to proximity in the sense of conceptual proximity, physical proximity, and attainment. Conceptual proximity is demonstrated in constructs such as 'personal-someone else's' (P1) and 'about other people-about me' (P11). Physical proximity is derived from constructs such as 'on the body-outside the body' (P6) and 'outside the home-inside the home' (P9). Attainment was implied from constructs such as 'desire-attainment' (P4) and 'achievement-possession' (P11).

Commodity-thing

Discussions with participants revealed their deep attachment to certain specific items that, if one were to rigidly accept Borgmann's (1984) device paradigm, would be termed as commodities. These were items such as beds, cookers, boats and cheap cups with football team emblems printed on them. What was specific in each of these cases is that participants accepted that the artefacts were directly replaceable, often with superior products. It was considered by participants that any replacement would be lacking a certain intangible property. Constructs in this common experience included 'factory made-hand made' (P3), 'irreplaceable-ubiquitous' (P5) and 'factory made-crafted' (P6.)

Thinking-doing

The 'thinking-doing' common experience demonstrates participants' ability to consider artefacts as engaging either the mind or the body. A Cartesian distinction between mind and body is largely dismissed in phenomenology literature but this does not affect how individuals perceive action with the world. Examples of constructs considered in this common experience were 'entertainment-creation' (P4) and 'about the body-about the senses' (P9.)

4.13 The experience of appropriated artefacts

Control

In this study, the importance of proximity was highlighted. Proximity can be linked to Heidegger's concept of 'Ready-to-Hand' (Heidegger 1927) discussed in terms of computing by Winograd and Flores (1987). Heidegger gives us a dyadic split in the world of objects, they can be 'Present-at-Hand,' merely there and part of the world around us. One is aware of these objects but individual relationship with the world is concerned with action. An object that is 'Ready-to-Hand' is immediately employable by us with little or no cognitive effort. An object that is 'Present-at-Hand' is simply there and would take consideration and effort to employ in action with the world. Items that are proximal and ready to be employed in achieving a goal are 'Ready-to-Hand.' The use of these objects is without conscious consideration.

As well as physical proximity, proximity is perceived as whether an object reflects values and meets individual needs. This type of conceptual proximity links to

appropriation and personal identity (Akah and Bardzell 2010). This study has also highlighted proximity as a sense of desire and attainment. Objects that are desired are distal but those that have been attained or obtained through achievement are proximal. It is argued in section 2.6.1 that appropriation is linked to control and the experience of proximity affords control. This control is not only the ability to deny use through ownership and attainment but is also deft control through the object being "ready-to-hand" and familiar in practice.

Ensoulment

One of the common experiences highlighted was named commodities and things following Borgmann (1984) who discusses the idea that commodities present an end product whilst separating people from the means of production. This is the concept of massed produced, homogenised products being perceived as commodities whereas crafted objects are perceived as things. Turner and Turner (2012) demonstrate that emotional attachment endows the perception of artefacts with the properties of a thing. This process can be termed singularisation (Ahde 2007) or ensoulment (Blevis & Stolterman (2007)).

Affordance.

Another common experience elicited in this study was named 'thinking/doing.' This demonstrates the importance of action or considering action. The ability to act with objects is linked to affordances (Gibson 1979) and the relationship with the affordances of objects is phenomenological. That is, affordances are perceived mentally as part of the experience of an object. Affordances are not physical characteristics of objects; affordances are linked to how objects are perceived in terms of use.

4.14 Conclusion

Three very distinctly different approaches have been taken to gathering data that have made it possible to scope the nature of appropriation. Fieldwork at The Public revealed the importance of appropriation through repurposing or creative misuse. The investigation at Inspace demonstrated that affordance coupling might be an important part of the experience of interactive art, it is important to discover whether this is a common experience of interaction with technology. In the investigation of #unravel a

close personal relationship with the artwork was revealed, the participants interviewed can be argued to have ensouled the piece, understanding it as an important part of their relationship. The repertory grid study revealed aspects of the experience of appropriated objects, namely Control, Ensoulment and Affordance; further studies will explore whether these are common phenomena.

These three different studies allow us to form some form of signposting to the nature of appropriation. By studying from these various points of view repeating patterns that demand further study have been established. Repurposing is linked to perceiving alternative affordance and establishing control over an artefact. Audiences appear to take pleasure in understanding how an interactive piece works, this is linked to perceived affordances and they establish personal relationships with objects. Finally Control Ensoulment and Affordance were revealed as common themes in the experience of everyday appropriated objects.

The sandbox computer game Minecraft is an arena that is rich in appropriation and it is to this game that this thesis now turns. The subsequent chapter describes a series of interviews with adult Minecraft players. These interviews revealed the nature of appropriation with screen-based applications.

5 A Naturalistic Study of Minecraft™

This chapter follows from scoping studies described in the previous chapter examining appropriation from three distinct points of view. These studies elicited three main common properties of appropriated objects:

Control

Ensoulment

Affordance

The following chapter focuses on the game Minecraft. Anecdotal observation of young people playing the game had highlighted an environment rich in appropriation. Minecraft has a high cultural cache, possibly more than most other games and offers an interesting arena for study. At the time of the study, Minecraft was popular amongst young adults and students at Edinburgh Napier University provided a willing and suitable study group.

The study describes attempts to tackle the questions:
"What is the nature of appropriation?"
"How is appropriation manifested in a computer mediated environment?"
"What are the constituent parts of appropriation?"

Appropriation is demonstrated in Minecraft through players' personalisation and care over their environments. This chapter will begin with a brief introduction of the game and its relationship to appropriation. Appropriation within and of Minecraft will be covered, moving on to describe a qualitative study undertaken with players of Minecraft. Themes that were elicited in this study were Loss of time, Survival Mode vs Creative Mode, Minecraft as a social space and Empathy. Once these themes have been discussed, they are compared with the properties that emerged from the scoping studies described in Chapter 4.

This chapter concludes with an emphasis on the social nature of appropriation. It is argued that ensoulment is triggered by feelings of control over ideas and objects. These feelings of control are produced through affordance coupling, which, in the case of Minecraft is communicated over social media to others through the act of appropriation.

5.1 Minecraft for the uninitiated

5.1.1 The game

Minecraft is a game produced by Mojang, an independent game developer that was purchased by Microsoft for $2.5 billion (Stuart and Hern 2014). Mojang describe it thus: "Minecraft is a game about breaking and placing blocks. At first, people built structures to protect against nocturnal monsters, but as the game grew players worked together to create wonderful, imaginative things" (Mojang 2013). The game has few set goals and is used as an environment in which people can act as they choose within specific constraints.

One of the notable aspects of Minecraft is the manner of its development. From inception, Minecraft has been iteratively developed utilising player feedback (Duncan 2011). The close relationship between the developers and players has led to the games' designers becoming minor celebrities. The game is currently available on a number of platforms including Xbox and claims over ten million purchases of the desktop version alone (Mojang 2013).

Minecraft is played within algorithmically generated worlds. These worlds attempt to produce a facsimile of a natural environment with areas of land and sea, different types of forest, mountains and other phenomena. The environment and everything within it is constructed out of blocks giving the game a distinct aesthetic. Minecraft enjoys a wide range of merchandising deals and its simple graphic style has entered common cultural lexicon.

Once a player's avatar is spawned into a Minecraft world the imperative is to build a shelter before nightfall. At night, various monsters will appear attempting to kill the player's character. Should a player's character die, it will lose any items it has been carrying.

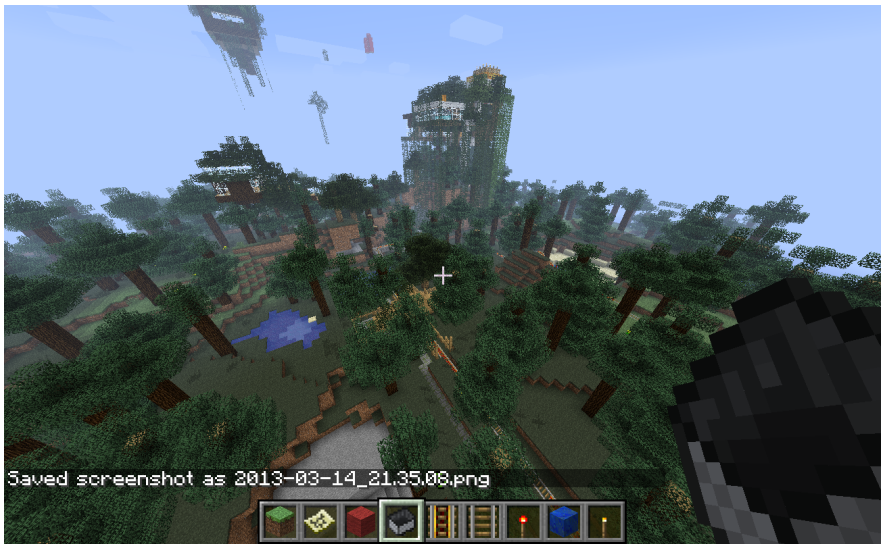

Figure 5-1 A typical Minecraft environment with player built structures in the background.

5.1.2 **Modes and affordance**

Minecraft is played in three distinct modes known as Creative, Survival and Adventure. Adventure mode was developed for a specific type of play and is discussed later. This section will concentrate on Survival and Creative modes, as these are the modes most play is conducted in. In Creative Mode players have all and every possible item available, meaning they are free to build with any material with no issue of resource. In Creative Mode players have freedom of movement, their characters are able to fly and there are no monsters. In Creative Mode it is argued that everything within the game can be viewed as 'Ready-to-Hand.'

In Minecraft's Survival Mode players must gather resources to be able to undertake any activities. As players progress through the game, they gather more materials allowing them to construct tools and more complex objects. Many of the materials players use are available either as ores or as stones underground. To be able to gather these items, players must mine. Strict recipes are used to allow players to create

various objects. As an example, it is possible to make glass to place in windows. In order to make glass a player must present nine blocks of sand and four blocks of wood to a furnace. Players must have previously constructed a furnace from eight blocks of cobblestone.

Some items, for example diamonds, are more rare than others. The complex relationship between items in Survival Mode means that players are aware of the affordances of items. As an example, gathering enough diamonds affords the construction of a more efficient pick that affords easier mining and resource gathering. There is an extensive wiki that provides recipes for each object within the Minecraft universe. It is posited here that playing in Survival Mode is analogous to having items 'Present-at-Hand.'

5.2 Appropriation within Minecraft

This thesis has argued previously that the phenomenon of appropriation is manifested within acts of customisation and personalisation and is the act of making something one's own. Regular players of Minecraft build highly complex mines and shelters. These shelters are elaborate in construction and decorated with pictures on the walls; players invest a great deal of time in producing personalised environments. Using Minecraft in a community of young people with high functioning autism, Rizzo (2012) tells us "Participants feel in charge of the world they create through *Minecraft* because they 'own' it" (italics and parentheses from original).

The development environment of Minecraft allows for alteration and modification and there are many community-developed mods available. Mods range in complexity from introducing new items such as a satchel, to creating complete playing environments such as the Doctor Who client mod. A popular mod that was used by two of the interview participants is Tekkit, which introduces automatic machines to Minecraft. Players are keen to share their creations on community websites such as Reddit and Facebook. Activities such as this can be viewed as evidence of social appropriation (Postigo 2008). It is claimed (Tong 2011) that sharing through YouTube videos are a major contributor to Minecraft's success. In fact, it is reported (Owadenko 2014) that Minecraft fan videos have received over 31 billion views.

Figure 5-2 A room in a Minecraft dwelling

The affordances of objects enable players to appropriate available items in increasingly creative ways. One notable appropriation is the creation of a model of the Starship Enterprise –D™ after the Star Trek: The Next Generation™ television series. A video walkthrough of this project was uploaded by user Halnicholas to YouTube on 27th September 2010 and as of 10th March 2015 had gained 12,576,979 views. Halnicholas introduces the video stating "I really don't play Minecraft like other people." The video was included as an example of uses that surprised the developers in the official documentary (Owens 2012). This YouTube video has inspired many imitations and has been succeeded by ever more grand facsimiles of real and fictional environments such as cities from popular books and television programs.

Another notable appropriation is the creation of a working mechanical computer within Minecraft. This construction employed Redstone, an official item within Minecraft. Redstone enables the construction of mechanical circuits including logic gates. The Minecraft computer can perform simple calculations and includes 150 bits of RAM. Another example of appropriation is the creation of player-invented games. One of the most popular is Spleef. Spleefing has been adopted by many players and is a competitive activity between players. It is a game that involves breaking blocks under opposing players' feet in order to cause them to fall into lava. The appropriations listed above have been shared across a variety of social media channels. They have all been imitated and become well known creative acts within

the wider Minecraft community. Spleef has been adopted as part of the official Minecraft experience and its rules and instructions on building official arenas have been adopted into the Minecraft wiki.

5.3 Reflexive Appropriation of Minecraft

This discussion moves on to consider reflexive appropriation of Minecraft. The term reflexive appropriation is used after Giddens (1991) who discusses reflexive appropriation as the use of knowledge and understanding to gain power over an object or idea thereby appropriating it. Minecraft has been adapted and repurposed to perform tasks other than a game. In this section, specific examples will be discussed.

The first notable example is that of Yogscast, a dedicated YouTube channel that began life as a Minecraft commentary channel. The appropriation of Minecraft here is not technological per se but as a source of income. The popularity of Yogscast is such that the channel owners and presenters were able to turn the production of Yogscast into a full time profession. The channel has since branched out to discuss other games and popular culture events.

Minecraft Teacher is the pseudonym of Joel Levin, a computer teacher from New York City. Mr.Levin initially appropriated Minecraft as a teaching medium in his school; his ideas have since been taken up internationally. Subjects that are taught through Minecraft include History, Geography, Mathematics and Science. This appropriation is so successful, a company known as MinecraftEdu™ has been established producing an official education version in collaboration with publishers Mojang. The education version has its own custom mod, which can be purchased from MinecraftEdu.

Minecraft is often used to produce scripted adventures. One example is the Hunger Games. These scripted adventures run in much the same way as more typical computer games where players have to solve puzzles and make decisions that affect the progression of a narrative. When players initially developed these games, there were distinct issues in the fact that people who were not the creators could change or

destroy parts of the games in Survival and Creative Modes. In order to afford this type of game play, Mojang introduced Adventure Mode on July 7 2010.

5.4 A study of Minecraft

In order to understand individual experience of Minecraft, a study was undertaken with regular players. Six interviews between 25 and 45 minutes were conducted. Participants were encouraged to either bring their Minecraft worlds or images of their creations to show the interviewer. All participants signed informed consent forms and had the study explained to them as directed by University ethics guidelines. In many of the interviews there were technical issues that did not allow the worlds to work in the expected manner. In many instances participants were so busy trying to get their worlds to work, they appeared to lose the sense that they were being interviewed.

All but one of the interviewees were undergraduate students in the School of Computing at Edinburgh Napier University. All participants were in their early twenties and are or were regular players of Minecraft. The first interview was a joint interview conducted with a male and female who played Minecraft together. The other five interviews were individual, four were males and one was female. Interview 3 was a repeated interview after recording equipment failed in an initial attempt.

The interview was semi structured allowing themes to emerge through the process of interviewing. The interviewer had some familiarity with Minecraft and had personal experience of seeing family members playing it but understanding of the game was limited. The first interview was joint at the participants' insistence as they were keen to demonstrate their world together and was used as a rough guide for conducting further interviews. By examining what these players considered was important led to the interviewer being able to introduce similar concepts to see if they were of consideration to other participants.

5.5 Coding and themes

Each interview was transcribed and then examined; the method of examination was in the form of repeatedly listening to the recordings and reading the transcriptions. This repetition allowed patterns to emerge and coding took the form of identifying recurrent themes in the experience of playing Minecraft; for example the interviewees all regularly mentioned 'playing with friends.' These potential themes were then reviewed and consolidated. The potential themes 'playing with friends' and 'elaborate pranking' were grouped into the theme 'Minecraft as a social space.'

Five major themes were exposed, themes that are considered major are those that were discussed by three or more participants. These five themes were termed:

- **Loss of time**
- **Survival Mode vs Creative Mode**
- **Minecraft as a social space**
- **Common resources and common practice**
- **Empathy**

Edited portions of the transcripts related to codes are available in Appendix v.

5.5.1 **Loss of Time**

A sense of loss of time is a common phenomenon related to playing video games. Players often perceive a feeling of a loss of time in games as positive, ascribed to relaxation and a way of escaping everyday stress. Loss of time is also associated with enjoyment and immersion within games (Wood et al 2007). Loss of time and relaxation were mentioned in interviews 1, 3, 4 and 6 intimating that this is a common experience in playing Minecraft. Loss of time and this type of immersion are related to discussions on Flow (Csikszentmihalyi 1992).

Lundgren and Björk (2012) describe certain types of activities within games, including Minecraft, as 'pottering' or 'calm flow.' They describe this as "Feeling in control of the game, however without being stressed, frustrated or bored." They discuss pottering in terms of game play without tension although tension is seen as a necessary component for Flow (Csikszentmihalyi 1992).

5.5.2 **Survival Mode vs Creative Mode**

All participants discussed Creative and Survival Modes. There is a lack of tension when playing the game in Creative Mode and the interview participants demonstrated an awareness of the implications of this. In Creative Mode players are not in danger from monsters and they have any and all items Ready-to-Hand. Participants discussed the types of play different modes afford. P1 in Interview 1 refers to Creative Mode as 'cheat mode' and there is a definite sense that playing in Survival Mode is the 'proper' way of playing. In fact P2 in Interview 1 was so incensed by P1's use of Creative Mode, she destroyed all the constructions he had made with a large explosive. This act of destruction is put in perspective and the participants argue that because the items were 'cheated' in (i.e built in Creative Mode) they were of little value and would not be something P1 was proud of.

The participant in Interview 2 discussed the concept of using Creative Mode, referred to as Sandbox Mode, in order to freely build large constructions. He and his friends' motivation was to build an attractive and inviting public area for other people to visit. What Creative mode affords here is the ability to prepare a large area for play without having to spend time gathering materials or running the risk of being killed by monsters.

For the participant in Interview 3 using Creative Mode is not an issue except that it affects his achievement score. The developers of Minecraft introduced the concept of achievement on April 19th 2011. Players gain achievements for killing monsters and performing certain tasks, achievement is a cumulative score, completing certain achievements make other new achievements available.

The participant in Interview 4 associates Survival Mode with personal attainment and satisfaction. For her, the act of gathering large amounts of wool and the plants to dye them with are an intrinsic part of the construction she is most proud of.

The participant in Interview 5 also associates Survival Mode with attainment, telling us "it's a lot more like gratifying" and intimates that there is a 'proper' way to build structures in Minecraft.

The participant in Interview 6 makes use of Creative Mode when using the mod Tekkit in order to afford him more free play. Later on he tells us that switching to Creative Mode during Survival play is 'just cheating, that's just cheap'. There is a strong sense of when it is appropriate to use Creative Mode and when it is not.

5.5.3 **Minecraft as a social space**

Technology appropriation as social collaboration is discussed in section 2.6.1. All participants discussed social activity within Minecraft. For P1 in Interview 1, Minecraft was boring on your own. The participants in interview 1 do not play on large collaborative worlds with strangers, which they attribute to having to establish common rules and communication.

For the participant in Interview 2 building and sharing with friends is an essential part of the experience of Minecraft. The participant in Interview 3 does play alone but prefers to play with friends because it's 'more fun.' The participant in Interview 3 also discusses how Minecraft is an excellent medium to socialise with a geographically separated friend. This participant uses Minecraft and games like it to relax and 'potter' (cf. Lundgren and Björk 2012).

The participant in Interview 4 does engage in solo play but also plays with friends. For her, there is a financial barrier to playing cooperatively. Playing Minecraft on servers is only possible with high bandwidth Internet connection. Servers also take resources in terms of having powerful machines permanently connected and demanding regular maintenance. When she mentions Survival Games, she is discussing the type of games that are played in Adventure Mode.

The participant in Interview 5 initially indulged in solo play but describes this as boring. He then tells us that he does not enjoy playing with strangers. The participant in Interview 6 has purchased the Xbox version of Minecraft in order to continue his relationship with his long distance girlfriend when they are physically separated. This is notable because he also laments some of the restrictions of the Xbox version but is prepared to make the trade off in order to 'join in.'

Social play in Minecraft is also demonstrated by what has been termed, in this study, as 'elaborate pranking.' Players will expend a great deal of time playing elaborate practical jokes on each other. The participant in Interview 2 discusses spending up to 2 hours designing and building a trap for his friend. What is of note here is that it is felt to be appropriate behaviour because they are such close friends. Because these pranks are played on private servers, the server administrator can reset the server to a previous configuration, effectively nullifying the effects of the prank. It is interesting that the participant in Interview 2 discusses the fact that his friend would not reset the server if the participant had been pranked. This intimates a hierarchy amongst those who play on servers and those who manage servers. This type of pranking is sociable and is different from what has become to be termed as Griefing[1].

The participant in Interview 3 initially describes an elaborate prank where a player's avatar is encased within blocks. This action is performed when the player is AFK, Away From Keyboard. When the player returns to the game, their screen is black and they perceive a fault of some kind. For this participant, pranking someone is fun when victims do not notice until the last minute. The participant in Interview 6 also discusses setting traps for his friends. He tells us that he has not witnessed anyone getting upset with this type of behaviour.

[1] Griefing is the act of going onto public servers and destroying artefacts or abusing other players. It is the specific term in Minecraft for Trolling, the act of deliberately creating nuisance or disruption in online environments.

5.5.4 **Common Resources and Common Practice**

Minecraft has a strong community and there is a wealth of shared resources. The participants in all interviews discussed common resources. The participants in interview 1 discuss the fact that they had got bored with Minecraft but new features released in the Tekkit mod renewed their interest. They cite YouTube as a source of ideas and inspiration.

The participant in Interview 2 discusses searching YouTube, specifically Yogscast, discussed earlier. This participant specifically discusses learning an idea for a game similar to the popular game Battleships. Sharing of ideas and practice are strong themes within Minecraft. Both the participants in Interview 1 and 6 used the Tekkit mod and both had built automated quarries and sorting machines. Participants 2 and 6 had built similar traps to each other. There are tutorials on creating machines on Yogscast, both tutorials last just over 19 minutes. Building the quarries and machines demonstrate an investment in time but are not as involved as one might be led to believe. The majority of development and invention is in those that create the mods that afford these practices. The participant in Interview 3 creates Spleef arenas for social play with friends. To be aware of Spleef and able to build 'official' arenas demonstrates immersion in the social communication of Minecraft.

The participant in Interview 4 seeks out and plays Adventure Mode games on other peoples' servers such as Hunger Games. Hunger Games is a highly popular server in Minecraft and claims to have 2 million players as of February 2013 (McPVP.com 2013). The similarity in participants' play demonstrates a high receptiveness to social media. YouTube is referenced in Interviews 1, 5 and 6 and Yogscast is specifically refererred to in Interviews 2, 4 and 6 although in Interview 6 it is referred to as BlueXephos, which is the name of the Yogscast main YouTube channel. Reddit is discussed as a resource in interviews 3, 4 and 5.

5.5.5 **Empathy**

In four of the interviews (1, 3, 5 and 6) there was a discussion of empathy shown toward NPCs (Non-Player Characters) and animals in Minecraft. There is no question

that the participants are fully aware that they are playing a game and they are sympathetic to the irony of their feelings. Never the less, their moral objections and feelings of distaste are genuine. The male participant in Interview 1 has encased a cow within the internal structure of a machine. This machine then provides him with an infinite milk supply. The female makes it clear that she is not involved with the machine and believes the act to be cruel.

The participant in Interview 3 discusses his issue with imprisoning villagers, game generated NPCs. A basic Google search for prisons in Minecraft show that they are a popular type of structure in Minecraft. There are many prison adventure servers available. His opinion on imprisoning NPCs is that it is cruel; he is also surprised at the level of effort that would have to be expended to herd the villagers into a prison.

The participant in Interview 5 finds killing animals so distasteful that he does not eat meat in the game. He states that though he eats meat in the real world, he will not kill animals in virtual worlds for moral reasons. For the participant in Interview 6, his friend's act of pouring lava on a group of villagers was amusing but evil.

This study provides an overall picture of Minecraft players who tend to prefer playing with their friends. Popular practices within the game are building large personal structures that act as homes for players' avatars. Players also collaborate on large structures and either play team sport type games or enjoy playing elaborate pranks on each other. Minecraft is also perceived as a medium for successfully maintaining geographically separate relationships. Players spend time on social networks seeking ideas and how-to guides. Successful customisations and impressive structures are rapidly shared through the community. This leads to a large amount of similar constructions being repeated.

5.6 Mapping the Themes onto the structure of previous findings.

The three main common properties highlighted in the study on appropriated objects were:

Control

Ensoulment

Affordance

What follows is a discussion of the five themes extracted from the study into Minecraft and their relationship to the properties highlighted in the study on appropriated objects.

Loss of time

Generating a sense of time loss is seen as a desirable effect in games (Sweetser & Wyeth 2005, Wood et al 2007). This phenomenon, known as autotelic experience (Csikszentmihalyi 1992) or unconscious action (Gallagher and Zahavi 2008) should be expected if studying a successful game. The sense of a loss of time and active engagement (Turner 2010) are seen as desirable within interaction with computers. Engagement and loss of time can be linked to the control property from the study on personal possessions, what is argued here is that engagement and appropriation, through proximity are linked. This is an important point to be highlighted and demands further investigation. This study has revealed that autotelic experience is created through a complex amalgamation of control and the successful translation of affordances into actions. There is also a close link to proximity and control, without control interaction is at risk of breakdown (Winograd and Flores 1987), interrupting autotelic experience.

Survival Mode vs Creative Mode

The relationship between Survival Mode and Creative Mode and the concept of 'Ready-to-Hand' and 'Present-at-Hand' has already been discussed. 'Ready-to-Hand' was linked to the property of Control in the scoping studies. In the scoping study,

Control in terms of proximity was also related to desire and attainment. The participant in Interview 4 discussed attainment in her satisfaction from collecting the wool to build her house. It is posited here that the property of Proximity and the experience of Survival Mode are similar.

There is a general consensus amongst players that playing in Survival Mode is the 'correct' way of playing Minecraft. Players gain satisfaction from gathering and producing individual items. The effort and care in making an item in survival mode produces an artefact perceived as a Thing. This would intimate that items produced in Creative Mode are perceived as Commodities. In corroboration of this perception, in Interview 1, the female participant felt within her rights to destroy everything the male participant had built in Creative Mode. This further demonstrates that the experience of Proximity can create the experience of a Thing.

To create an object in Survival Mode takes a great deal of understanding of the affordances of different objects in Minecraft. These affordances are expressed through what are called craft recipes. An example of a simple craft recipe for a bed is in Figure 5-3. To build a bed, a player needs to combine three blocks of wood with three blocks of wool. More complex objects require combinations of objects and recipes.

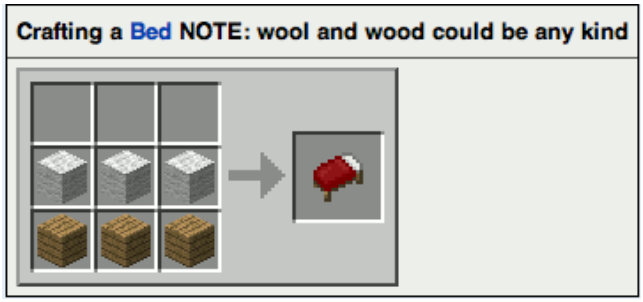

Figure 5-3 Crafting recipe for a bed, screenshot from MinecraftWiki

The male participant in Interview 1 discusses the detailed understanding required to build a large-scale item. These players use a wiki to gain the knowledge they need. It can be argued that the construction of objects in Survival Mode is a demonstration of reflexive appropriation through knowledge and understanding, as described by

Giddens (1991). In literature, appropriation has been linked specifically to control (see section 2.6.1). In the studies in Chapter 4, the link to control of artefacts was presented in terms of proximity. It is argued here that the control exercised over objects in Survival Mode, produced through knowledge and understanding is a trigger for appropriation.

Ensoulment is presented here as a manifestation of appropriation through the experience of a Thing as opposed to a Commodity. Control over an artefact through proximity triggers ensoulment, therefore a feeling of control over an artefact is an essential component for ensoulment.

Minecraft as a social space, Common resources and common practice

These two themes are manifestations of the same phenomenon, namely the social aspect of appropriation. The common property Affordance was presented in the study on personal possessions. It was argued that this property is related to affordances or the understanding of potential action on an object.

Giddens (1991) gives a striking example of an affordance not being recognised until demonstrated. He discusses a person who had never encountered a ladder. This person could not perceive the ladder as anything more than a structure of sticks with holes until he saw another person using the ladder. In the scoping study discussing personal possessions, the Affordance property was linked to action. In a small sample of Minecraft players, similar structures and ideas manifested; this would imply that these players gain affordances through social media and later translate them into use. It is also possible to map this property to the act of gaining and communicating understanding witnessed as a part of the experience of #unravel. By seeking out other players' appropriations and practice in Minecraft, it can be argued that players gain new understandings of affordances. This transformation of affordances into use is a manifestation of control through understanding.

What is demonstrated here is that appropriation can be a form of communication. The concept of appropriation as communication was discussed in section 2.6.2. The sharing of appropriations and ideas are a means of communicating amongst players.

By sharing appropriations, a player communicates a form of knowledge and understanding. This endows another player with a new form of power and control over the act of playing Minecraft.

Empathy

The high level of empathy demonstrated by players was a surprising result and demands further investigation. The discovery of this phenomenon begs the question of whether this happens only in this type of game. This phenomenon may well be an effect of appropriation but investigating this would be beyond the scope of this current study.

5.7 Conclusion

This study was conducted in order to understand the experience of exploring an appropriated computer mediated environment. It has been established that Minecraft is individually appropriated, evidenced in players' creation of highly personalised environments. It has also been shown that Minecraft is socially appropriated through the production of mods and sharing across multiple social media platforms.

Minecraft is also reflexively appropriated, used as a source of income, a teaching tool and a gaming environment. Minecraft's structure of collaboration and community has allowed consumers and developers to develop and form the software through reflexive channels. What has been discovered through the interviews conducted is that players actively seek out and replicate appropriations by other players. These appropriations are communicated through social networks. This sharing of concepts and activities acts much in the way that Dawkins (1976) describes the propagation of memes.

What has been shown is that communication, through appropriation is in the form of perceived affordances. These affordances are understanding and knowledge that afford other players' appropriation of Minecraft. This concept of appropriation as communication works specifically with the literature on appropriation in art and

social studies; it is also a manifestation of abduction and the semiotic transmission of affordances described by Magnani and Bardone (2008).

It can be argued that within Minecraft, the placing of a piece of wood on the ground can be termed a simple affordance but to turn three blocks of wood and three blocks of wool into a bed is a complex affordance (Turner 2005). In order to gain control and understanding over the complex affordance of bed making, players must couple the simple affordances of wood and wool together. A number of examples have been discussed of people coupling (Dourish 2003) these simple affordances in surprising manners thereby appropriating Minecraft. This then is the experience of appropriation in Minecraft, coupling simple affordances and then communicating them to others.

It is believed that some answers to the question "What is the nature of appropriation?" have been exposed. What has been highlighted is the nature of ensoulment as a composite of appropriation. Through the previous study, this study and literature, ensoulment is demonstrated as a phenomenon of gaining control over ideas and objects by making them directly and personally relevant.

To answer the question "How is appropriation manifested in a computer mediated environment?" Appropriation in Minecraft at least, is demonstrated as the communication of unexploited affordances. It has been shown in the literature that this is also true of the communication of ideas in art.

To examine "What are the constituent parts of appropriation?" This study has demonstrated further links between appropriation and control, ensoulment and affordance.

The challenge now is to examine the act of appropriation 'in the wild' within an interactive art environment and this is the focus of the subsequent chapter.

6 Return to Animo

6.1 Animo

The original study of The Public, described in chapter 4 revealed many nuances of the use of Animo that demanded further study. The complexity of the interactive reveals notable participant behaviour in both using and interpreting a public piece of work. Figure 6-1 below is a diagram of Animo constructed after the initial study at The Public and can also be found in chapter 4 as Figure 4-5.

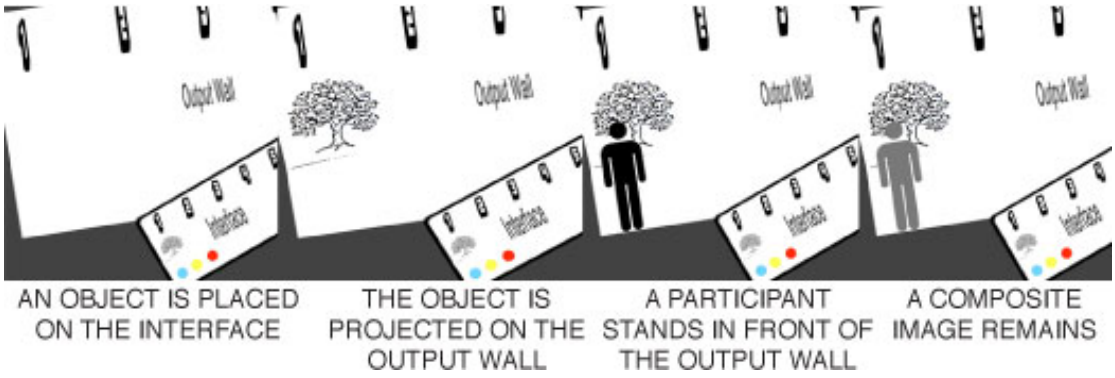

Figure 6-1 A diagram describing interaction with Animo

Animo was initially created as a method of producing seven framed animation sequences. The concept was to create a large facsimile of an animation flipbook. Participants are able to construct amalgamated pictures with objects placed on a table. These objects are projected enlarged on the output wall. A participant is able to take a picture with the enlarged projection creating a combined picture. Participants are able to make seven individual pictures.

It has become clear in these studies that Animo is not immediately intuitive. This is shown repeatedly in the data gathered with many potential participants being unable to gain any satisfactory results. Attempts to make Animo work ranged from simply pushing the start button and watching without actively participating to being very active but not noticing essential composite parts of the piece. There are several concepts to understand to gain an outcome that is perceived as fully satisfying. This

is termed here as distributed affordances and attempts will be made to describe them in detail. Figure 6-2 below is a screen shot from the study conducted, participants' faces have been pixelated in order to preserve anonymity and the picture has been numbered to aid description.

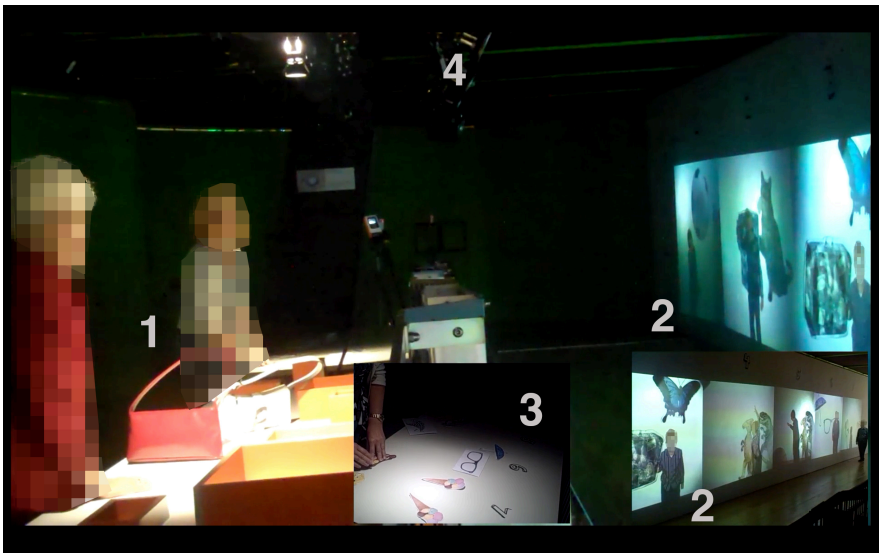

Figure 6-2. A screen shot from the study. The director stands at 1, the actor at 2, images are manipulated at 3, cameras and lights are at 4.

Animo is intended as a collaborative activity with at least one person, termed by The Public's website as the 'Director' stood at 1 and another person, the 'Actor,' at 2. The director has access to the start button and the primary table, shown in close up at label 3 where images are placed. The director places and manipulates images on the table (3) and the actor positions herself in front of the output wall (2) in order to produce composite images.

At the time of this study, Animo had only one button, pressing the button commences an automated process and audio instructions. Each of the seven images is taken in turn and populates the wall. Creating a satisfying image series takes cooperation between actor and director. It is possible to use Animo alone but it is a difficult activity. The position of the director is physically raised above the actor and the floor at position 2 is significantly sloped, forming part of the ramp through the building.

This creates the opportunity for a spectator's view at 1 and large groups, sometimes as many as ten, often form to watch proceedings and wait their turn.

6.2 This study

This study was conducted between the 28th August 2013 and 1st September 2013. A return visit was made to The Public with the express purpose of investigating Animo, as discussed in chapter 4, in more detail. The dates were chosen to coincide with English school holidays and the building was significantly busy. Overall traffic flow in The Public had dramatically increased because of a large amount of development around the building including the construction of a large shopping centre that was connected to the building by a pedestrian piazza. The timing of the study was also crucial, as it had just been announced that the building would be closing in early November to be turned into a branch of Sandwell College. This meant that it would likely be the final opportunity to study work in The Public.

This study involved placing four video cameras at various vantage points around the interactive. The video recorded on these cameras afforded a comprehensive view of interaction around the exhibit. Cameras were placed in plain sight and each had a red light indicating when they were recording. It was evident that participants were aware of the cameras as they were often commented on or gestured at. In fact there were times when the cameras were mistaken as part of the interactive and some participants attempted to manipulate the cameras, not noticing the table control. The cameras used were Cisco Flip Cams, these are specific hand held video cameras. Three of the cameras were early, standard definition (SD) models and one was a high definition (HD) model. The cameras were placed so that the HD camera captured an overall view whilst the SD cameras were placed to give close up details of specific sections of the piece. In total, just over 8 hours of video was recorded.

In order to inform participants of the study, information notices were used explaining that the cameras were in place for a study. These notices were placed at both entrances to the interactive and one on the secondary table. The investigator was in attendance and clearly visible wearing a University staff badge at all times. Only one person expressly requested that they not be recorded, they indicated this by holding a

piece of paper in front of their face and stating “no pictures,” any recordings of that person and their family has been deleted. When people did ask about the nature of the study; after a brief explanation, they were told that videos would be stored securely and would not be made publicly available. They were also told that any pictures shown would take steps to ensure people could not be recognised.

The aim of this study was to investigate complex interaction in the wild with a specific focus on appropriation. Questions asked in this study were:

Effective use of Animo is complex and understanding its various nuances is hard, how do participants make sense of its operation and what aspects, if any, do they enjoy of their experience with the piece?

In the initial study, described in chapter 4, appropriation in terms of repurposing has been witnessed on this piece. How common an occurrence is repurposing and how important is it to a satisfactory experience of Animo?

What can we learn about the nature of affordance from a complex interaction such as Animo?

6.3 Welcome to the Animo Experience

Once the director pushes the button on the table, Animo runs through an automated process and audible instructions. The entire sequence takes three minutes and twenty seconds.
The audible instructions have a specific script and Animo progresses thus:

> “Welcome to the Animo experience.”
> “To begin making your image, go to position one.”
> “Get Ready.”
> Beeping noises are used to signify that a timed activity is occurring and a countdown appears on the wall.
> The noise of a camera shutter sounds, this is accompanied by a flash.
> “Move to position two.”

"Get ready."

Beeping noises signify a timed activity is occurring and a countdown appears on the wall.

The noise of a camera shutter sounds, this is accompanied by a flash.

This then repeats until position seven.

Once all the images have been taken, each image is highlighted in turn with all other images darkened, each image highlight is accompanied with a 'popping' sound.

The entire sequence is briefly displayed.

The wall is darkened and the words "The End" are displayed on the wall.

The interactive returns to its rest state.

6.4 Affordances and roles

It is important here to revisit the issue of affordances as discussed in Chapter 2. It is Turner (2005) who discusses the distinction between Complex and Simple affordances. Simple affordances are the direct visceral affordances described by Gibson (1979). Complex affordances have diverse descriptions and Turner (ibid) draws these together through Ilyenkov's concept of significances and the ideal and Heidegger's concept of familiarity. Turner argues that it is understanding through significances and familiarity that allows individuals to cope with interaction with the world.

Simple affordances in Animo are discussed below from the point of view of both the Director and the Actor. It would be counter productive to discuss every simple affordance, such as the table affords standing on, and only those relevant to the operation of Animo or observed being exploited are outlined below. What is important to conceive here is that there are more nuanced concepts for both participants to understand and engage with in order to achieve a satisfactory result from Animo. These nuanced concepts are Complex Affordances. The notion of a satisfactory result is entirely subjective; one of the vignettes shows a family having an extended enjoyable experience without any notion of how to use Animo in its designed manner. What is encountered in Animo is an amalgamation of varied concepts and affordances in order to create a desired result. In order to cooperate

fully and create images together both Actor and Director have to navigate these concepts together.

Actor and Director have different physical positions affording different points of view over Animo. Their shared motivation is to create amalgamated images from images on the table and the Actor. In order to create satisfactory images they must cooperate and as an example, it is important to consider the concept of positioning the Actor in relation to the camera. The affordance of the camera is to take a picture, it can be argued that this is a Complex Affordance as, not only is it mediated through the camera but also the automatic process of Animo, with no direct user control. In order to get a satisfactory image, both Actor and Director need to understand and cooperate where to place the image on the table, and thereby the wall, in relation to the Actor. Everything must be successfully negotiated within the time constraints of Animo's automated process. One could be reasonably expected to understand this by familiarity from repeated use.

It can be argued that the overall affordance of Animo itself is the production of a series of amalgamated images. In order to successfully navigate the process of producing these images, Director and Actor need to sequentially understand and cooperate through a number of other affordances distributed throughout the space. This is in a sense drawing a number of affordances and uses together into a conceptual package; the process Dourish (2003) describes as coupling.

6.5 Distributed Affordances

The term, distributed affordance has been proposed (Verborgh et al 2013) to describe dynamically creating representation in web-based hyperlinks, tailored to predicted preferential user needs. In this study, the concept of distributed affordances is introduced as a means of describing affordances that are distributed across physical space. These affordances are also conceptually distributed between participants, particularly Actor and Director. By generating an understanding of the physical space, the technology embedded within it and their role within the gestalt of Animo, participants couple these affordances through action and reflection.

In order to create satisfying images, it is necessary for the actor to face the camera. On many occasions it was clear that actors did not perceive where the camera was, resulting in a set of images of the backs of their heads. With the timed nature of the photograph set, this often led to directors and spectators shouting instructions at the actors who would generally look around in a confused state. This was not aided by the fact that the cameras were often positioned in a manner that caused significant incongruity between what could be expected as an output and what was achieved. Figure 6-3 below demonstrates the effect of this. To the left of the image a young boy can be seen posing directly in the centre of a picture of a pair of glasses. The second image is the composite image left on the wall and the boy is off centre to the glasses. As well as this, there is a secondary table that contains more images to select. Participants are able to choose alternative images from the boxes on the secondary table.

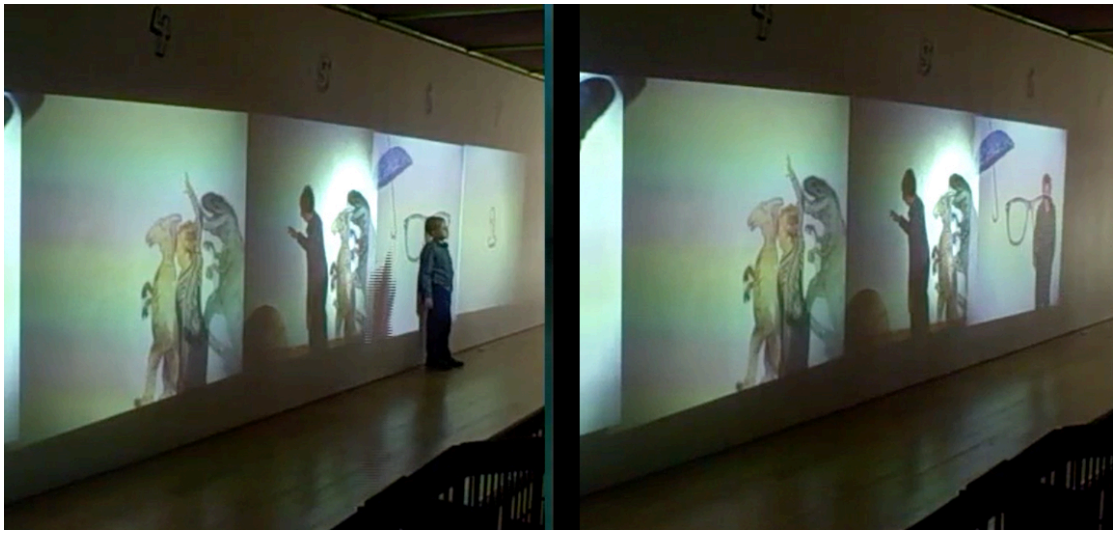

Figure 6-3 Boy and glasses demonstrating camera positioning

Creating an understanding of these distributed affordances is difficult without instruction. There are written instructions on the primary table and the audio instructions also guide participants. The button set has been reduced to one button from three; there was originally a button that made the camera shoot before the countdown finished and another that reset the interactive. It is rare that participants read the instructions and there is often an expectation that pressing the button is all that is required. The Public managed this by stationing Visitor Assistants (VAs) at

the top of the ramp who would explain the interactive to visitors. The VAs worked in shifts and some were more active in explaining than others. During the period of study confused visitors would often ask the investigator for instructions.

6.5.1 **The Director's role**

Simple Affordances:

The table affords leaning, the pictures have movability and the button affords pressing. The director's position affords an overall view of Actor and Output wall.

Complex Affordances:

The director is expected to understand that anything placed on the table will appear on the wall. Signifiers used are corresponding numbers on the table and the wall. When an image is expected on the table, lighting above the table is darkened and a spotlight shines on the area of the table where an image should be placed. The director is also expected to understand where actor and image should be positioned to create a satisfying image.

6.5.2 **The Actor's role**

Simple Affordances:

The only simple affordance is that the wall affords leaning. The Actor is in a position where nearly all affordances are complex ones.

Complex Affordances:

The actor is expected to understand that the director has control over positioning the table images. They are also expected to understand where to stand and when to pose. Signifiers are numbered positions on the wall and a countdown that appears on the wall next to the frame they are standing in as well as audible beeping noises to indicate something is about to happen, just before a picture is taken.

6.5.3 **Rest State**

In its rest state, depicted in Figure 6-4 below, Animo has a demonstration of its possibilities displayed on the wall. The welcome images are the type of image series that can be created and make use of text and positioning, they also depict images of

the director's hand interacting with the actor. The primary table is often cleared at the end of the day and is left blank.

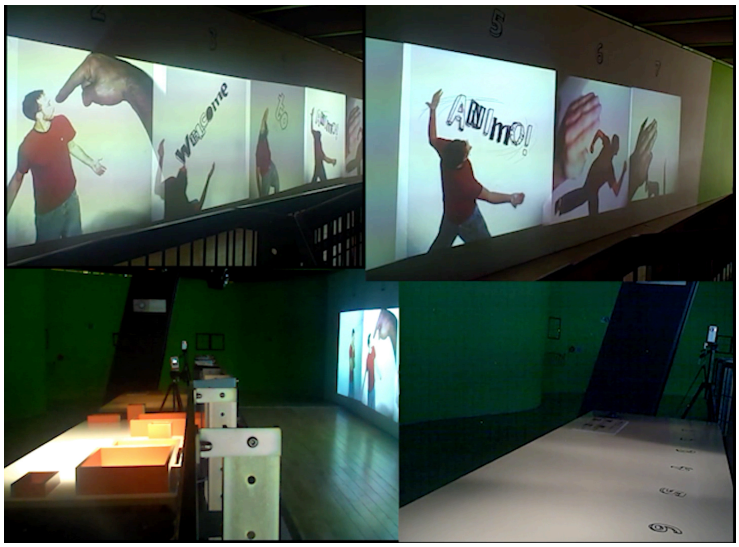

Figure 6-4 Animo in its rest state

This investigation attempted to take an approach that invaded on normal activity as little as possible. This meant that when the table was clear it was left clear and when participants left images behind on the table, they were not moved. Participants clearly found it very difficult to ascertain the affordances of Animo when it was blank and this led to some very interesting data being produced. When the investigator was asked to provide instruction, the instructions given were clear and to the point but limited whilst remaining respectful.

6.6 Data

The approach to interpreting the video data follows guidelines from Gjedde and Ingemann. Initially, where multiple views were available, they were amalgamated into one overall video affording a complete view across the space. Once this was managed, the videos were edited into sections; these sections were edited periods of activity with any long periods of inactivity either cut out or significantly speeded up. The initial intention was to edit and subtitle all videos captured but given the sheer volume of data this was not possible.

The approach taken was to edit the videos into smaller vignettes where individual action was taken. When suitable, vignettes have been given a descriptive title but many of the titles are in the form of date and time recorded. This was difficult in many cases because the prominent position of the work makes it social and collaborative. Many of the edits are very long, demonstrating extended interaction as groups wait and take turns to participate.

In total, eight edited vignettes informed this study totalling 1 hour and 47 minutes. These vignettes are listed below with a brief summary:

Long Sequence Recorded on the 28th August 2013 1300 – 1400 duration 42:06
This vignette, which is an excellent example of extended social use and turn taking, is discussed below.

Rude Boys Recorded on the 28th August 2013 between 1300 and 1400 duration 05: 26
This short vignette shows two boys engaging in disruptive behaviour, including deliberately moving the investigation cameras.

Incidental Recorded on 28th August 2013 between 1500 and 1630 duration 13:01
This vignette is an edited series of people walking through Animo without actively taking part. This includes a young boy who expresses a wish to interact but is discouraged by the woman accompanying him.

Group of Youths Recorded on 28th August 2013 between 1500 and 1630 duration 09:28
This vignette is discussed below. It shows a group of young people enjoying interaction with Animo. Their final act is to remove all items from the primary table and engage in a series of group portraits.

Family Recorded on 28th August 2013 between 1500 and 1630 duration 17:53
This vignette is discussed below. It shows a family having an extended enjoyable interaction with Animo despite not knowing it's canonical operation.

Once they establish the canonical interaction, they ignore this and construct group portraits.

Guided Group Recorded on 29th August 2013 between 1000 and 1130 duration 07:28
In this vignette, two women have Animo demonstrated to them in the course of a guided visit.

Grandmother/Daughter Recorded on 29th August 2013 between 1250 and 1320 duration 02:53
In this vignette a young girl and a mature woman interact with Animo. This recording happens at the end of the camera's recording session and is cut short.

Young Mother Recorded on 30th August 2013 from 1130 duration 08:46
This vignette is of a young mother interacting with Animo in the canonical manner. Two mature women observe and engage with the mother who takes on a role of demonstrating the interactive to them.

Families Recorded on the 1st September 2013 1100-1230 with a duration of 33:40.
This vignette shows protracted use from two families, neither of whom understand that they are expected to place items on the primary table. One family returns and make the association with images on the table, this then prompts understanding from a third family. There is an interesting manifestation of the code 'sabotage' where a young girl removes an image from the table to deliberately frustrate the actions of a young boy.

Four specific short vignettes are focused upon in this chapter, **Young Mother**, **Group of Youths**, **Family** and **Long Sequence.** These four vignettes have been selected because they reveal the major patterns of interaction that were observed in this study. Where other vignettes supported coding, this is discussed. Full narrative descriptions of these vignettes are available in Appendix vi, the text below concentrates on interpretation.

6.7 Vignette 1 - Young Mother

In this vignette a mother operates Animo on her own, taking the role of both actor and director. Two mature women actively spectate and interact with the mother, Animo is revealed as a pleasurable spectating experience. What we witness is the cross-generational role of the mother whose main motivation appears to be to help her daughter enjoy Animo and the mature ladies who are keen to spectate and understand but not actively participate.

This vignette demonstrates several points to be understood from Animo. Firstly, it is possible to operate Animo alone though difficult. The mother demonstrates an awareness of the narrative expectation of Animo but does not specifically attempt to create this. She also struggles with camera positioning and timing. Animo is initially encountered by a couple who demonstrate an unwillingness of some people to actively engage with Animo. Two mature women demonstrate an eagerness to understand but not participate; they also highlight the fact that spectating Animo is an enjoyable experience itself. Observing the male from the initial couple physically leaning back it can be postulated that his reluctance to participate may be a familiarity with technology. For a person whose main experience with electronic media is a television, pressing a button and leaning back is a familiar action. It is speculated that the mother's motivation is more to entertain her daughter and help her engage with Animo rather than directly engage with it herself, this point becomes more pertinent later in this study.

This vignette established the following codes:
'lean back button pushing'
'just pushing'
'lone operation'
'getting it'
'understanding positioning'

6.8 Vignette 2 – Group of Youths

What is observed here is group activity with Animo revealing social activity and repurposing. What is of note is the lack of verbal communication between director and actor. In this vignette, there are two young males cooperating in the director role, one of them carefully plans his pictures, an activity that is common practice. He also uses the physical nature of the table and his body to lay claim to the director's role.

In this sequence of actions a female takes control of the group, giving verbal instructions. The group are possibly using their actions to help form group identity and project this in the similar poses they adopt. They are interested in each individual image but not in the series as a whole. Though this is speculation, their silent common goal at the start of this sequence would hint at some form of discussion away from Animo. The only verbal communication is constrained to instructions and participants pointing themselves out to each other. This would suggest that they are more interested in their own images than the interaction itself. The lack of verbal communication also demonstrates an assumption that other participants understand their role within Animo. If the activity is plain for all to see, a simple or visceral affordance, there is no need to explain it.

This vignette established the following codes:
'claiming images'
'looking ahead'
'creative misuse'

6.9 Vignette 3 – Family

This vignette specifically demonstrates how hard it is to establish how to work Animo in its canonical form. A family repeatedly interact with Animo, over a period of fifteen minutes. There is considerable confusion over which way to face and where to stand in order to construct a satisfactory shot. Rather than explain how to stand, family members shout instructions such as 'turn around' or 'closer'. The father is content to spectate until his daughter calls him into shot but once he becomes aware of the primary table, he and the mother become actively engaged in the process.

Before becoming aware of the relationship between pictures on the table and the wall, the family decide to completely ignore the pictures and make family portraits.

The family are engaged with and enjoying Animo. They press the button and go through the sequence a total of five times, only stopped by someone else establishing their turn. In fact they ignore the first couple's attempts at politely establishing a turn. Their interaction lasts fifteen minutes and thirty seconds overall, a long period for a public interactive. It takes them a long time to fully understand Animo's affordances; this is a ramification of their entry from the ramp contra to the canonical direction.

There is an interesting consideration to be made as to why the father takes so long to make the association between the images on the table and the wall. The father naturally takes up a director's role by spectating and giving instructions. He becomes actively involved when called in by the daughter to make family portraits. Once the father does establish the role of the table he becomes an active participant, choosing images and moving them into position on the table. When they make the decision to ignore the images on the wall and just make family portraits, they once again expose a willingness to repurpose Animo.

What is posited here is that Animo affords group portraits, this can be considered a simple affordance, albeit constructed from an amalgamation of complex affordances. The only action required to make group portraits is to press the button and there is no requirement for a person to take up the director's role. Group portrait activity has been witnessed on three separate occasions, namely the first visit (chapter 4), vignette Group of Youths and this vignette; it is coded as 'Group portrait.'

This vignette established the following codes:

'Shadow play'
'Not in shot'
'Scaffolding'
'Watching waiting'
'My turn: table touching'
'My turn: verbal claim.'

‘Passing down’
‘Souverniring’
‘Group portrait’

6.10 Vignette 4 – Long Sequence

Perhaps the most pertinent observation to make in this vignette is a lack of verbal communication. The dominant female states that it is hard to explain and chooses to allow her friend to understand it by interacting with it. What verbal communication there is is to negotiate the production of images. A single person in a group usually takes charge, giving instructions to the rest.

When there is no one waiting, participants often take more than one turn and it is through interaction that they establish how to use it successfully. When Animo is crowded, groups such as the original family will take a turn and then acquiesce control to another waiting group. They will then wait for another turn. The act of sabotage is an interesting activity showing an inventive way of playing with Animo, whether for fun or spite.

A revealing action is the boy’s request to “do a scary one.” The young girls in the original family have considerable difficulty in understanding the nuances of Animo, possibly because of their young age. However, they show clear understanding when asked to look frightened of the dinosaur and this is one of the more successful images. The boy was spectating their actions and when it is his turn, he asks several times to “do a scary one.”

As different groups take turns they regularly transition between roles as spectators and participants. What is witnessed is a type of collective construction of the optimal image series through acts of micro creativity (cf. Bryan-Kinns 2014). As people take turns, they will make a conscious decision to either emulate the panel from the last group or reinvent it. As an example, the first image holds a picture of a smiley face for the first three interactions, which is replaced with a birthday cake by one group. A young girl in this group successfully creates an image where it appears that she is blowing out the candles on the cake. From then on the cake remains in this panel. As

different groups take part they edit and change different elements to suit their actions. In this way each group edits the images into an optimal series built from the available images. The pressure of large numbers of groups waiting turns means that it is rare in these situations for people to plan or take their time. Planning behaviour is more common when participant groups are alone.

This vignette established the following codes:

‘Sabotage’
‘My turn: wall claim’

6.11 Conclusion

These four vignettes are a suitable selection to establish patterns of use with Animo. From these vignettes codes were produced that will be amalgamated here in order to establish main themes within Animo’s operation.

Theme: Turn taking

The first theme to discuss is turn taking. Queuing and turn taking are mundane social practices but the way that people establish turns in Animo is an important form of communication. From vignette 2, the codes ‘My turn: table touching’ ‘My turn: verbal claim’ manifest and vignette 3 highlights ‘My turn: wall claim.’ Table touching is specific to intra group turn taking. Physical occupation of the table demonstrates control of the interactive.

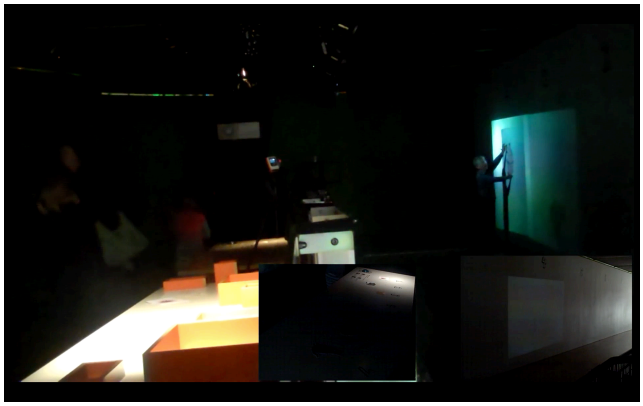

Figure 6-5 Physically claiming, this boy has taken up position despite a girl planning images at the primary table.

When a person is performing ‘lone operation,’ other participants do not approach the table. Standing at the table and moving pictures would potentially interfere with another person’s use of Animo and is only tolerated intra group. People also establish turn taking verbally and simply by standing in position, usually around the second table and once at the output wall.

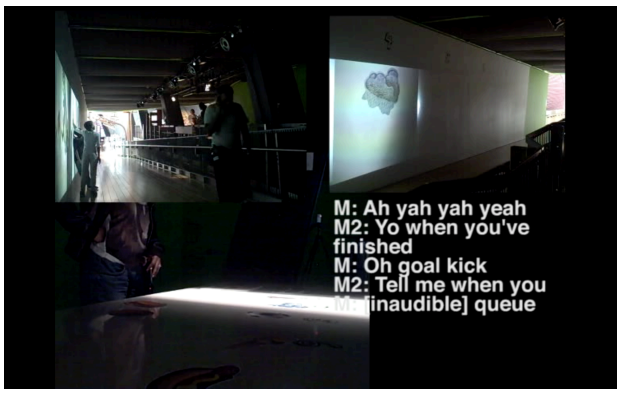

Figure 6-6 My Turn Verbal claim 1 this image and the next demonstrate a conversation between groups establishing turn taking

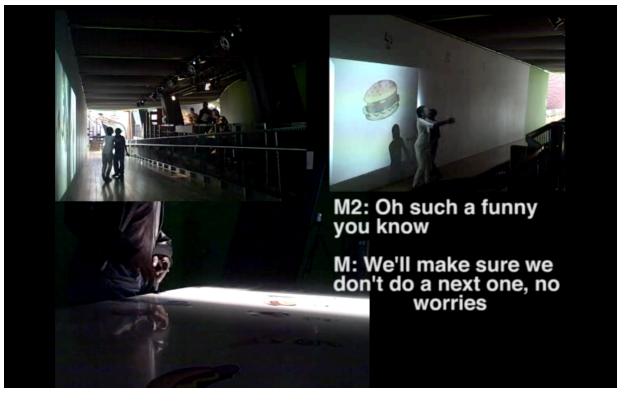

Figure 6-7 My Turn Verbal Claim 2

When people are spectating they stand around the secondary table waiting their turn, this was coded as ‘Watching waiting’ and when people are walking up the ramp they avoid getting in the actor’s way, often waiting until the sequence has completed before traversing, coded as ‘Not in shot.’ Stopping to allow someone to take a photograph is a common experience for most of us, particularly those who live in areas that enjoy significant numbers of tourist visitors. People walking up the ramp demonstrate avoidance behaviour and take great steps to not interrupt the actor.

It is suggested here that those that are currently interacting with Animo take ownership of the piece for the duration of their interaction. They project a social exclusion zone around the primary table and from the output wall that people not in their group are unwilling to invade. The convention of not invading the exclusion zone is unspoken and largely understood. Young children transgress this convention in the vignette Long Sequence. Firstly, Boy1 observes from the side of the primary table, watching and commenting on the actions of the original family. The young girls from the original family also transgress this convention by pressing the button on the table when Green Top is taking her turn. This transgression is most notable in the short vignette Rude Boys where the boys lean over a woman and girl and press the button, leading to a heated argument.

Figure 6-8 Not in shot two mature women (in centre of image) wait at the ramp entrance in order to not disturb interaction.

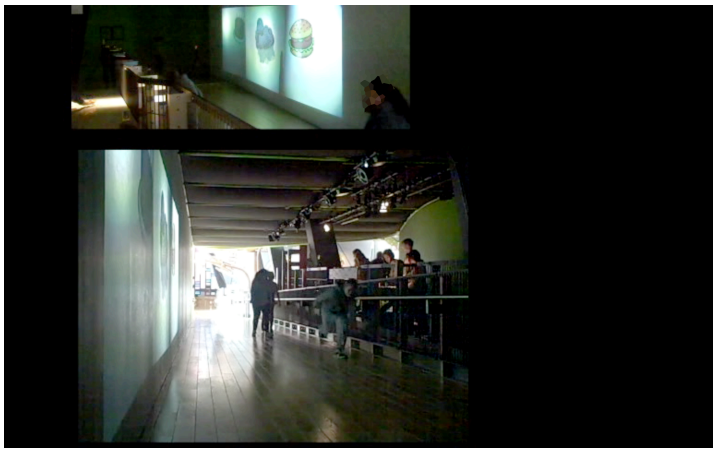

Figure 6-9 Not in shot, the people coming up the ramp walk as close as possible to the edge and the leading boy crouches to avoid disturbing interaction.

Theme: Understanding

There are several instances of people taking part in 'lean back button pushing.' What distinguishes these people from those 'just pushing' is that they stop and observe. They are clearly trying to make sense of how Animo operates; the barrier to their understanding is their unwillingness to physically explore Animo. It is possible to observe the desire to understand and the very real difficulty participants have in conceiving all the nuanced interactions. In this theme are the codes 'getting it,' 'understanding positioning' and 'scaffolding.'

Again, a lack of verbal communication is of interest. Participants seem to instinctively understand that Animo is more easily understood through observation than explanation. Never the less, attempts to explain are coded as 'Passing down.' Participants are also seen to vocalise their moment of 'getting it.' The father in Vignette 3 says "No wonder the ice cream's not in it" and the mature women in Vignette 1 also verbalise their understanding. In the text, this is described as the women making positive noises but the actual sound they make is one of comprehension that is particularly difficult to describe.

Theme: Repurposing

The code 'Group portrait' was observed in vignettes 2 and 3 and in the original study. The difference in vignette 3 was that this was undertaken before Animo's canonical operation was fully understood. The taking of group portraits appears to be a common activity and groups make a conscious decision to ignore the images on the table. This was vocalised by the girl in vignette 3, where they were not aware of the images on the primary table, "let's all just do family photos ignoring the pictures." This was witnessed in the study in Chapter 4 when the youths used the contents of their pockets and by the youths in vignette 2 when they brush the images off the table.

The only example of altering the images on the table was witnessed on return from a lunch break. A couple were lone operating, using the table and not the wall. Rather than use any images that were already on the table they used images from a smart phone. As the investigator was not present no video was captured, only a photograph taken on a phone camera (demonstrated in Figure 6-10 below). The couple were

unwilling to discuss their activity with the investigator. Lone operation itself, particularly using only the primary table, is a form of repurposing, in that the canonical use of Animo is between more than one person.

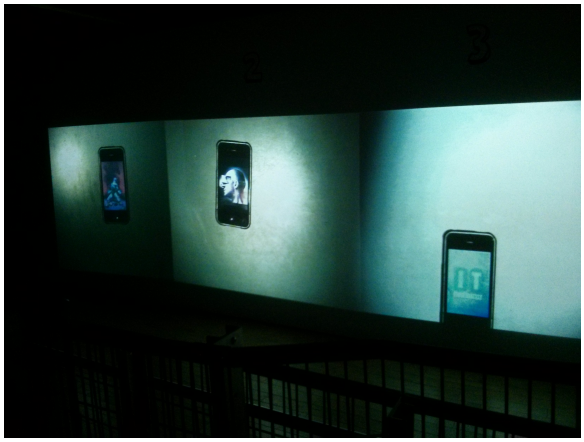

Figure 6-10 Using a smartphone on the primary table.

It is possible to argue that 'Shadow play' is repurposing though it is something that, in this study, was witnessed by people that were unaware of Animo's canonical operation. It can also be argued that not being aware of the canonical operation does not mean an artefact cannot be used or repurposed. 'Souverniring' can be seen as a form of repurposing as can 'Sabotage.' Souverniring,' taking pictures involves exploiting an opportunity to take pictures not afforded directly by Animo. This concept has complications, as in The Public's original design; you would have been able to buy souvenirs of your Animo interaction in the shop. Sabotage can be argued to be repurposing because it involves live playful interaction between actor and director, arguably something not anticipated in Animo's original design.
Perhaps the most interesting fact is how few people put their hands into images. This occurs once in vignette 3. This also happens accidentally in vignette 4 but is not followed up.

Operation of Animo

The issue of participants finding Animo hard to operate begs the question, is Animo poorly designed? This can be considered a problem but what have been discussed, in chapter 4 are the many issues faced with the design of the ramp itself. When Animo was initially designed, it was expected that participants would enter from one

direction and be guided in its use. What can be determined from this study is, even with the issues of interpretation, Animo is an enjoyable and engaging piece of work that commands protracted engaged interaction.

Figure 6-11 Souverniring, father takes photograph with telephone

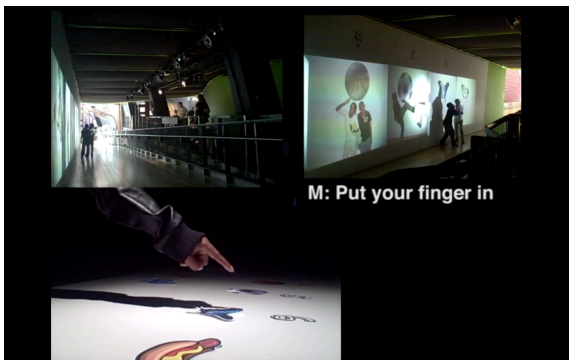

Figure 6-12 Placing a hand in the image

What this study demonstrates is that Animo is open to interpretation. Participants are keen to understand how the interactive works and will spend time physically exploring to gain satisfactory results. The amalgamation or coupling of affordances in order to make sense of Animo is different according to who is involved. Knowing or not the canonical operation of Animo is no barrier to enjoying it.

Interesting, but beyond the scope of this study is the generational differences in how participants explore Animo. Animo is a particularly interesting piece for study because it was designed for approach from only one direction, the top of the ramp, but is now approached in both directions. This means that there are few cues for those approaching up the ramp.

6.12 Questions posed by this study

It is necessary to address the questions asked in the introduction of this chapter namely:

Effective use of Animo is complex and understanding its various nuances is hard, how do participants make sense of its operation and what aspects, if any, do they enjoy of their experience with the piece?

The affordances of Animo have been discussed and affordance is an important concept in Human Computer Interaction. What this study of Animo reveals is a dialogue between both the simple affordances of the objects in the environment and the complex or coupled affordances of the environment itself. Participants make sense of Animo in terms of themselves both through their understanding of how this type of interactive works, their experiential understanding, and their motivation. This motivation is to successfully enjoy interaction with Animo. This point of motivation is crucial to this study, what is witnessed is "autopoetic" interaction. Participants interact with Animo in order to enjoy interacting with Animo. It is the appropriation of Animo, taking ownership of it and interpreting it in terms of themselves that makes the experience of Animo enjoyable and worthwhile.

In the initial study, described in chapter 4, appropriation in terms of repurposing has been witnessed on this piece. How common an occurrence is repurposing and how important is it to a satisfactory experience of Animo?

Interestingly, a repeated pattern of using Animo to create group photographs was manifest. The themes of sabotage, souverneering and shadow play have been represented as repurposing. The fact is that people interacting with Animo will develop ways of enjoying themselves even if they have not managed to ascertain its canonical operation. Referring back to the study of Minecraft in chapter 5 where appropriation was witnessed as the communication of affordances and the study of #unravel in chapter 4 where understanding appeared to be part of the experience of

interactive art. It is posited here that repurposing is a consequence of affordance coupling and making sense of personal perception of Animo.

What can we learn about the nature of affordance from a complex interaction such as this?

This study introduces a notion of distributed affordance. It has been argued that complex affordances are made sense of through coupling. In this specific piece not only are the affordances physically distributed throughout an environment but also affordances rely on the action of others to be exploited successfully. To successfully appropriate Animo and couple its affordances participants need to have an awareness of social activity. Perhaps the most surprising aspect of this is participants' reliance on tacit understanding and a lack of vocal communication.

7 Three Practice based case studies

7.1 Introduction

In the preceding chapter, a study of Animo exposed the strategies people use for understanding and employing a complex piece of interactive art. Coupling affordances was revealed as a major part of the experience with Animo. Affordances were presented as both simple and complex as well as distributed both socially and across space. This chapter discusses three artefacts that were produced during the pursuit of this PhD. As argued in section 3.8, practical exploration has made a specific contribution to these studies. It is also argued that questions of impact have to be addressed in practical research and it is only the artefacts produced that have had significant impact that are discussed here.

Each artefact will be presented in turn with a description of the artefact itself and the process of its design and production. Each piece will then be analysed in terms of Process, Invention and Relevance following guidelines from Zimmerman et al (2007). Finally, the artefacts will be discussed in terms of appropriation and their contribution to this thesis.

7.2 Aide Memoire

The Aide Memoire was born out of a series of creative sessions with Tommy Dykes, a freelance designer and PhD student at Northumbria University. These sessions involved discussions around the theme of memory and nostalgia and the construction of small working prototypes. The theme drawn on for these sessions was the concept of memory authenticity. A fictitious service company was devised that would visit, interview and record members of a family. Edited versions of these memories would be stored in a device and made available to members of that family. It was felt important that the physical object have the appearance of a family heirloom, handed down from one generation to the next. This concept drew on ideas from Mr.Dyke's previous work Talking Memories where he produced an object for elderly people to record memories. The project also drew inspiration from the work of Graham Pullin, specifically the Museum of Lost Interactions (Pullin 2010).

7.2.1 **Process.**

The Aide Memoire is constructed from out of date testing equipment shown in Figure 7-1. The large look and feel of the equipment was hoped to evoke the sense of a past that is made of mechanical, tangible technology. By the use of an embedded Arduino communicating with software written in Max/MSP the object was appropriated and repurposed.

Figure 7-1 Aide Memoire (second iteration)

The software for the device is run on a Mac mini, which is usually hidden under the table displaying the Aide Memoire. The knobs on the top of the board are connected to an Arduino microcontroller. The Arduino is connected to the Mac mini. The headphones are connected directly to the Mac mini through the box via an extension cable. There is a needle gauge on the box, powered by a servomotor, controlled by the Arduino.

The process of building the Aide Memoire was a series of regular meetings where the two designers discussed concepts of authentic memory and the idea of a physical object that embodied their ideas. Discussions explored the fact that stories of relatives in a family were likely to be more relevant if they were told by the relative themselves rather than by someone else about the relative.

The aesthetic of the product is a product of bricolage, the engineering school at Edinburgh Napier University discarded a large quantity of pre transistor equipment, and this specific box was felt to have a suitable look and feel. Sound content was sourced from recordings Mr. Dykes had already made of his family, specific interviews of both designers' family members and some samples sourced from sound archives with appropriate copyright licenses.

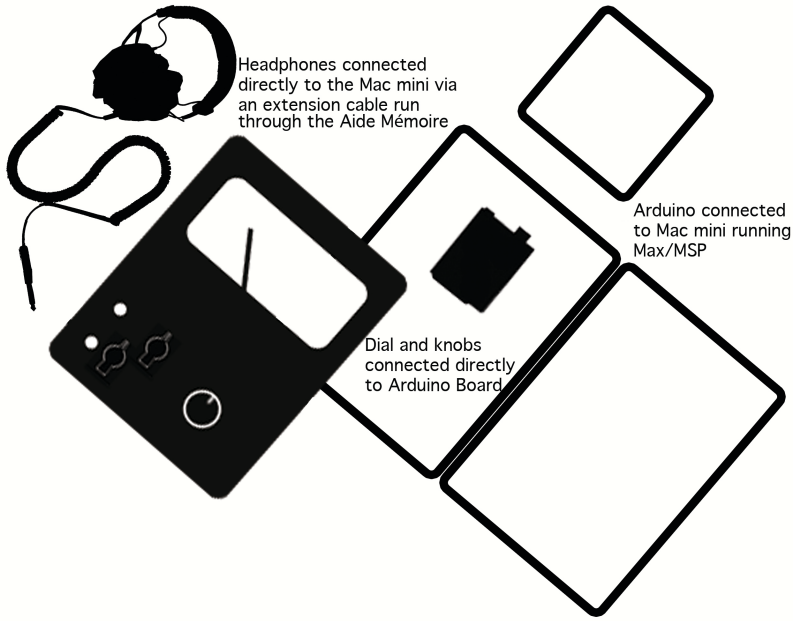

Figure 7-2 Aide Memoire schematic

Audio control software was produced by the investigator in Max/MSP and connected to a prototype interface. Both designers then took advantage of the prototypes to test and refine the interface. Once the prototype was established as satisfactory, Mr. Dykes produced the final version of the electronics and the first iteration of the piece was developed. This iteration was exhibited and both designers employed observation and gallery feedback to refine the piece.

Because this was a repurposed object it was not possible to enforce complete control over the knobs and dials. Despite there being what were considered obvious knobs for interaction, many people would try to use the connection screws to interact with the object. Participants were also more forceful than expected, for example the main tuning dial is controlled by a ten-turn potentiometer. This is a potentiometer that will turn ten times and no more, several people were observed attempting to force the dial

to turn further. Comments from participants were that the lack of visual feedback on the original device left them confused.

7.2.2 **Invention**

Aide Memoire confirmed an ability to produce high quality prototypes that would stand up to continued rigorous examination. Much was learnt about participant behaviour toward objects and the elusive nature of what a designer might consider simple affordances. One of the more surprising discoveries was the unfamiliarity of participants with the action of the ten-turn potentiometer. In the design sessions, this was felt a natural affordance because of the design team's familiarity with analogue radios and the knob's similarity to a tuning dial. It was incorrectly believed that this was intuitive; in fact it is a learnt interaction and young people who are unfamiliar with analogue radios need to be introduced to the concept.

Taking observation and comments from initial exhibition into account, a second iteration of the artefact was produced. The majority of connection screws were removed though it was not possible to remove the two on the furthest right of the box without damaging the faceplate. A servomotor was added that controlled a needle on the front of the box. The needle's movements were proportionally connected to the movement of the main dial. Finally a set of instructions were produced and placed inside the open lid of the box. Great care was taken to make the instructions in keeping with the aesthetics of the box itself.

7.2.3 **Relevance**

The first iteration of Aide Memoire was accepted to the 2009 Sonica Festival of sound and audiovisual experimental arts in Ljubljana Slovenia. The Sonica exhibition ran throughout the month of June at Gallery Jakopič in the city centre. After this event, a second iteration was constructed adding functionality. The second iteration was displayed at Create '09 held at the BCS in London and Creative Cultures '09 held at Edinburgh Napier University. The Aide memoire has also been shown at Edinburgh Mini Maker Faire 2013, 2014, 2015 and 2016 as well as appearing on Slovenian television.

7.2.4 **Appropriation**

Appropriation was an essential component of this piece. The outer form of the artefact was an appropriated piece of testing equipment. The physical interaction of using a tuning dial was appropriated from radio tuning dials. This piece specifically demonstrates issues with perceiving affordances. The affordance of a tuning dial was revealed to be a complex, learnt affordance. This artefact highlights that it is possible to appropriate an affordance though great care must be taken in how simple and intuitive the affordance is.

7.3 Homesick Aliens

The Homesick Aliens were initially produced for an event in 2010. They were developed considering the effect of narrative to engagement with technology. Five aliens were made using the soft toys known as Ugly Dolls™. A story was developed for the dolls whereby they had been discovered on Earth and were unwell. Participants would be encouraged to "code them better." Each doll has an Arduino Lilypad attached to the area where one would expect to find a humans' heart. This Lilypad was then attached to electronic devices, used to advance the story (see Figure 7-3).

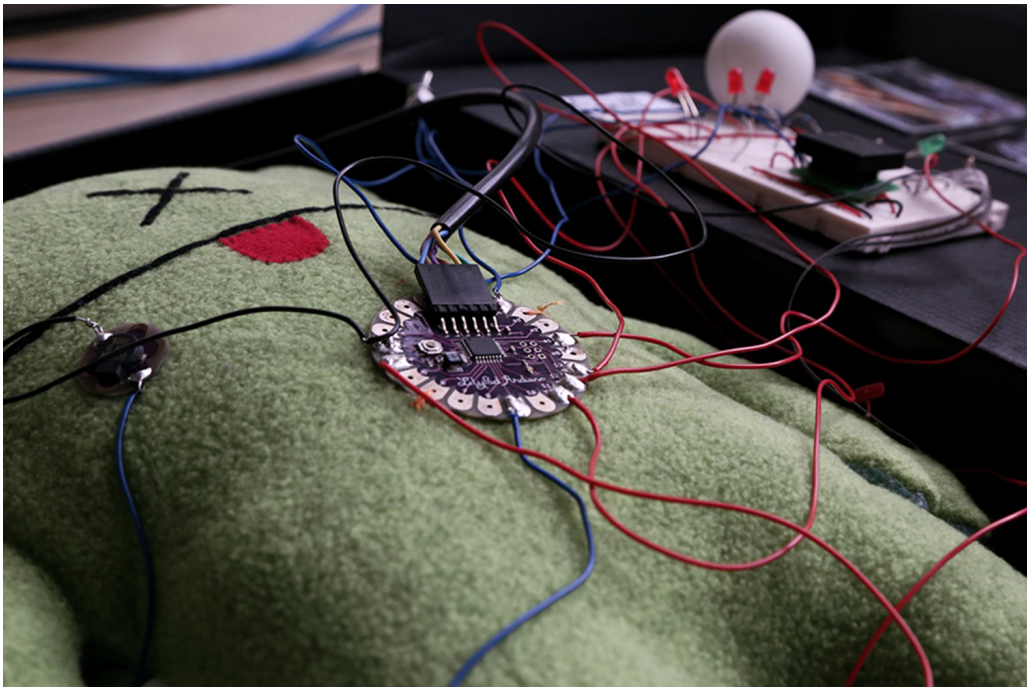

Figure 7-3 Homesick Alien

The three parts of the aliens' story is that the participant is tasked with discovering what the alien likes to eat, it's favourite colour and how to comfort the alien by holding its hand at just the right pressure. Food is emulated with RFID cards. There are several cards, each with a picture laminated onto them. Pictures were of a variety of objects, a mouse, ice cream and a pile of rubbish being some examples. By presenting the RFID card to the alien, it is possible to discover which food it preferred. Feedback is given by three red LEDS, each one will light up when a correct input is made.

An RGB LED covered with a ping-pong ball represents the aliens' favourite colour. These are presented as mysterious orbs and participants need to alter the RGB settings in code presented on a laptop. Setting the correct code makes a red LED turn on. Colour clues are on the reverse of the RFID cards and colours have to be entered in hexadecimal, affording a discussion on number conversion; conversion software is provided. With the colours on the screen, the RGB LED and the rear of the RFID card, it is possible to have a conversation about cross platform colour fidelity.

A force sensor is used to represent holding the aliens' hands. Once all three inputs are correct, a speaker sewn next to the alien's mouth produces a tune. Because all of these inputs and outputs are programmable, aliens are usually coded to "like" different things and "sing" different songs. Once a participant has successfully made an alien sing, they are then encouraged to repurpose the code and change the parameters that make the alien sing. Participants are also able to change the tune the alien sings.

7.3.1 **Process**

Production of the Homesick Aliens was a solo process, the imperative was initially to create a quick and easy entry to programming. It was believed that the form of the Ugly Dolls would be a means to quickly engage young people. Initially different forms of technology were explored whilst teaching a module in physical computing. This exploration led to strong familiarity with these technologies.

The story was developed using the various affordances of the technologies such as the RFID cards and was a method to master the use of these technologies. The first doll

was developed as a rough prototype with a view to creating a more finished piece. Once the first doll had the Arduino Lilypad attached with connected wires it was reminiscent of a person on a life support system. This view prompted the narrative and the various technologies were adapted to afford telling the story of a homesick alien.

7.3.2 **Invention**

The Homesick Aliens have proved to be an excellent medium for starting conversations with young people about physical computing. Using the narrative means that programing and computing concepts can be presented in an informal manner. The combined approach of the inputs has meant that the aliens can be adapted for their audience. For example, very young children can simply be asked to find the right food to make the alien sing.

Most people appear to engage with the dolls on sight. It is likely that this is due to the appealing nature of the Uglydolls themselves. Many people make sympathetic comments directed at the dolls; they have been dressed to appear as if they are on a form of life support machine. The combination of the doll's appearance and the life support emulation encourages anthropomorphism.

The nature of how the dolls are displayed often means that people are time constrained in their interactions. They are often in groups and will be pressured to move on. It can be argued that the dolls conform to Edmonds' (in Candy and Edmonds 2011) framework of attractors, sustainers and relators. The attractor is their physical appearance; the sustainers are the narrative and the acts of coding. The relators are repurposing and adapting the dolls through programming. People have often been witnessed returning for repeated interaction.

The use of narrative to engage people with these unfamiliar concepts is effective. The dolls stand up robustly to repeated use remaining relevant for five years and are still used in discussion at many levels. They would benefit from being complemented with a more focused study. Time and resource constraints have not allowed further study so far.

7.3.3 **Relevance**

The Homesick Aliens have been regular attendees at various recruitment events for Edinburgh Napier University's School of Computing. They have also been presented at Edinburgh Mini Maker Faire 2013, 2014, 2015 and 2016. Edinburgh International Science Festival run the Mini Maker Faire and included several pictures of the aliens in their 2013 brochure, they have also inspired a character on promotional material (Figure 7-4).

The Homesick Aliens have been used in a number of school engagement activities in primary schools across Edinburgh and its environs throughout June and July 2015. They have proved a popular and successful approach to introduce children to using the Arduino programming environment.

Figure 7-4 Promotional material from Edinburgh Mini Maker Faire used with permission.

7.3.4 **Appropriation**

Appropriation is a key factor of the Homesick Aliens, the dolls are popular soft toys and their form has been appropriated in an effort to quickly establish empathy from children. During participation workshops children are encouraged to adapt and alter the software to their own ends. It can be argued that participants appropriate the dolls in their activities. They are given the ability to exploit the affordances of the

technology through programming. This can be viewed as coupling these affordances through appropriation. Once children have performed this appropriation their imperative is to reprogram the dolls, ignoring the canonical functions and story; manifested in actions such as creating patterns with the lights and working to compose versions of popular songs from the speakers. This is appropriation through repurposing or another example of creative misuse.

7.4 Giant Eyeballs

Giant Eyeballs is an installation constructed for the Edinburgh International Science Festival 2014. This work was part of an exhibition titled Making It. Making It was held in the Grand Gallery at National Museum of Scotland from the 5th to the 20th April 2014, Ocean Terminal shopping centre from the 4th to the 19th April 2015 and The Centre Livingston Saturday 26th May to Sunday 10th April 2016. The overall aim of the exhibition was to communicate the success of Maker culture[2].

Participants interact by looking through white peepholes. A camera points at their eye and they see an enlarged image of that eye on a monitor behind the peepholes. A series of red dots are drawn onto the image of their pupil, moving as their eye moves. The movement of their pupils also affect sound files embedded in the software. Two large monitors sit on top of the stand; an embedded light sensor changes the image on the monitors as a participant puts their head up to the peephole. In its rest state (see Figure 7-9) the monitor encourages participants to "take a peek" with text, when in use, the participant's eye is projected on the monitor, often producing two eyes that move independently from each other.

7.4.1 **Process**

The Science Festival were keen to communicate the story of Temptone, a graffiti writer publisher and activist. Temptone was diagnosed with Amyotrophic Lateral Sclerosis, resulting in him being completely paralysed, only able to move his eyes. A

[2] Maker Culture is a relatively recent phenomenon that uses social media and cheap ubiquitous technology to create various products. These products are shared over social media encouraging DIY invention and creation. There is a popular magazine called Make and there are regular Maker Faires across the world where makers gather and demonstrate their work.

group of technologists constructed a method of analysing the movement of a person's pupils with a Sony Playstation camera. The instructions and software for this project were published online. In 2013 an undergraduate student of the BSc Interactive Media Design degree at Edinburgh Napier University, Artur Janas, replicated this technology to produce a comic book experience that was interacted with through eye movement.

Figure 7-5 Early peephole prototype

Figure 7-6 Early software prototype

Design of the installation began with an approach from Matt Wright of the Science Festival. Initially a cardboard box with a peephole was constructed. A camera was placed in the peephole and connected to pixel tracking algorithms and a tone generator in Max/MSP, this resulted in being able to control tones with the movements of one's eye. A series of prototypes were constructed refining the artefact over time. Yann Seznec, a renowned musician and interactive artist was approached to collaborate on sound and visual production.

Figure 7-7 Giant Eyeballs main panel

Edmonds' framework of attractors, sustainers and relators was considered from project inception. The monitors were considered the attractors, particularly with their call to 'take a peek.' The sustainer was the eye interaction itself and the relators were considered to be the narrative of Temptone and discussion of the exhibit amongst families.

7.4.2 **Invention**

One major concern in the design process was the creation of a simple affordance for the peepholes. Early prototypes had used cut out holes (see Figure 7-5) and the inside tubes from toilet rolls as peep holes. Considering the issues with the tuning interaction with the Aide Memoire, it was felt that the use of a familiar object or shape was important. Objects that encouraged and afforded peeking were considered such as cameras and binoculars and it was considered that binoculars were suitably familiar objects. In order to create the binocular shape, a second hand View-Master™ was purchased and scanned with a 3D scanner. The resulting 3D model was subsequently altered, including space for the light sensor and printed with a 3D printer. In this way the affordance of peeking was appropriated from the Viewmaster. This section will begin by describing the overall artefact and then discuss how this drew from the study conducted so far.

This artefact was produced toward the end of this PhD investigation and took into account previous investigations into appropriation. There was a desire to produce an artefact that encouraged and rewarded appropriation and these concepts were discussed with Mr.Wright in his role as exhibition designer. The role taken in this project was as the main designer responsible for the majority of the software, production of hardware and prototyping and final installation and maintenance. Mr.Wright was responsible for the exhibition as a whole and provided the final housing. Mr.Seznec produced the visuals and sound for the display within the peepholes and an early version of the user interface for control and calibration of the artefact. The overall display stand is shown in Figure 7-8 and the main internal panel in Figure 7-7.

Figure 7-8 Giant Eyeballs in use

Figure 7-9 Giant eyeballs screen in rest state

7.4.3 **Relevance**

The grand gallery at the National Museum of Scotland is a high profile exhibition space in Edinburgh that achieves a large volume of visitors. The Making It exhibition was featured on STV news and was well publicised by the Science Festival. The

2015 and 2016 display were in major shopping centres in Edinburgh and Livingston with a high footfall.

7.4.4 **Appropriation**

Appropriation of the final artefact was discussed during the design phase and it was felt that allowing the participant control through their eye movements would establish interaction as a personal event. The tracking software was not as accurate as desired, meaning that participants could not obtain intended control as discussed by Bilda et al (2008). However, this did not appear to be a specific barrier to participants' enjoyment of the work. Providing audio and visual feedback to eye movements was felt to be enough to keep people engaged.

Some observation was conducted on site and interesting repeated activities revealed themselves. No formal analysis was conducted and what follows are anecdotal observations from notes taken at the time. Many people referred to the large images of the eye as disgusting. Repurposing was observed, where some children stuck their tongues into the peephole. This then meant that their tongues would appear enlarged on the monitor. Participants resolved the issue of a lack of fine control through blinking to create sounds; this did create a more evident effect than attempting to use eye movement.

Conversations with Science Communicators manning the artefact in 2014 and observation revealed that older people were keen to gain an understanding of the technology. During observation, communicators often took advantage of having one of the designers in the location to direct visitors to for further explanation. It was clear that people needed guidance to observe the large screens and did not necessarily make the connection that the eyes on the screen were the eyes of those participating. This is described a report from Scotinform thus (the tunnel area is where the peep holes were located):

- Visitors did not tend to look up at video screens unless advised by Science Communicators to do so.
- Visitors did not spend too much time within the "tunnel" area of the pod unless the Science Communicators were engaging with them and explaining the content.

A noteworthy observation is demonstrated in Figure 7-8. All the people in this picture are from one family group and they are adopting a common stance witnessed in other participants. What was observed was a desire to interact from children. This is a common observation in interactives of any type, where children will be keener to engage. In this picture it is possible to observe a father helping the children to take part in the action of peeking. The grandparents are standing back and observing activity as a whole.

This generational relationship is reflected in the study of Animo discussed in Chapter 6. In the Animo study it was a common pattern to observe parents acting as facilitators of children's active engagement with technology and older people happy to observe others rather than taking part. Weiss et al (2009) in a study conducted with Aibo robotic dogs discuss similar findings, they link this to Norman's (2005) three levels of emotion. It is possible to consider older members of the public engaging reflectively, whereby they stand back and observe, gaining an understanding of the artefact on display. The potential conclusion then is that if it is possible to successfully design for public engagement then perhaps it is necessary to model work in this manner, allowing for cross generational activity. This implies that a successful interactive should be engaging for people to observe others, allow people to actively help younger people interact and be accessible to younger people and children.

7.5 Conclusion

Building these three interactive artefacts respond to different motivations. Throughout this study an imperative has been to create pieces to study through but it was important that these artefacts have an audience. The Aide Memoire was built as a response to creative discussions around memory and gained the required audience by

being accepted to an international exhibition. The Aide Memoire was a specifically personal piece of work that was designed for lone interaction. The experience of the artefact is difficult to share except through discussion. The overall response to the piece is positive and it succeeds in creating a reflective experience based around reminiscence.

The main discovery from the Aide Memoire was that understanding of affordances is much more nuanced than assumed. This was revealed in misunderstanding of the tuning dial. What appears to be a simple or instinctive affordance can be revealed to be a learnt affordance and it is important to consider this in design. In terms of appropriation, people did make sense of the work in terms of their situated selves but it is important to point out that the piece was built before appropriation was revealed as the main theme of this study meaning that it was not directly influenced by this approach nor assessed with this in mind.

The Homesick Aliens have proved to be a successful artefact for encouraging young people to learn to code. These artefacts have now been experienced by hundreds of individuals with highly positive results. The use of narrative and their adaptability allows participants to appropriate them fully. Young people have been witnessed appropriating the aliens by creating their own stories, using them and recoding them accordingly. These artefacts afford repurposing through coding and can be claimed to be extremely successful in their current iteration. They also encourage further understanding of physical computing allowing full control of their functionality. Their narrative and physical appearance allows children to anthropomorphise them. The affordances of the various attributes of the dolls are complex and require coupling to be fully understood. Through appropriation children make sense of the coupled affordances and discover their own ways of interacting with the technology.

Giant Eyeballs are a successful adaptation of Edmond's framework of attractors, sustainers and relators. Through observation and an official report, a great deal has been learnt about the experience of group interaction. In Giant Eyeballs there has been repeated observation of cross-generational reaction to interactive work, this has also been highlighted in the study at The Public discussed in Chapter 6. Participants' desire to understand the technical aspect of Giant Eyeballs also reflects the

observation and interview presented in chapter 3 where the artefact #unravel is discussed in terms of affordance coupling. Giant Eyballs demonstrates a successful appropriation of an affordance; that of 'peeking through' afforded by a Viewmaster and repurposed on the viewing panel.

8 The Dimensions of Appropriation

8.1 Control

Bilda et al's (2007) engagement model reveals control as an important attribute in the creation of creative engagement placing the interaction mode Intended/In Control as a central theme. To understand this point of view it is necessary to examine Bilda's work, built from a series of investigations with interactive artwork. What was shown in Bilda's study was the slow revealing of what he terms as dialogues between participant and art piece. In his model, participants gradually learn how the piece responds to their interactions slowly gaining understanding and control over the piece. In this way, the mode Intended/In Control is reached when the behaviour of the work appears predictable to the participant. Bilda encourages the producer to try to establish when this mode is reached and then program in uncertainty and unexpected results. In terms of what has been discovered in this PhD this can be read as the participant perceiving the coupled affordances of the work, gaining control over its operation. Once control has been reached, uncertainty or unpredictable behaviour can be understood in terms of the disclosure of new affordances or understanding. It was highlighted in the studies of #unravel, Minecraft and Animo that discovering and communicating new affordances is an important pleasurable experience with technology.

For Csikszentmihalyi (1992) control is an essential component for Flow and for Heidegger gaining control makes objects Ready-to-Hand, this is control as virtuosity. To the novice, a piano is not much more than an object with which to create resonate sounds, the piano affords making pleasant noises and practice. However, for the expert player a piano affords a great deal more, such as employment. Although it may seem obvious, this difference is important, control through virtuosity discloses affordances of an object that are not available to others. This is also manifested in Minecraft where virtuosity has enabled the use of Minecraft as an education tool and source of employment for those who run Yogscast. Virtuosity and control is exposed in those playing Minecraft where they describe loss of time, a manifestation of engagement. When playing Minecraft, control through virtuosity enables one to continue playing without breakdowns or being pulled out of the Minecraft world.

Tactics to maintain this type of virtuosity can be witnessed in the production of games for Xbox where buttons on the controller perform the same functions allowing players to develop expertise with one controller affording quick entry into any new game.
It is possible to posit then that control is an essential component for appropriation. Control enables appropriation in terms of making action with an object part of a repertory of automatic action. Control in terms of possession enables one to decide who may use an object and when. Virtuous control of an object is a method for disclosing alternate affordances of that object.

8.2 Ensoulment

Ensoulment is the act of endowing an object with personal relevance. This thesis has already discussed Borgman's device paradigm at length in section 2.6.1 and it is through ensoulment of an external object that it is made it our own.
Phenomenological experience can only ever be subjective and a person can only make sense of the world in terms of personal relevance. This is exposed specifically in the relationship between skateboarders and the Undercroft at the Southbank "The Undercroft has culture, tradition and joy ingrained into the very materials from which it was created and we, as skateboarders, not any outside authority, made it that way." (Powell in Blayney 2014 p.11).

Ensoulment is an important aspect of the experience of appropriation and is a part of how it is possible to exercise control through ownership. Were the external object not ensouled, one would not care who used it and in what manner. The couple that played Minecraft together interviewed in Chapter 5 highlighted the importance of ensoulment in their experience of playing the game. Items that were not ensouled, created in Creative Mode were of no value and could be destroyed with no fear of retaliation. Ensoulment is a specific characteristic of the Homesick Aliens established through narrative. Reports of their effectiveness are anecdotal but young people do engage with them very quickly, commenting on how 'cute' they are and endowing them with names. This appeal is appropriated from their form as Ugly Dolls and by making them individual it is an effective tool for engaging with young people.

Ensoulment is manifest in requests for souvenirs from Animo, people use the interactive and then ascribe personal meaning to the output, hoping to keep a copy. In the #unravel interview the couple had developed a relationship with the interactive making it an important experience within their own relationship, this ascription of personal meaning to the piece is understood here as ensoulment.

Through customisation and decoration, ensoulment is communicated and it is customisation of everyday technology that is considered an important aspect of modern technology. Ensoulment is employed to indicate and manifest control over an object; it is how a person can demark one similar object from another and communicate ownership.

8.3 Affordance

Affordance has been discussed at length and is a central theme in this study. Affordance was highlighted as a component of the experience of personal possessions where constructs concerned with action were revealed. Relationships with objects are bodily and personal, concerned with what can be done with them. The discovery and sharing of affordances is an essential component in experience with technology. This has been demonstrated in the experience of playing Minecraft where it was argued that discovering new affordances is an essential construct in the experience of the game. This discovery and communication was also witnessed in the extended study of Animo where participants were aware that use of the piece was hard to ascertain and would offer to explain it to each other.

In the extended study of Animo distributed affordances was established as an attribute of the piece. Affordances were distributed throughout the space and actor and director were expected to understand the effect each other's actions would have over the final output. What was interesting here was the reliance on tacit understanding, there was little verbal communication, and participants relied on each other directly perceiving the activity and their actions within it. Animo is straightforward to understand by watching others use it but it is direct personal experience of affordances that truly enables a person to appropriate them.

Affordance was exposed as an important property of the Aide Memoire where the designers made assumptions regarding simple affordances. The Homesick Aliens exploit the affordances of various sensors to create a narrative; once participants successfully complete the exercise they are able to appropriate the affordances of these sensors themselves. This use of narrative then can be shown to be a method of disclosing affordances to participants allowing them to exploit the affordances themselves. In the design discussions around building Giant Eyeballs, the creation of an affordance of peeking was felt to be important; the solution was to scan and print an adapted Viewmaster™. Kaptelinin (2013) uses the Holmes stereoscope, which was later adapted into the Viewmaster as his prime example when discussing affordance. Similar to the manner that Ziff (2006) discusses the appropriation of Che Guevara's image to communicate non-conformity; in a similar manner, affordance of 'looking through' was appropriated from the Viewmaster.

The dimension of affordance linked to appropriation is the experience of intentions toward an object. This has been described as a 'call to action' in the discussion of Animo and this thesis aligns with Norman (Date unknown) when he corrects himself to redefine his discussion of affordance as perceived affordance. However the affordance of an interactive environment is more complex than those that are easily described, affordance is strictly bound within context (Heft 2003) and personal intentions. This means that the phenomenological experience of affordance is related not only to bodily shape but also to the understanding of what can and ought to be acted upon an object.

8.3.1 **Distributed Affordances**

This thesis posits a concept of distributed affordance and its implications on design. This notion was described in the discussion of Animo in Chapter 6 where affordances were distributed across space. Not only did one participant need to be aware of the affordances of their own situation but also the ramifications of the other participant's actions. This can be considered a kind of social affordance but in the context of Animo the physical separation of participants is an important factor. Heft (2003) points to Michotte's (1963) work on phenomenal causality, Costall (in Thinès et al 1991 p.58) tells us "causality can be seen." Michotte's studies were concerned with

perceiving the causal actions of one object on another but his findings relate here. Michotte discusses the structural organisation of perception and how individuals can perceive one action affecting another, something he claims to be primitive and non-derivative (Michotte in Thinès et al p.98).

The consequences of actions and intentions to act are bound in the intentions and actions of another. That these distributed affordances are directly perceived is evidenced in the communication strategies employed by participants. Participants relied on tacit understanding from each other and would use bodily movement, gaze and vague instructions to communicate their desires and intentions.

8.3.2 **Affordance Coupling**

In this study the act of affordance coupling and its relationship to the pleasurable experience of digital technology has been a central theme. To reiterate, the concept of coupling is appropriated from Dourish (2001) and is discussed in detail in section 2.4. In this section, drawing from Turner (2005) a distinction is made between complex and simple affordances. Simple affordances being those directly perceived and complex affordances those constructed from amalgamating a number of simple affordances. It can be argued that coupling is the process of perceiving the individual complex affordances of objects and cognitively drawing them together. In this way the collection of complex affordances transforms into a simple one. All studies have revealed an association between appropriation and affordance and this is evidenced in the fact that appropriation through ownership directly disrupts affordance.

A common appropriation of Animo was witnessed, employing it as a means to create group portraits, demonstrating a manifestation of coupled affordances. What this indicates is that once the operation of Animo has been understood, its complex affordances are coupled into one simple affordance. Through this process Animo transforms from a collection of pictures, tables, buttons and cameras into a machine for taking group pictures. Through appropriation and the coupling of affordances participants are able to perceive what Animo is for.

Minecraft players are perhaps the most evident examples of engaging with affordance coupling. As shown in Chapter 5, one of the main experiences of playing the game is

discovering and sharing affordances of objects. It is true that these objects are virtual and as such have no physical manifestation but affordances are represented in recipes to produce new items from a collection of others and in new ways to exploit Minecraft blocks. The example of Halnicholas' Starship Enterprise™ model spawned a raft of imitations, until Halnicholas posted his video, most people had not considered Minecraft as a means of recreating models or environments from fictional worlds but once this was realised then the game was transformed.

What Halnicholas had managed through appropriation was to perceive an alternative affordance for the Minecraft environment itself. His knowledge and understanding of the software endowed him with the control he needed to explore Minecraft without consciously seeking affordances. Halnicholas coupled the complex affordances of the various objects and interpreted them as a means for producing a model. Perceiving alternative ways of employing Minecraft are evident in the examples of Minecraft Edu, Yogscast and the adoption of Spleefing.

8.4 The questions posed by this thesis

"What are the dynamics of appropriation?"

Appropriation is composed of a complex relationship between control, ensoulment and affordance.

Control can be understood as the deft manipulation of an object. Experience and an ability to have control over an object is a means of exposing alternative affordances of that object. Ownership of an object also allows control over its use. Ensoulment is the establishment of a specific relationship between a person and external objects.

"What is the relationship of appropriation to affordance?"

Affordances are the experiential relationship between people and objects concerned with action with and through the object. Appropriation is closely linked to exposing alternative use by perceiving alternate affordances.

Appropriation is a means of coupling affordances, simplifying complex activities around us. It is through appropriation that the collection of cameras, tables, pictures and other technology that make up Animo are not perceived in the complex separate affordances of each composite part but are coupled into a meaningful aesthetic experience.

How do individuals experience appropriation?

Appropriation occurs when a person perceives an alternate affordance of an object. Once this affordance has been perceived it is transformed into use. The moment between appropriation and use is fleeting and hard to establish but appropriation transforms the experience of objects.

Appropriations are communicated between people. Communicating appropriation allows people to establish ownership; my laptop affords many things but only to me. This is the communication of ensoulment, a specific relationship between the object and the person. Ensoulment establishes ownership and control over an object. Control in terms of virtuosity is another method of exposing affordances of an object that are not available to the casual user.

8.5 The contributions of this thesis

This thesis has contributed to understanding of both appropriation and affordance and a clear link has been established between these two phenomena. It has been demonstrated that the discovery and communication of affordances is an essential component of the aesthetic experience of interaction. A dynamic relationship between appropriation and action with and on the world has been exposed. Appropriation occurs when a person perceives new affordances of an object and transforms them into use. Appropriation is also the end result of coupling complex affordances; the example used here is the transformation of Animo from the individual affordances of its components to an aesthetic interactive piece.
From the studies of Animo, a notion of distributed affordances was introduced where the ability of people to appropriate complex affordances distributed across space was highlighted. Not only are opportunities for action reliant on the manipulation of objects in other areas of the space but there is also a social cooperative dimension of this activity.

The composition of appropriation has been shown to include control, ensoulment and affordance. Control is as much to do with the ability to use or deny use of a resource, as it is to do with skilful manipulation of that resource or artefact. Ensoulment is the internal manifestation of personal significance to an external object. Ensouled artefacts can take many disparate forms including artwork that is on public display, architectural space and mass-produced objects. It is affordance that is revealed as the dominant principle of the composite of appropriation. Appropriation is concerned with intentions toward and exploitation of external artefacts. Without perceiving the affordances of these artefacts people would not be able to exploit them.

This thesis has provided some sensitising information providing a possibility to consider and potentially design for appropriation. Though Dix (2007) claims this as an oxymoron an approach is tentatively offered. Much as it is not possible to design experience, only the data for participants to produce experience themselves, this is similarly true for appropriation, however it has been revealed that appropriation is concerned with the disclosure and discovery of alternate affordances. In this way it is possible to consider the design of systems to be sensitive to this act of appropriation. A system that reveals its opportunities for action that is discoverable may be a uniquely successful system. It has been demonstrated that the communication and discovery of alternate affordances (appropriation) is at the very heart of the aesthetic experience of interaction.

Whilst this thesis is unable to offer any strict guidelines to design it can provide sensitising concepts. Where this discussion turns now is consideration for further work highlighted by this thesis.

8.6 Opportunities for further study

8.6.1 **The constituents of appropriation**

Expanding the understood constituents of appropriation and examining their relationship to each other is an area that will provide a good quantity of high quality data. This study has initially exposed a structure composed of control, ensoulment and affordance. Control has already been derived from notions of proximity and it is important to establish the nature of this experience in more detail.

The experience of ensoulment is a rich area and it has already been argued that it can involve a plethora of external agents. Further studies on this phenomenon can provide important areas for study. It could be questioned here whether ensoulment might expose the nature of the phenomenon of empathy discovered in the study in Minecraft. This is a demanding question and could prompt the pursuit of data in the experience of virtual worlds.

Further to this the nature of affordance is an already established arena for study and this thesis provides some contribution to that understanding. What is pertinent here is the argument that appropriation is the coupling of complex affordances. This phenomenon could potentially have boundaries that can be tested empirically and a study of this type can expose the accuracy or otherwise of this declaration.

8.6.2 **Further investigation of distributed affordance**

This thesis begs inspection of the notion of distributed affordance that was posited in the study of Animo. It is clear that there is a phenomenal perception of causal affordances offered by the actions of others. The social dimension of this relates directly with the work of Michotte and provides a rich arena for further study. There are not only social aspects involved but also the implications of what Michotte describes as the tool effect, where the act of using a tool is perceived as a collated set of actions. People simultaneously perceive actor and tool as separate entities as well as a single set of actions.

This discovery is open to a full thesis in itself and it has not been possible to fully pursue this phenomenon within this study. There are many avenues that are exposed by this study such as how far tolerance for perceiving distributed affordances is and whether this tolerance is temporally or geographically aligned. The notion of distributed affordance also opens avenues for exploring aesthetic interaction. Interaction with Animo is a rewarding and enjoyable experience but it is hard to understand exactly why. By constructing and evaluating similar arenas for interaction it is possible to highlight positive and negative aspects of this type of collaborative interaction.

8.6.3 **Appropriation as a design method for education**

The use of appropriation and storytelling in Homesick Aliens is already the subject of further study. These artefacts are being employed in a cross curricular study with schools in Edinburgh. It is hoped that their use will expose the nature of employing appropriation to engage young people. There is also an area of study concerned with appropriation and storytelling. Storytelling has been demonstrated to be an effective tool for the young people who experience the Homesick Aliens and this relationship should bear further investigation.

It is hoped that this study will expose the value of designing for appropriation when attempting to engage young people. This particular study is aimed specifically at introducing young people to computer programming and physical computing but it should provide useful findings for other areas. The study has a specific bent toward notions of participatory design, a field that has not been explored in this thesis. It is hoped that the use of participatory design methods will expose some greater understanding of the nature of appropriation and how it may be possible to design for it.

8.6.4 **Exposing and studying appropriation in interaction**

This study has prompted the exploration of affordances in aesthetic interaction through the production and evaluation of artefacts. It is expected that this study will prompt the production of further artefacts that can be evaluated and discussed through the framework of appropriation. By exposing the relationship between appropriation

and aesthetic interaction, avenues have been exposed that can be explored in greater detail.

By developing methodologies that have proved effective in the evaluation of these artefacts this thesis can contribute positively to this arena. This study has prompted an active pursuit of commissions and practical application that will afford the further study of the findings of this thesis. It is believed that by exploring and expanding on the work produced here that a contribution can be made to the field of aesthetic interaction.

8.7 Final Conclusions

This thesis suggests a reframing of the understanding of appropriation in interaction. Traditionally appropriation has been accepted as the final act in users' interaction with technology occurring after adoption. By exposing appropriation as being related to affordance and perception it is instead revealed as a user's initial experience with technology.

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10 Appendices

Appendix i. Transcription extract from interviews conducted during the scoping study at The Public.

I: Do you mind describing Animo to me, what goes on in Animo? Imagine that I'd never been there, I can't see it and you've got to describe it to me.

P1: You've got seven different frames.

P2:Yeah

P1: You have like a, there's a camera that shines on the actual frame and there's a camera on the table which you can put your own props on so you can be in the actual cartoon and then take seven different photos and then after that takes your own animation does like little things for you.

I: So the first time you saw it did you get it straight away?

P2: Well, you

P1: It's just, you just paper on a table with seven different numbers on.

P2: It did need to be explained, but you sort of got the general gist of it because of the example that's on, you know that says "welcome to Animo" and you sort of get the gist because of the numbers and that but how to use it is like a different story like 'cos it's very like.

P1: Holodeck

P2: Gerrin [sic] out like you stand in front of it and it takes your photo, that's like fine, you get that but sometimes, if you've been on it you then think "how's that work? " How the cameras are [m]angled and how does it take the photos like. That's what got me like, how many cameras is there? How does the camera work? How does the lighting work?

Transcription edited at this point

I: So do you think you need to do it more than once to get to to really get to it?

P1: Yeah

I: And how many times have you guys done it now?

P1: Ooh, must have lost count

P2: Well, for me, I don't like having things like that done. Like, I don't like standing there and watching people like and people watching me having my photo took

P1: But I'll just go up and do it I just

P2: So for me, I just didn't really like it didn't really like appeal to me like I liked the technical side and how it worked and I think it's good fun for people who like it. For me, I just don't like people watching me have my photo took but like when [Male's name] was doing it, it was good fun, like it was nice to see how people.

Transcription edited at this point

P2: and we all go to the same school but everybody else doesn't and I think it was like that was the ice breaker weren't it kind of cos that was the first thing we come to on the tour and it was the ice breaker because we was watching everybody have fun. And with things like that, it brings personality out, I think because if [Male's name] weren't really talking at the start but when he come on that he was like his funny self so people got that from him

This extract is from the group interview

I: So describe Animo, come on everybody describe Animo to me

P1: There's seven like green screens sort of things and you stand in front of it and you take your picture

P2: You can put anything personal to you on there, like something you like, and take a picture with it

I: Something personal, so would I need to come prepared?

Transcription edited at this point

P2: And then there's seven different slide show things and then you just go there and you just have fun and then you jump around and take pictures and then at the end it's like a sequence and it goes really fast and it's really funky

P3:It's like being in your own little movie

P4: Flipbook

P2: Yeah, like a storyboard thing

Appendix ii. Edited transcription of the interview with a couple discussing #unravel discussed in Chapter 4

P1: I think probably engaged with it quite instantly but probably developed more of a an interest in it over the weeks. Again, to see it behind the scenes in that open lab day especially just getting to know the secrets of how it works.

Transcription edited at this point.

P2: Um, I think we would have enjoyed it as much if we didn't know those things but knowing those things definitely, it enhances it because it's something not very many other people know about and it sounds really clever when you start to learn how it worked.

Transcription edited at this point.

P2: It's, different people might have different interpretations of it. So if you're sharing each, each others' interpretations of it that's, that's good. I was coming at from a position where I did know more about it. I didn't want to give too much away about it because you don't want to um. I guess I didn't want to ruin it for people who didn't want to know.

Interviewer: OK

Kind of thing. 'Cause there was a guy standing next to me on the um er, the night that you were there and I, I don't think I gave away any of the secrets, if you like about it but I was just trying to explain certain things about how it worked.

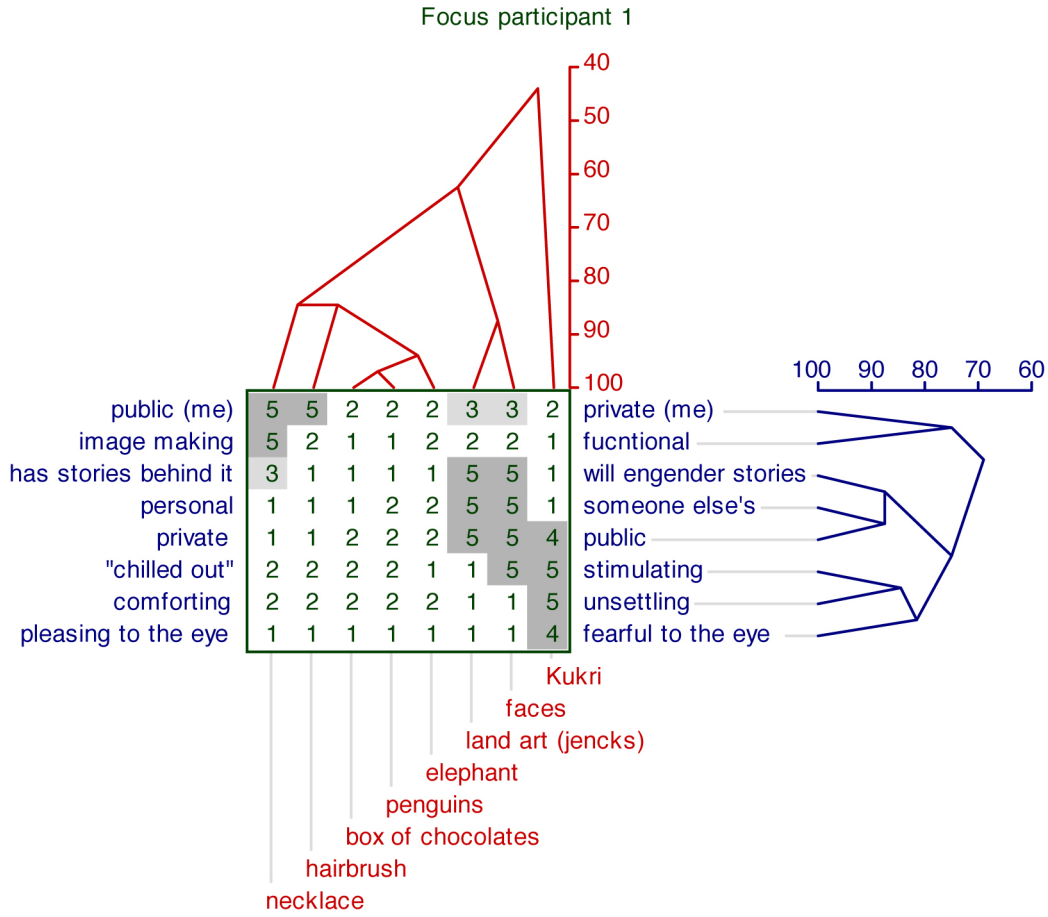
Transcription edited at this point.

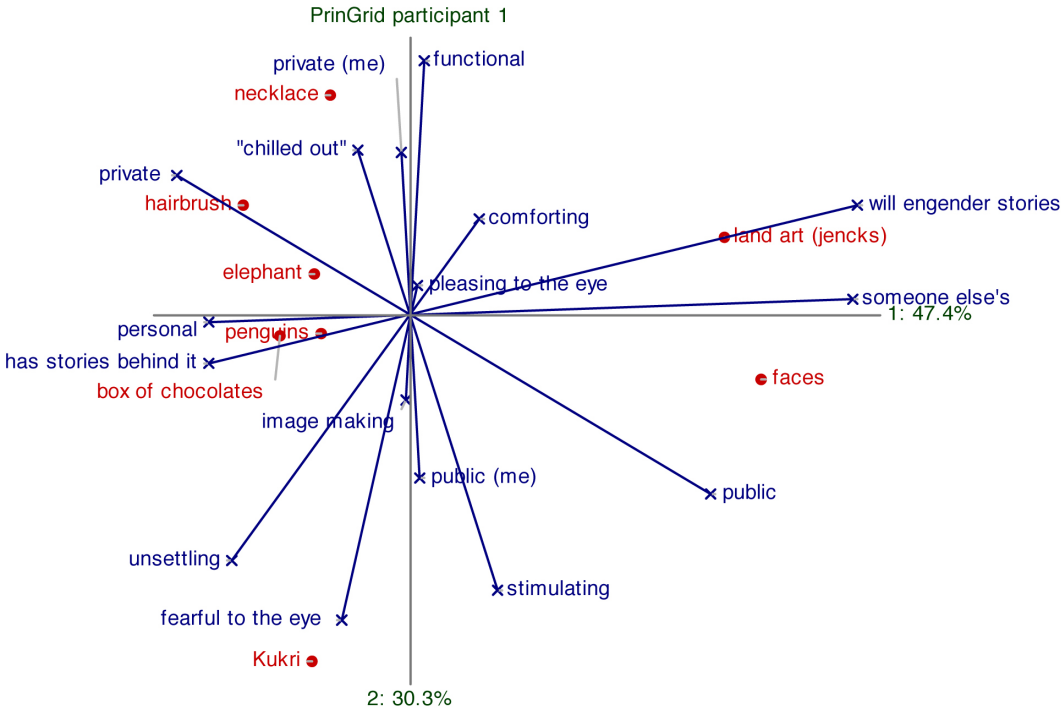
P1: It does need a bit of explanation I think, you can't just go in and figure it out just by looking at it or. I think it probably needs a bit of description but I don't know. Maybe he enjoys explaining it to people because we like it and it's nice talking about it.

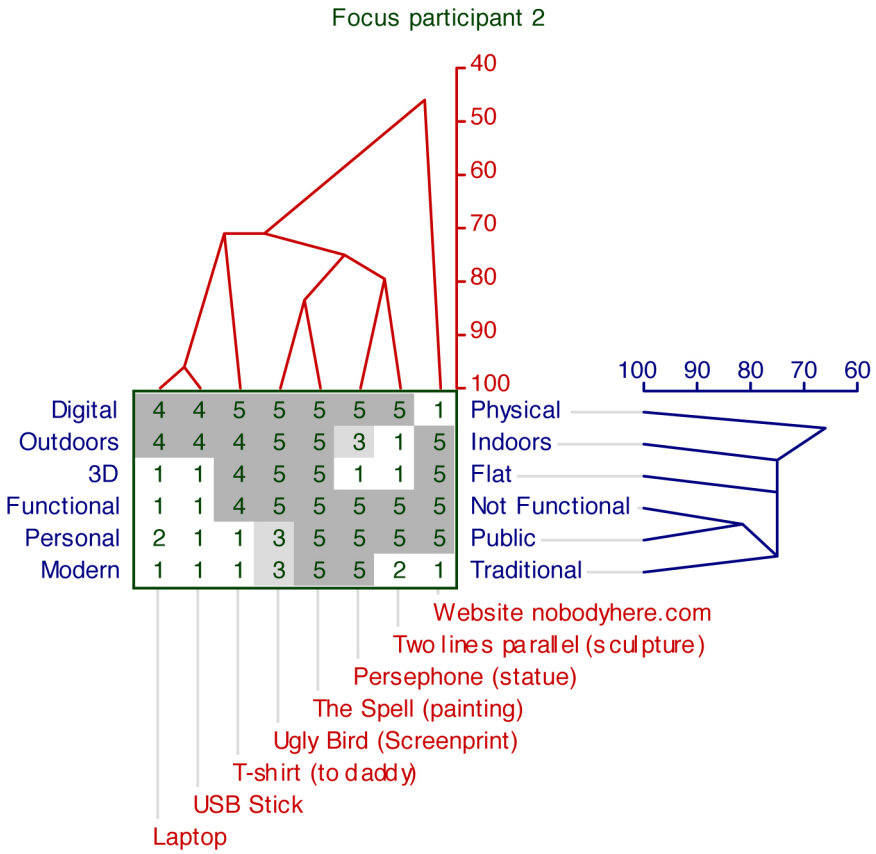
Transcription edited at this point.

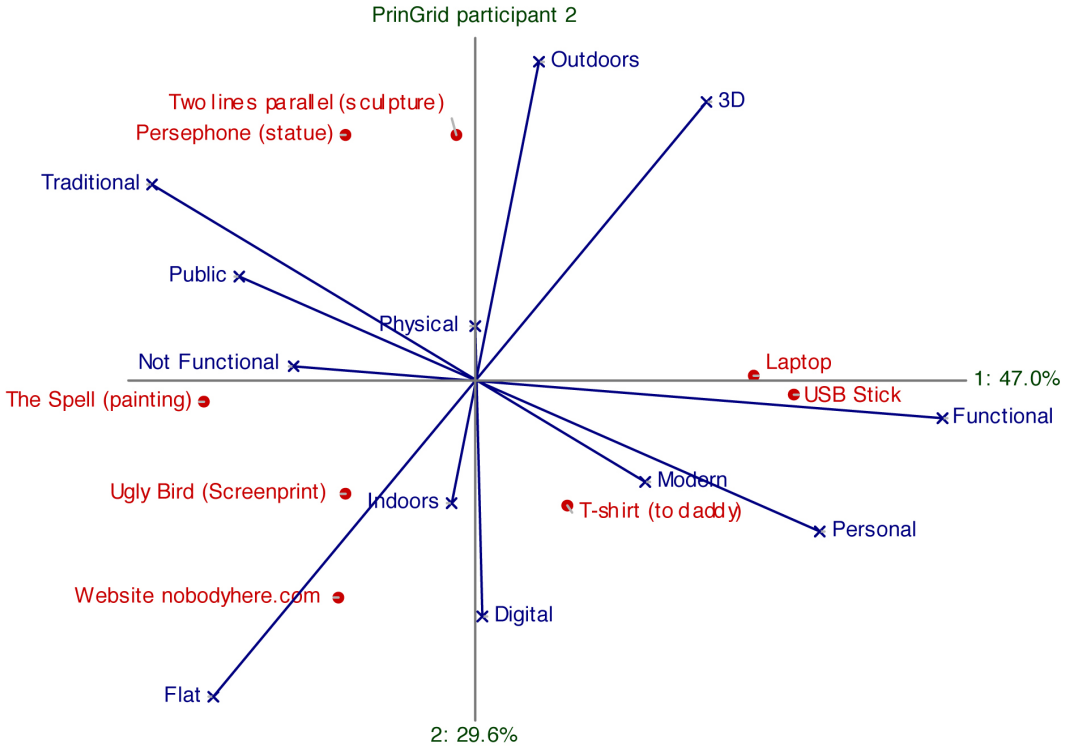
P2 :It's having a, it's having a clever machine that's inbuilt with this stuff that knows how humans interact or how how humans tell stories. It's just so, yeah it wakes you up to the fact that you don't really tell the same story twice and that you will change how you tell it to different people or how you feel at the time or how they feel or what you want them to hear as well. It's a just it's more, I don't know if it's an expression. It's more a kind of a reflection on how we are and it yeah, you just kind of re-realise that's what you that's what people are like.

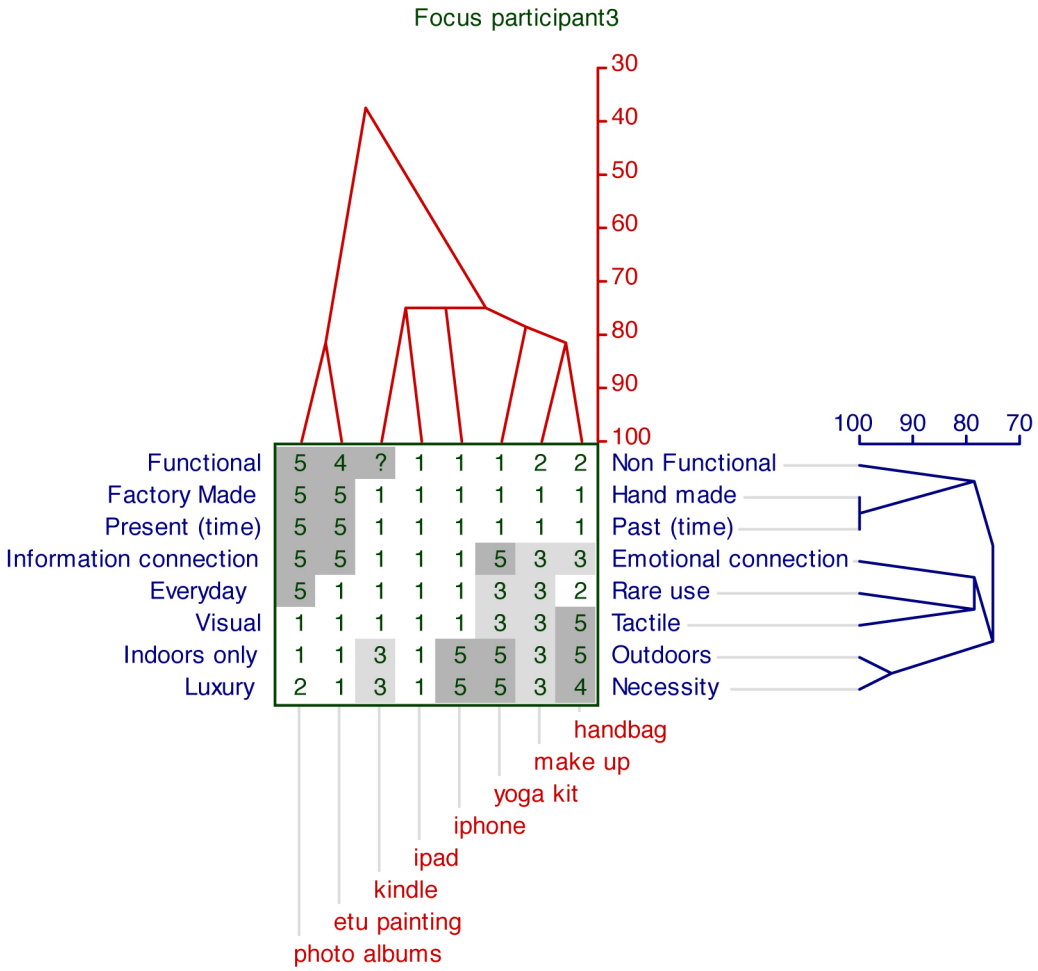
Appendix iii. Focus and Prin Grids from repertory grid studies discussed in Chapter 4.

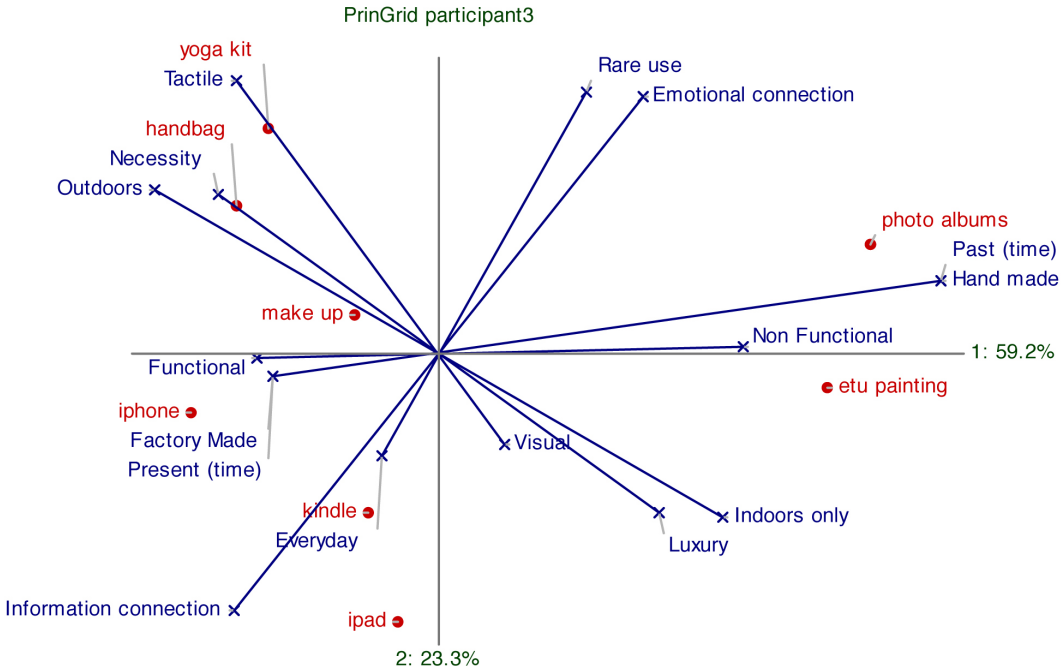


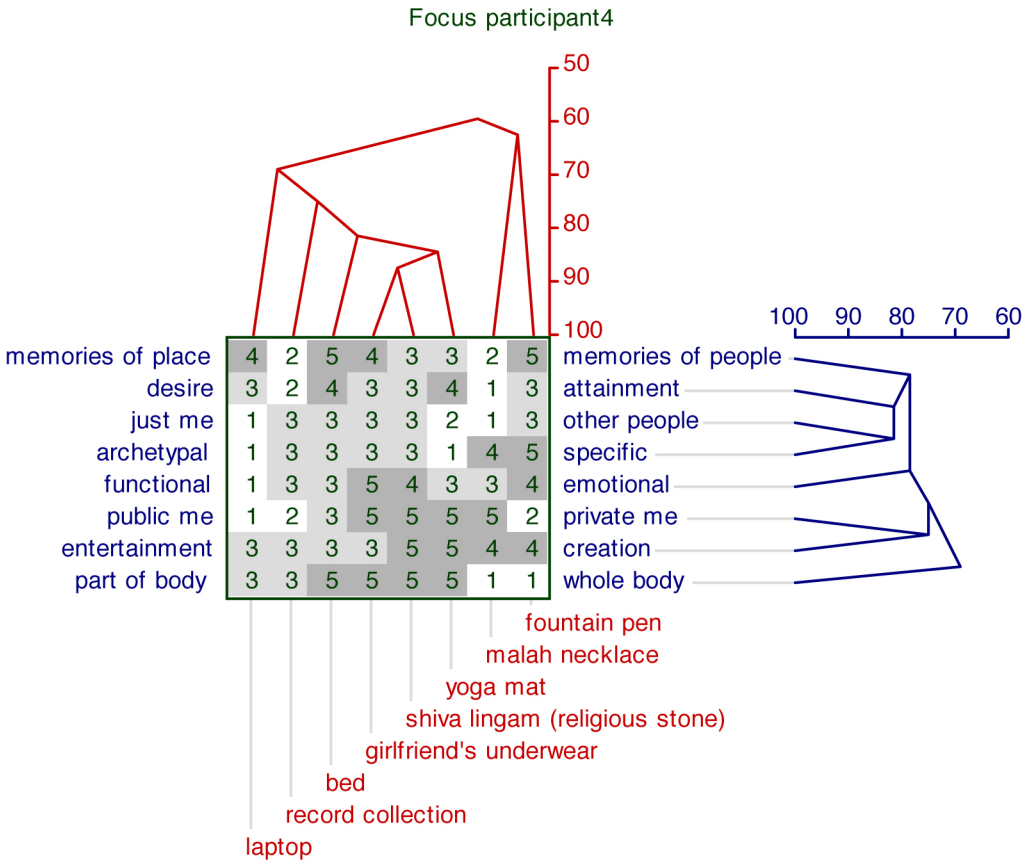


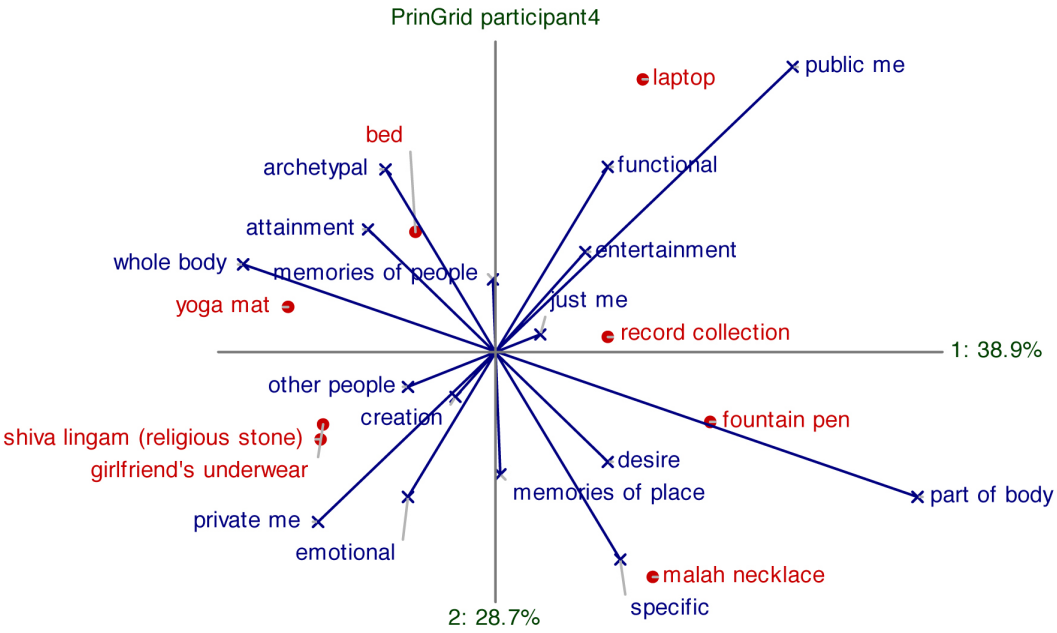

Focus participant 2
40
50
60
70
80
90
100
100 90 80 70 60
Digital 4 4 5 5 5 5 5 1 Physical
Outdoors 4 4 4 5 5 3 1 5 Indoors
3D 1 1 4 5 5 1 1 5 Flat
Functional 1 1 4 5 5 5 5 5 Not Functional
Personal 2 1 1 3 5 5 5 5 Public
Modern 1 1 1 3 5 5 2 1 Traditional
Website nobodyhere.com
Two lines parallel (sculpture)
Persephone (statue)
The Spell (painting)
Ugly Bird (Screenprint)
T-shirt (to daddy)
USB Stick
Laptop

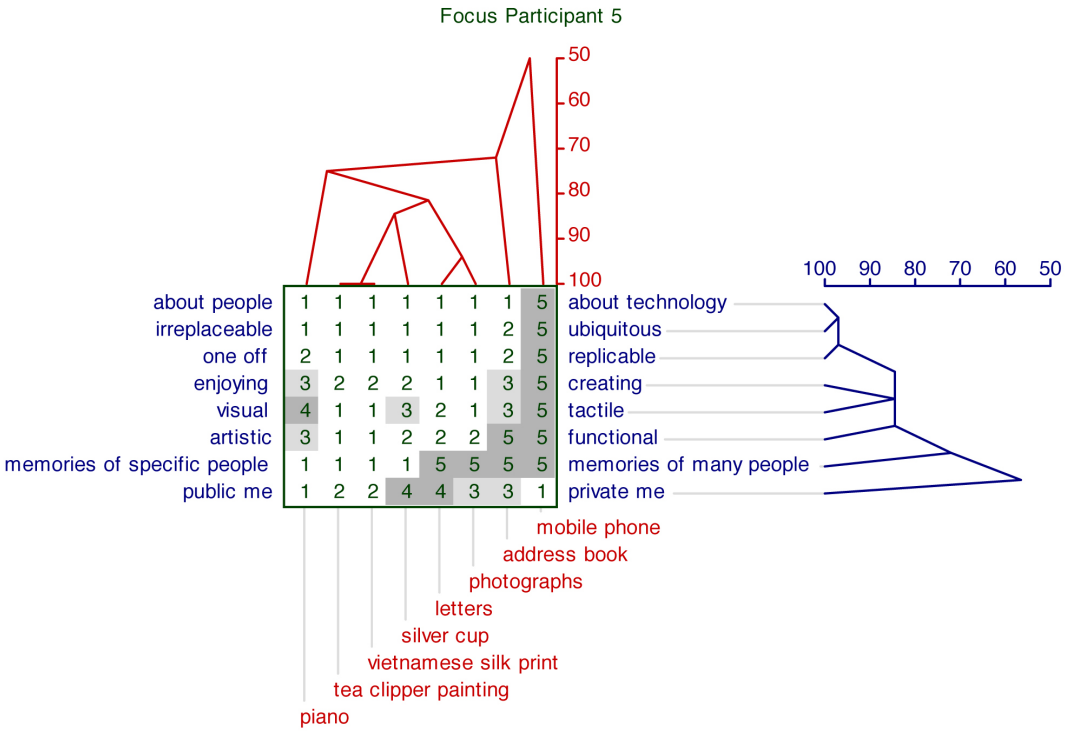

PrinGrid participant 2
Outdoors
3D
Two lines parallel (sculpture)
Persephone (statue)
Traditional
Public
Physical
Not Functional
The Spell (painting)
Laptop
USB Stick
1: 47.0%
Functional
Modern
Ugly Bird (Screenprint)
Indoors
T-shirt (to daddy)
Personal
Website nobodyhere.com
Digital
Flat
2: 29.6%

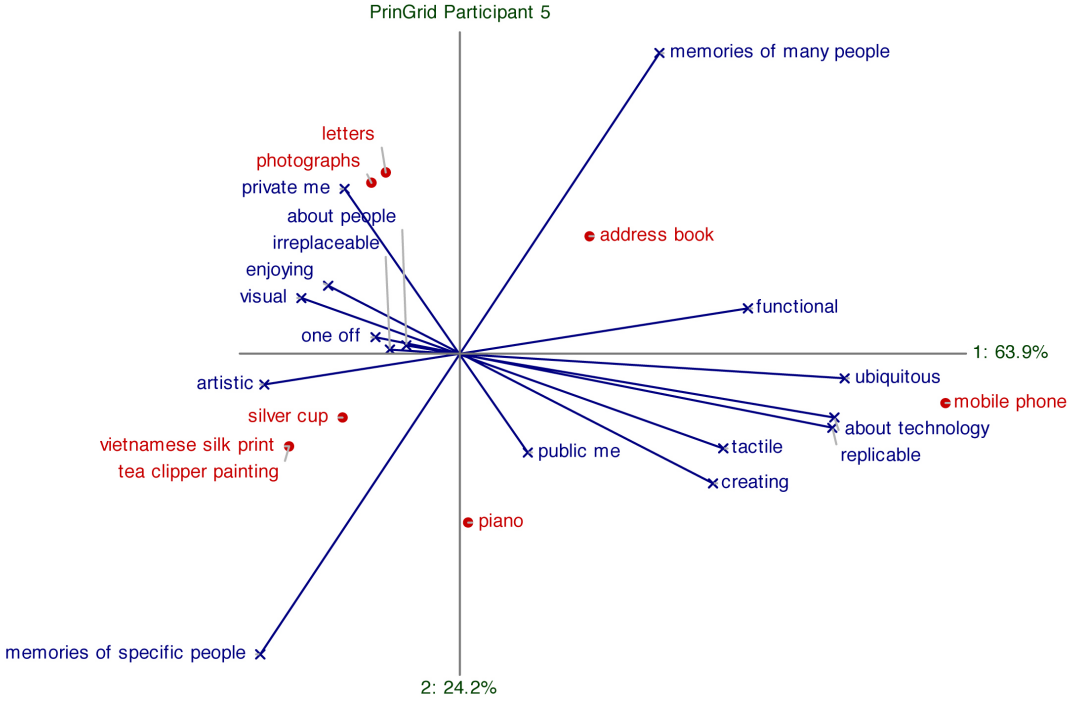

Focus participant3
30
40
50
60
70
80
90
100
100 90 80 70
Functional 5 4 ? 1 1 1 2 2 Non Functional
Factory Made 5 5 1 1 1 1 1 1 Hand made
Present (time) 5 5 1 1 1 1 1 1 Past (time)
Information connection 5 5 1 1 1 5 3 3 Emotional connection
Everyday 5 1 1 1 1 3 3 2 Rare use
Visual 1 1 1 1 1 3 3 5 Tactile
Indoors only 1 1 3 1 5 5 3 5 Outdoors
Luxury 2 1 3 1 5 5 3 4 Necessity
handbag
make up
yoga kit
iphone
ipad
kindle
etu painting
photo albums

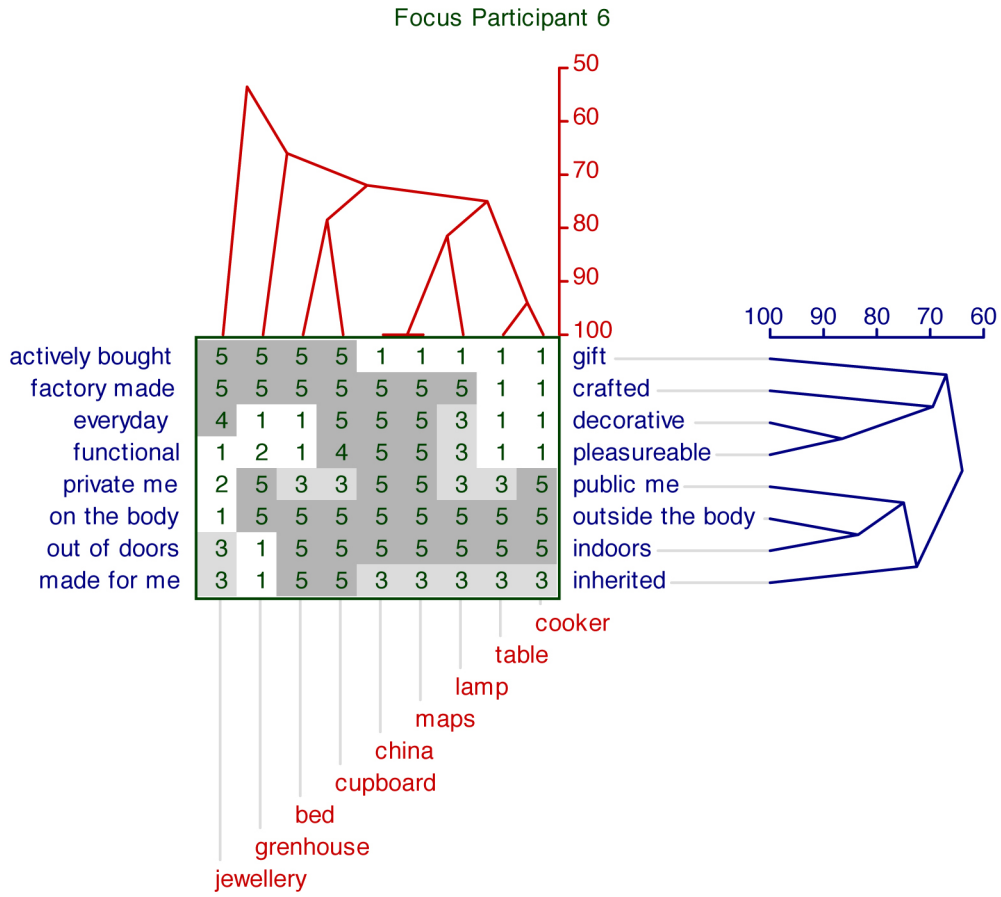

PrinGrid participant3
yoga kit
Tactile
handbag
Necessity
Outdoors
make up
Functional
iphone
Factory Made
Present (time)
Information connection
kindle
Everyday
ipad
2: 23.3%
Rare use
Emotional connection
photo albums
Past (time)
Hand made
Non Functional
1: 59.2%
etu painting
Visual
Indoors only
Luxury

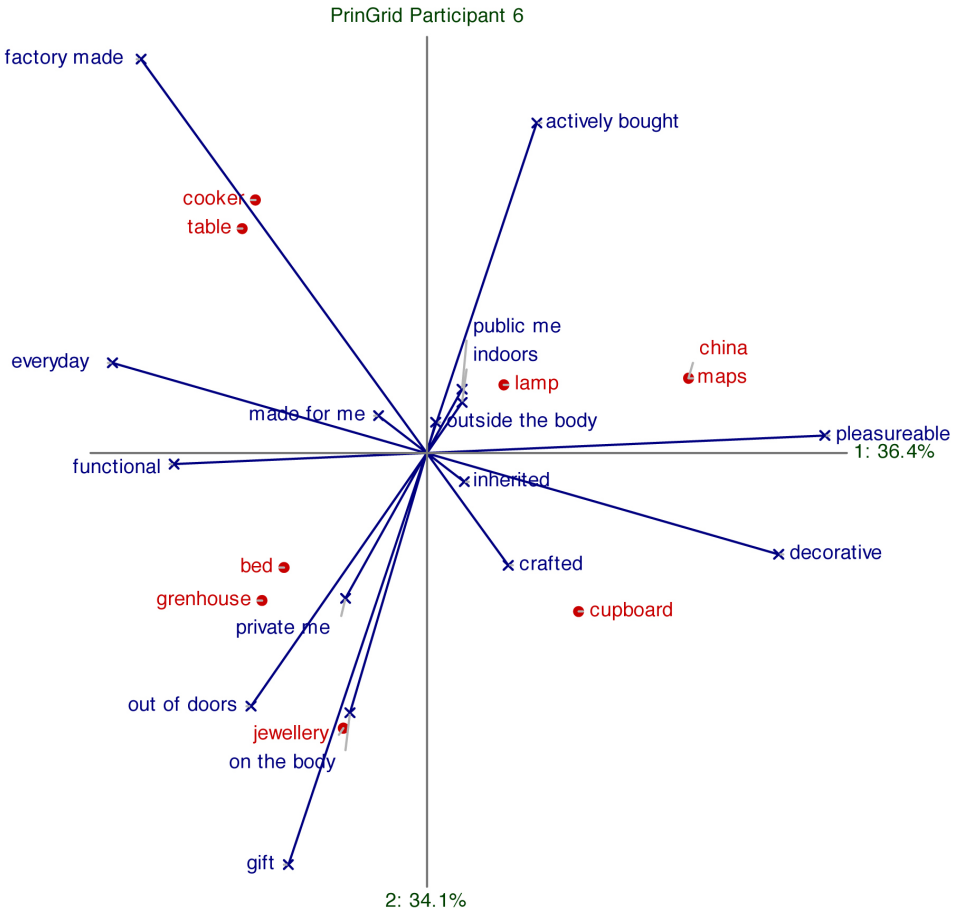

Focus participant4
50
60
70
80
90
100
100 90 80 70 60
memories of place 4 2 5 4 3 3 2 5 memories of people
desire 3 2 4 3 3 4 1 3 attainment
just me 1 3 3 3 3 2 1 3 other people
archetypal 1 3 3 3 3 1 4 5 specific
functional 1 3 3 5 4 3 3 4 emotional
public me 1 2 3 5 5 5 5 2 private me
entertainment 3 3 3 3 5 5 4 4 creation
part of body 3 3 5 5 5 5 1 1 whole body
fountain pen
malah necklace
yoga mat
shiva lingam (religious stone)
girlfriend's underwear
bed
record collection
laptop

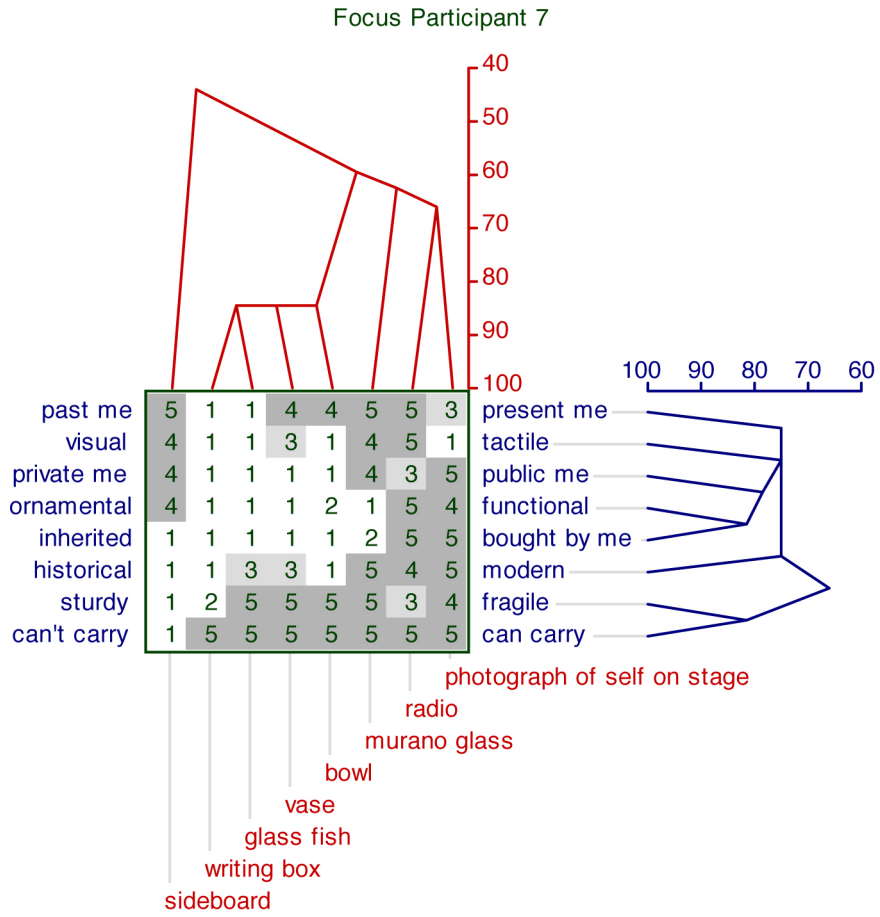

PrinGrid participant4
laptop
public me
bed
archetypal
functional
attainment
entertainment
whole body
memories of people
just me
yoga mat
record collection
1: 38.9%
other people
creation
fountain pen
shiva lingam (religious stone)
girlfriend's underwear
desire
memories of place
part of body
private me
emotional
malah necklace
specific
2: 28.7%

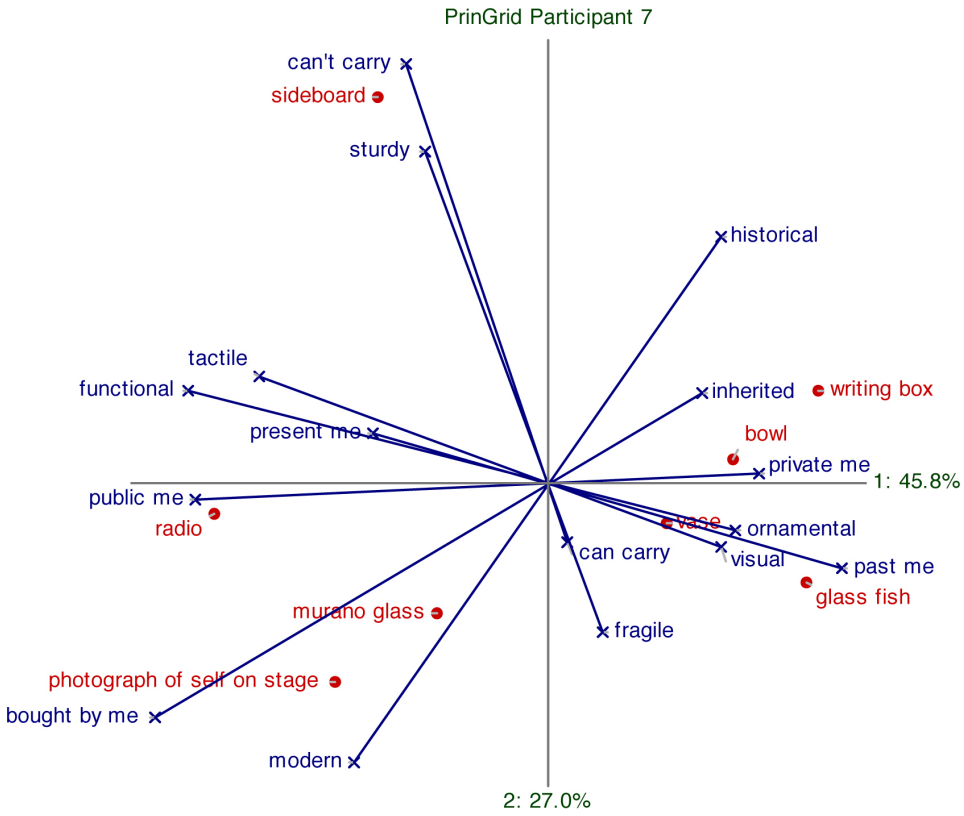

Focus Participant 5
50
60
70
80
90
100
100 90 80 70 60 50
about people 1 1 1 1 1 1 1 5
irreplaceable 1 1 1 1 1 1 2 5
one off 2 1 1 1 1 1 2 5
enjoying 3 2 2 2 1 1 3 5
visual 4 1 1 3 2 1 3 5
artistic 3 1 1 2 2 2 5 5
memories of specific people 1 1 1 1 5 5 5 5
public me 1 2 2 4 4 3 3 1
about technology
ubiquitous
replicable
creating
tactile
functional
memories of many people
private me
mobile phone
address book
photographs
letters
silver cup
vietnamese silk print
tea clipper painting
piano

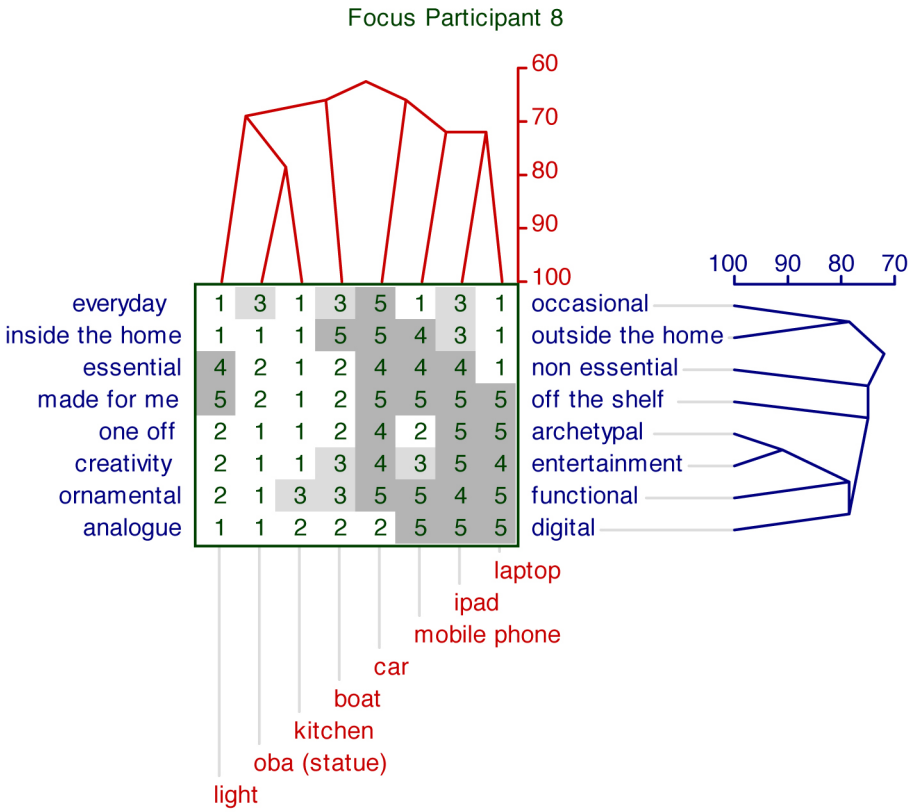

PrinGrid Participant 5
memories of many people
letters
photographs
private me
about people
irreplaceable
enjoying
visual
one off
address book
functional
1: 63.9%
artistic
ubiquitous
mobile phone
silver cup
about technology
replicable
vietnamese silk print
tea clipper painting
public me
tactile
creating
piano
memories of specific people
2: 24.2%

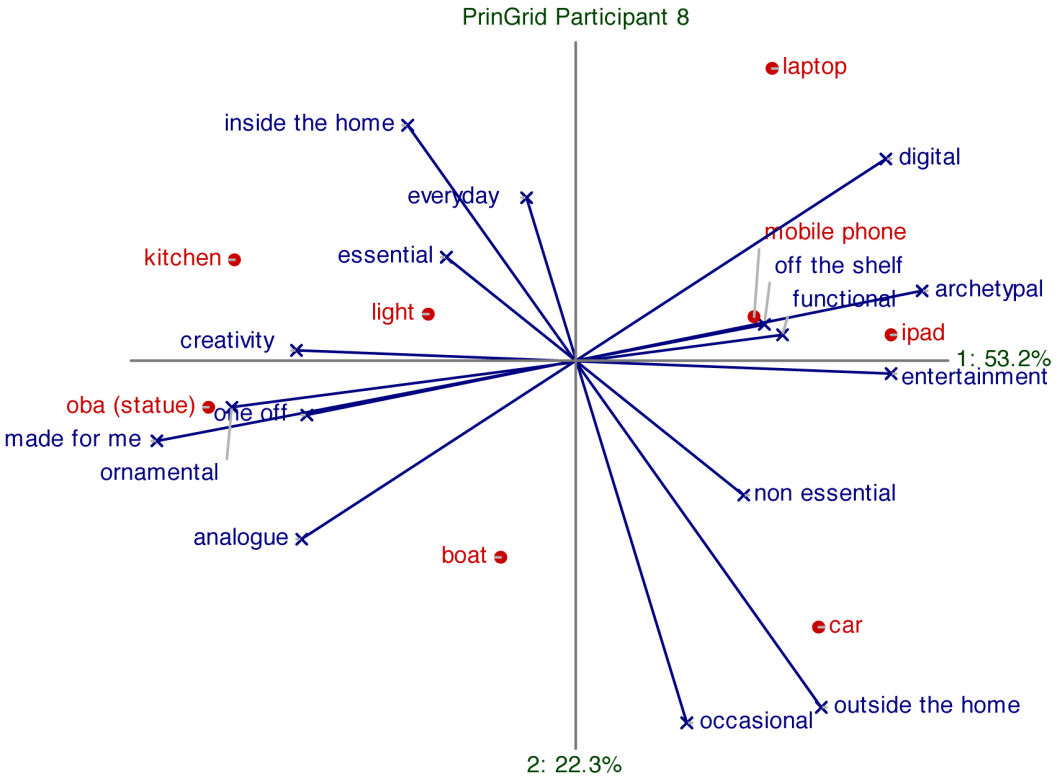

Focus Participant 6
50
60
70
80
90
100
100 90 80 70 60
actively bought 5 5 5 5 1 1 1 1 1 gift
factory made 5 5 5 5 5 5 5 1 1 crafted
everyday 4 1 1 5 5 5 3 1 1 decorative
functional 1 2 1 4 5 5 3 1 1 pleasureable
private me 2 5 3 3 5 5 3 3 5 public me
on the body 1 5 5 5 5 5 5 5 5 outside the body
out of doors 3 1 5 5 5 5 5 5 5 indoors
made for me 3 1 5 5 3 3 3 3 3 inherited
cooker
table
lamp
maps
china
cupboard
bed
grenhouse
jewellery

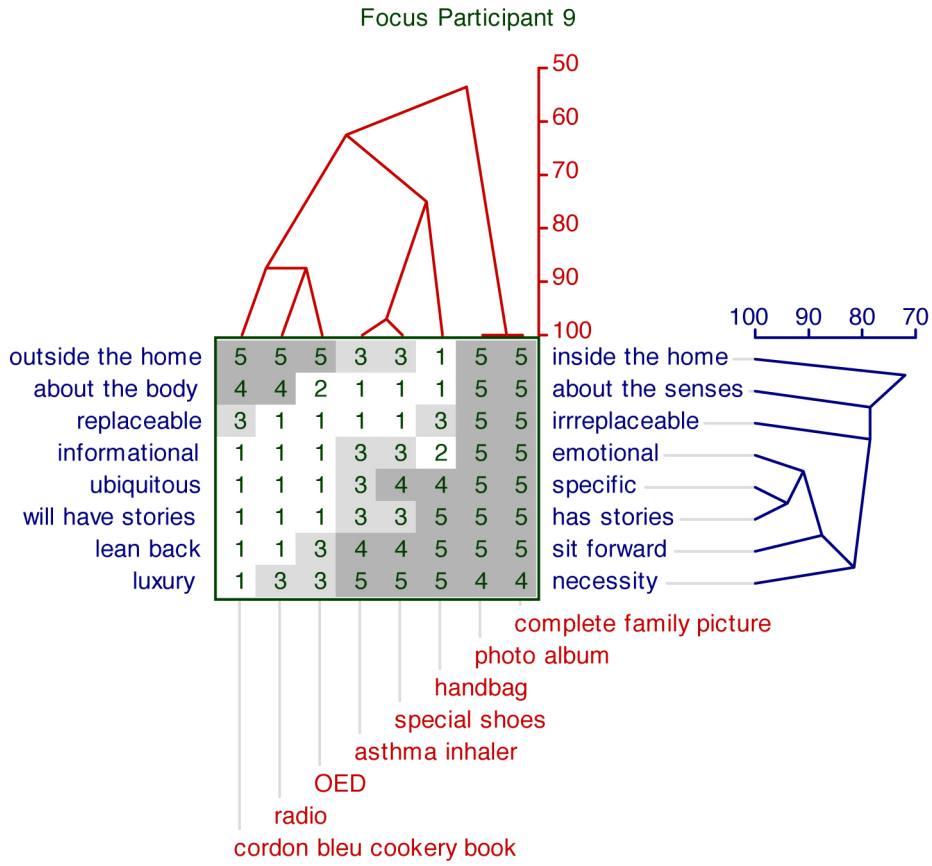

PrinGrid Participant 6
factory made
actively bought
cooker
table
public me
indoors
china
maps
everyday
lamp
made for me
outside the body
pleasureable
1: 36.4%
functional
inherited
decorative
bed
crafted
grenhouse
cupboard
private me
out of doors
jewellery
on the body
gift
2: 34.1%

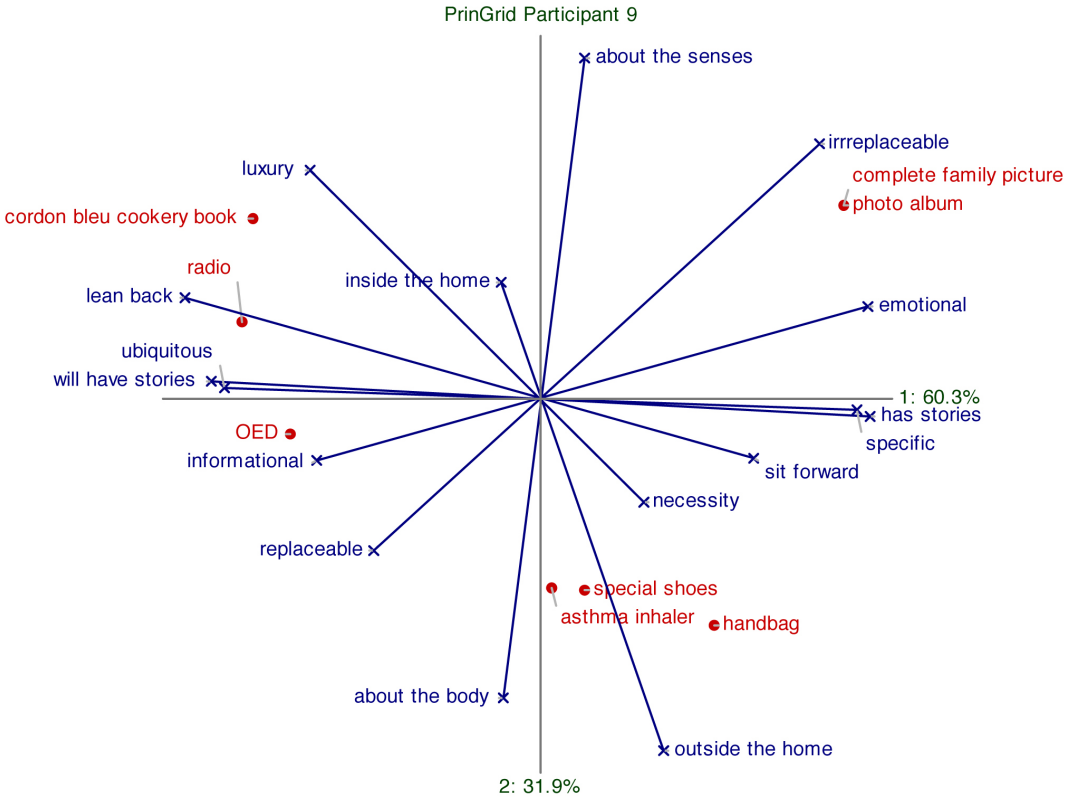

Focus Participant 7
40
50
60
70
80
90
100
100 90 80 70 60
past me 5 1 1 4 4 5 5 3 present me
visual 4 1 1 3 1 4 5 1 tactile
private me 4 1 1 1 1 4 3 5 public me
ornamental 4 1 1 1 2 1 5 4 functional
inherited 1 1 1 1 1 2 5 5 bought by me
historical 1 1 3 3 1 5 4 5 modern
sturdy 1 2 5 5 5 5 3 4 fragile
can't carry 1 5 5 5 5 5 5 5 can carry
photograph of self on stage
radio
murano glass
bowl
vase
glass fish
writing box
sideboard

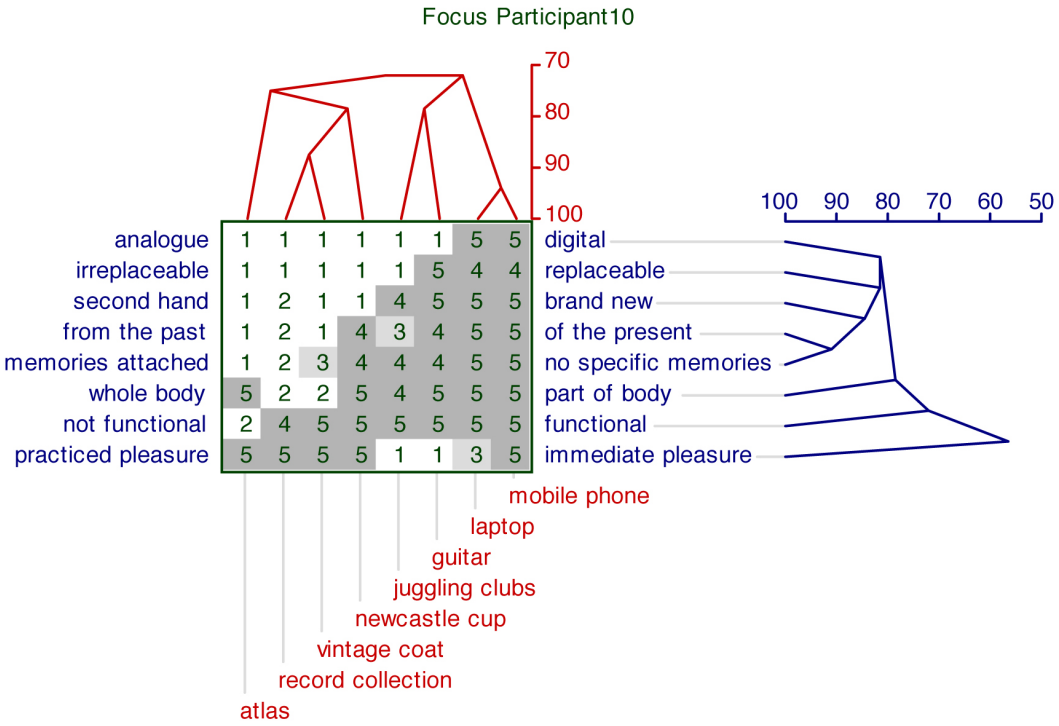

PrinGrid Participant 7
can't carry
sideboard
sturdy
historical
tactile
functional
present me
inherited
writing box
bowl
private me
1: 45.8%
public me
radio
vase
ornamental
can carry
visual
past me
glass fish
murano glass
fragile
photograph of self on stage
bought by me
modern
2: 27.0%

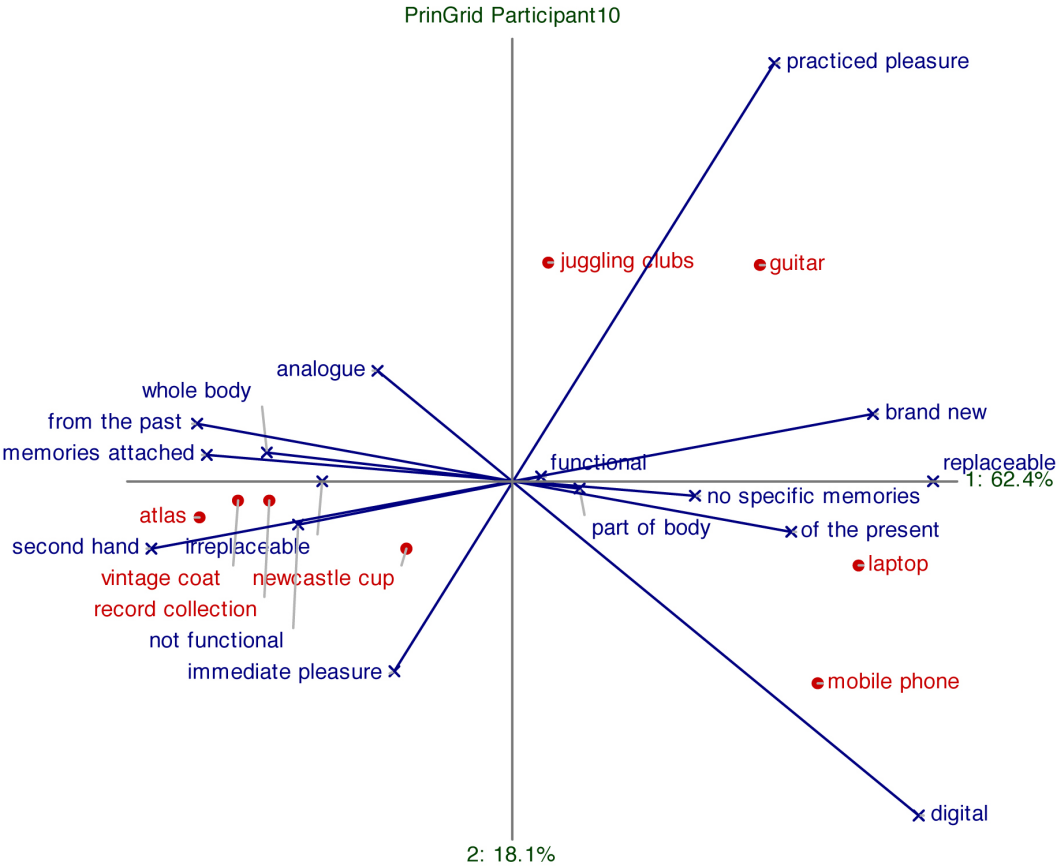

Focus Participant 8
60
70
80
90
100
100 90 80 70
everyday 1 3 1 3 5 1 3 1 occasional
inside the home 1 1 1 5 5 4 3 1 outside the home
essential 4 2 1 2 4 4 4 1 non essential
made for me 5 2 1 2 5 5 5 5 off the shelf
one off 2 1 1 2 4 2 5 5 archetypal
creativity 2 1 1 3 4 3 5 4 entertainment
ornamental 2 1 3 3 5 5 4 5 functional
analogue 1 1 2 2 2 5 5 5 digital
laptop
ipad
mobile phone
car
boat
kitchen
oba (statue)
light

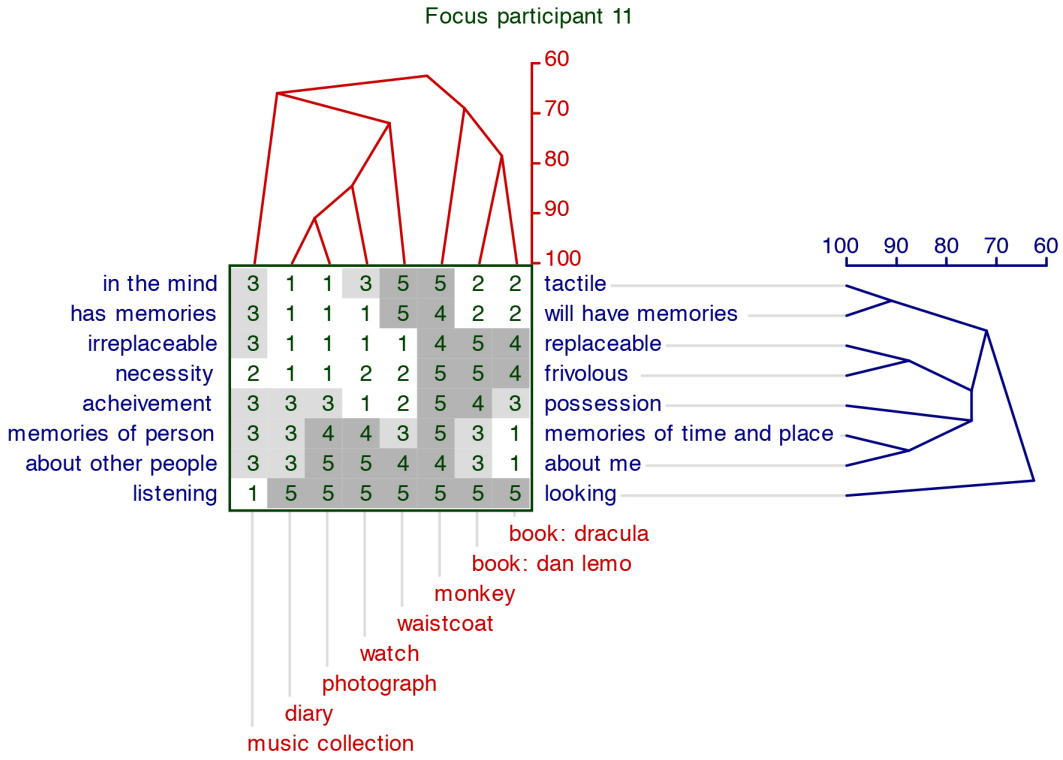

PrinGrid Participant 8
laptop
inside the home
digital
everyday
mobile phone
kitchen
essential
off the shelf
functional
archetypal
light
ipad
creativity
1: 53.2%
entertainment
oba (statue)
one off
made for me
ornamental
non essential
analogue
boat
car
occasional
outside the home
2: 22.3%

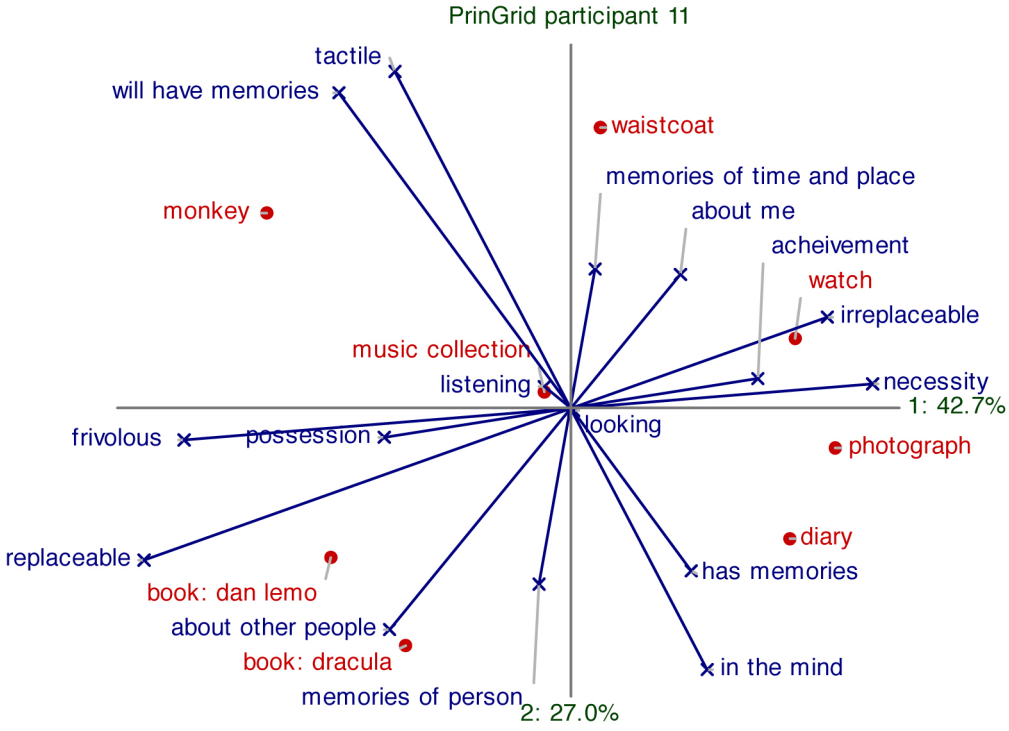

Focus Participant 9
50
60
70
80
90
100
100 90 80 70
outside the home 5 5 5 3 3 1 5 5 inside the home
about the body 4 4 2 1 1 1 5 5 about the senses
replaceable 3 1 1 1 1 3 5 5 irrreplaceable
informational 1 1 1 3 3 2 5 5 emotional
ubiquitous 1 1 1 3 4 4 5 5 specific
will have stories 1 1 1 3 3 5 5 5 has stories
lean back 1 1 3 4 4 5 5 5 sit forward
luxury 1 3 3 5 5 5 4 4 necessity
complete family picture
photo album
handbag
special shoes
asthma inhaler
OED
radio
cordon bleu cookery book


PrinGrid Participant 9
about the senses
irrreplaceable
complete family picture
photo album
luxury
cordon bleu cookery book
radio
inside the home
lean back
emotional
ubiquitous
will have stories
1: 60.3%
has stories
specific
OED
informational
sit forward
necessity
replaceable
special shoes
asthma inhaler
handbag
about the body
outside the home
2: 31.9%


Focus Participant10
70
80
90
100
100 90 80 70 60 50
analogue 1 1 1 1 1 1 5 5 digital
irreplaceable 1 1 1 1 1 5 4 4 replaceable
second hand 1 2 1 1 4 5 5 5 brand new
from the past 1 2 1 4 3 4 5 5 of the present
memories attached 1 2 3 4 4 4 5 5 no specific memories
whole body 5 2 2 5 4 5 5 5 part of body
not functional 2 4 5 5 5 5 5 5 functional
practiced pleasure 5 5 5 5 1 1 3 5 immediate pleasure
mobile phone
laptop
guitar
juggling clubs
newcastle cup
vintage coat
record collection
atlas


PrinGrid Participant10
practiced pleasure
juggling clubs
guitar
analogue
whole body
from the past
memories attached
brand new
functional
replaceable
1: 62.4%
no specific memories
atlas
second hand
irreplaceable
part of body
of the present
laptop
vintage coat
newcastle cup
record collection
not functional
immediate pleasure
mobile phone
digital
2: 18.1%


Focus participant 11
60
70
80
90
100
100 90 80 70 60
in the mind 3 1 1 3 5 5 2 2 tactile
has memories 3 1 1 1 5 4 2 2 will have memories
irreplaceable 3 1 1 1 1 4 5 4 replaceable
necessity 2 1 1 2 2 5 5 4 frivolous
acheivement 3 3 3 1 2 5 4 3 possession
memories of person 3 3 4 4 3 5 3 1 memories of time and place
about other people 3 3 5 5 4 4 3 1 about me
listening 1 5 5 5 5 5 5 5 looking
book: dracula
book: dan lemo
monkey
waistcoat
watch
photograph
diary
music collection


PrinGrid participant 11
tactile
will have memories
waistcoat
memories of time and place
monkey
about me
acheivement
watch
irreplaceable
music collection
listening
necessity
1: 42.7%
looking
frivolous
possession
photograph
diary
replaceable
has memories
book: dan lemo
about other people
book: dracula
in the mind
memories of person
2: 27.0%

Appendix iv. Tables of common properties and common experiences from repertory grid studies discussed in Chapter 4.

Common Properties of elements as a table

Participant	Element	Common Property
P1	Kukri	Distinct
	Faces	To Look at (3D)
	Land Art (Jencks)	To Look at (3D)
	Elephant	Keepsakes
	Penguins	Keepsakes
	Box of Chocolates	Keepsakes
	Hairbrush	Keepsakes
	Necklace	Keepsakes
P2	Website nobodyhere.com	Distinct
	Two lines parallel (sculpture)	To Look at (3D)
	Persephone (statue)	To Look at (3D)
	The Spell (painting)	To Look at (Flat)
	Ugly Bird (screenprint)	To Look at (Flat)
	T-shirt (to daddy)	Keepsakes
	USB Stick	To use
	Laptop	To use
P3	Handbag	To use
	Make up	To use
	Yoga Kit	To use
	iPhone	To use
	iPad	To use
	Kindle	To use
	Etu painting	To Look at (Flat)
	Photo albums	To Look at (Flat)
P4	Fountain pen	To Look at (3D)
	Malah Necklace	To Look at (3D)

	Yoga mat	Keepsakes
	Shiva Lingham (religious stone)	Keepsakes
	Girlfriend's underwear	Keepsakes
	Bed	Keepsakes
	Record Collection	Keepsakes
	Laptop	To use
P5	Mobile Phone	Distinct
	Address Book	Distinct
	Photographs	To Look at (Flat)
	Letters	To Look at (Flat)
	Silver Cup	To Look at (3D)
	Vietnamese Silk Print	To Look at (3D)
	Tea Clipper Painting	To Look at (3D)
	Piano	Skill Item
P6	Cooker	To use
	Table	To use
	Lamp	To use
	Maps	To use
	China	To use
	Cupboard	To use
	Bed	To use
	Greenhouse	To use
	Jewellery	Distinct
P7	Photograph of self on stage	To Look at (Flat)
	Radio	Cognitive
	Murano glass	Distinct
	Bowl	To Look at (3D)
	Vase	To Look at (3D)
	Glass fish	To Look at (3D)
	Writing Box	To Look at (3D)
	Sideboard	To Look at (3D)

P8	Laptop	To use
	iPad	To use
	Mobile Phone	To use
	Car	To use
	Boat	To Look at (3D)
	Kitchen	To Look at (3D)
	Oba (statue)	To Look at (3D)
	Light	To Look at (3D)
P9	Complete family picture	To Look at (Flat)
	Photo album	To Look at (Flat)
	Handbag	To use
	Special shoes	To use
	Asthma inhaler	To use
	OED	Cognitive
	Radio	Cognitive
	Cordon Bleu cookery book	Cognitive
P10	Mobile Phone	To use
	Laptop	To use
	Guitar	Skill item
	Juggling clubs	Skill item
	Newcastle cup	Keepsakes
	Vintage coat	Keepsakes
	Record collection	Keepsakes
	Atlas	Keepsakes
P11	Book: Dracula	Cognitive
	Book: Dan Lemo	Cognitive
	Monkey	To Look at (3D)
	Waistcoat	Keepsakes
	Watch	Keepsakes
	Photograph	Keepsakes
	Diary	Keepsakes
	Music Collection	Distinct

Common Experiences from constructs as tables

Common experience between participants	**Common experience across participants**	**Source**
'proximal-distant'		
'has stories behind it-will engender stories'	Memories/Stories	P1
'personal-someone else's'		
'private-public'	Public-Private	
'memories of place-memories of people'	Memories/Stories	P4
'desire-attainment'		
'just me-other people'		
'archetypal-specific'		
'functional-emotional.'	Functional	
'memories of specific people-memories of many people'	Memories/Stories	P5
'public me-private me'	Public-Private	
'on the body -outside the body'		P6
'out of doors-indoors'		
'private me-public me'	Public-Private	
'made for me-inherited.'		
'ornamental-functional'	Functional	P7
'inherited-bought by me'		
'past me-present me'		
'visual-tactile'		
'private me-public me.'	Public-Private	
'outside the home-inside the home'		P9
'memories of person-memories of time and place'	Memories/Stories	P11
'about other people-about me'		
'achievement-possession'		
'commodity-thing'		**Source**
'private me-public me'	Public-Private	P1

‘image-making-functional’	Functional	
‘functional-not functional’	Functional	P2
‘personal – public’	Public-Private	
‘factory made-hand made’		P3
‘present time–past time’		
‘functional-non functional.’	Functional	
‘about people-about technology’		P5
‘irreplaceable-ubiquitous’		
‘one off-replicable.’		
‘functional-pleasurable’	Functional	P6
‘everyday-decorative’		
‘actively bought-gift’		
‘factory made-crafted’		
‘historical-modern’		P7
‘made for me-off the shelf’		P8
‘one off-archetypal,’		
‘creativity-entertainment’		
‘ornamental-functional’		
‘analogue-digital’		
‘essential-non essential’		
‘informational-emotional’		P9
‘ubiquitous-specific’		
‘will have stories-has stories’	Memories/Stories	
‘from the past-of the present’		P10
‘memories attached-no specific memories’	Memories/Stories	
‘analogue-digital’		
‘irreplaceable-replaceable’		
‘second hand-brand new’		
‘not functional-functional’	Functional	
‘irreplaceable-replaceable’		P11
‘necessity-frivolous’		

‘thinking-doing’		**Source**
‘information connection-emotional connection’		P3
‘everyday–rare use’		
‘visual-tactile’		
‘indoors only-outdoors’		
‘luxury-necessity’		
‘public me-private me’	Public-Private	P4
‘entertainment-creation’		
‘part of body-whole body’		
‘enjoying-creating’		P5
‘visual-tactile’		
‘artistic-functional.’	Functional	
‘everyday-occasional’		P8
‘inside the home-outside the home’		
‘lean back-sit forward’		P9
‘luxury-necessity’	Functional	
‘about the body-about the senses’		
‘replaceable-irreplaceable’		
‘in the mind-tactile’		P11
‘has memories-will have memories’	Memories/Stories	

‘stimulating-unstimulating’	**Source**
‘chilled out- stimulating’ ’comforting-unsettling’ ’pleasing to the eye-fearful to the eye’	P1
‘big-small’	**Source**
‘sturdy-fragile’ ‘can’t carry-can carry’	P7
Distinct Constructs	**Source**
‘practiced pleasure-immediate pleasure’	P10
‘listening-looking’	P11

Appendix v. Edited interview transcripts demonstrating codes highlighted in Chapter 5

Loss of Time:

Interview 1:

P1: I mean we've spent many hours doing this like, for example if I've got work until 10. I come back and normally we'll play for a bit and it ends up being 6 in the morning before we realise that we should probably go to bed so it yeah, it's quite addictive.

Interview 3:

P: It's easy to lose yourself, it's easy to kill eight hours in Minecraft like, you know, without thinking about it.

and

You can stop whenever you want you tend to spend hours on it. Because you get lost, time just kind of goes when you're playing it.

Interview 4:

P: When I first really got into it I'd say maybe start at 10 at night and then it was 5 o'clock in the morning.

and

I: Right so you just kind of zone out?

P: Yeah I have a relaxing wee time.

Interview 6:

I do it while I'm listening to podcasts and stuff. I just find it kind of therapeutic in a way to make something and for it to work and do something.

Survival Mode vs Creative Mode:

Interview 1:

P1: I've just, I've just gone onto cheat mode quickly, just to show the that building something that complicated but erm that can be switched on and off just basically if we were just messing around we could erm. Rather than building it, if I click on it it just gives it to me. So it is literally cheating but it means I can show you how to make something so.

Later in the interview:

I: So that's interesting so why would you not just go straight to cheat mode and get it?

P1: 'Cause there's no, then you just make everything, I started off at first, before we first started playing Tekkit.

P2: I got really angry at him because he wanted to try stuff out and see how it would work er by cheating and then he's like 'oh well I'll do it properly afterwards.'

Later in the interview:

P2: I cheated in a giant er nuke which they're just they imagine a TNT explosion within Minecraft, the normal one, it's massive in comparison and I basically, I took this nuke and I blew up erm the, his little cheating area.

Later in the interview:

P1: But it's all stuff I cheated in, I didn't make it, make anything.

P2: He didn't have, he wasn't proud of it so he didn't mind.

Later in the interview, P1 participant again discusses cheating and his fear of reprisal.

P1: You can make lasers actually, I haven't checked, tried them 'cause I didn't want to cheat. I would if [P2's name] wasn't here, but. Right, so that's a mining laser, let's see what this does.

Interview 2:

P: We just stuck mainly to the Sandbox mode 'cause I think.

I: You kept in that sandbox mode so you isn't it also called the cheat mode?

P: Yeah.

I: Yeah, so you weren't a real stickler for keeping to the specific rules.

P: Not really 'cause we were trying to make our own server.

I: Right.
P: So we were going on cheat mode to just get it built up and looking nice and fancy for people coming on when we did make it public.

Interview 3:
I: And you don't see an issue in using Creative Mode as opposed to Survival Mode?
P: No I don't think so, erm I mean on Xbox you don't gain any achievements for playing on Creative Mode er. So it stops you from getting any, you don't get monsters, so you wouldn't get monsters anyway, but it stops you getting er other kind of achievements. Involved with you know mining so many blocks or creating so many blocks or whatever erm.

Interview 4:
I: OK so you tend to play on the Survival Mode.
P: Yeah.
I: And you wouldn't feel right playing it on the Creative Mode?
P: No, like I don't think there's any fun in that. I just really like mining like you feel really, like my cupcake and my rainbow, like I went and I got every single sheep; this is back when you couldn't shear sheep.
I: Right.
P: Like nowadays, you shear them and you get more wool. But you had to punch them, you had to punch sheep to get wool and that took ages but like I'm really satisfied.

Interview 5:
P:…but it's more fun sort of starting with nothing and building something. 'Cause it's more of an achievement to build like a house. 'Cause like that that took an hour maybe to build whereas in Creative Mode or in Survival Mode like you know, 6/7 hours to get all the materials for that and to build it properly erm.
I: So is it achievement that you that you build it for, to feel that you've done something?
P: Yeah sort of like that it's fun building like but it's a lot more like gratifying. If you sort of build it, you know collect all the materials for it and you build it yourself. Rather than having all the blocks there you know at the start.

and

P: Yeah just to try it out and see what it would look like but erm generally we sort of play Survival Mode a lot more now. Because it's a lot more you know er as I said earlier it was it's it's more of an achievement if you build something you know big and whatever than in Creative Mode or something.
Interview 6:
P: Yeah er, not really, I haven't oh ah when we make a server specifically for Survival and someone goes onto Creative Mode to cheat we just go 'oh that's rubbish.' Why would you do that like just to save their, you know stuff that they lost if they got killed by a skeleton or something? Like in a cave they go into Creative Mode and go 'I'm not going to lose my things I'm not going back to get them' yeah that's just cheating, that's just cheap.

Minecraft as a Social Space

P1: …If I said to [P2's name] 'd'you want to play Tekkit or Minecraft?' and she said no, I probably wouldn't either. It's kind of boring on your own.

A fight with skeletons distracts them and then P1 returns to the subject.

P1: Yeah, like yeah like I say I wouldn't play this on my own. It's more satisfying when you've got two, when you've got at least two people 'cause then.

Transcription edited at this point

P2: If erm you're yeah, playing with people you don't know I don't suppose it would actually be that fun. Er I've never actually tried it really but er you have to kind of communicate with them erm. You know, I think it's, it's not the kind of game that you do play alone, when you're on a server with somebody else because.
P1: You'd know them, you'd probably.
P2: You have to work together in order to get all the materials and build everything up.

Interview 2:

P: Yeah, it was erm, I don't think it would be as rewarding doing it on your own and then maybe not anybody seeing the creation afterwards. So it was good when erm the three of us had it built and could invite other friends in to see it.

Interview 3:

P: Er both, erm I play on my own sometimes, but I will play with other people. Erm it's more fun with other people but you find the productivity tends to get lower strangely with other people because you know. I suppose it depends on who you're playing with but you know tend to have a bit more messing around doing things you really not supposed to be doing. You can't really focus on doing one thing, erm it takes you a little while before everybody gets focused and they build just one thing.
I: And what kind oh OK so people you do play with are they people you play with on other games or are they just strangers?
P: Erm they're people I play with on other games, people I've either met through friends or people that I know in real life. Erm if er you know I've got some friends on Xbox that I know I've met through [male name]. So I've got some online friends things like that and just people that I then meet on Xbox through them.

Interview edited at this point

P: Go do it's not like I can go down the park and play football with him or something like that. Even just go out see a film go for a drink these kind of things, we can't do every day except when we're up visiting. So you know, for the most part we try and play games together and we tend to play Minecraft and Portal things are like that. Because they, I think it's nice to have a game where we can sit and do something and chat not be shooting something. I think the typical online games are shooters and I enjoy shooters but there's this the element of you tend to be working in a team and you've got to focus on what you're doing and then. Whereas, you know in a game like Minecraft you can just relax, chat, catch up with your day and stuff like that while you're pottering about building things erm.

Interview 4:

P: Erm I sometimes would play it with friends but because we're it really only playing on a server between us rather than a public one.

I: Right.

P: Like nobody's really had the money to have a server or like the power type server so I haven't really played it lately like last time we made a village.

I: Uh huh.

P: And we played like Survival Games where people make games in Minecraft and you're supposed to take part in it using Red Stone and stuff.

Interview 5:

P: Er I did at the start when I first got it, because I thought it was fantastic but then I realised you could play it with other people and it's kind of boring playing it on your own. 'Cause it's more fun if you're playing with other people at the same time er, usually I play with friends like there's er servers online that you can go to but I don't I prefer just playing with people that I know.

Interview 6:

P: Yeah and ooh I have an Xbox one as well but I just got that recently, because er my girlfriend has it on the Xbox and so do a couple more of my friends. They started playing it and I kind of wanted to get involved and join in.

I: Right so some of your friends and your girlfriend are on Xbox, OK and you're physically quite far apart from your girlfriend as well?

P: Er she lives in Glasgow.

I: Right, and you live here in Edinburgh?

P: yes I see her [inaudible].

Social Play (elaborate pranking):

Interview 2

P: So when you when the pressure plate, the lava would just fall from the roof and you could also lock doors behind them so they couldn't get out just have to burn to their death so there's loads of little creative.

I: OK and did you is that is that, did you spend much energy doing that?

P: Erm it took a lot longer with the erm with the gold and the red dust thing to cable things you have to put it underneath the ground so it would be hard for people to see the track.
I: So how long would it take you to build a trap?
P: A good two hours maybe for a decent one.

Transcrition edited at this point

I: Erm right okay so you went onto Minecraft, you did community things, you built stuff ,you blew people up, was it only him that you blew up?
P: Just him, because I've known him since I was about six.

Transcrition edited at this point

P: I see myself do it a few times too. My other friend [male name] on his server where we would build something together and I would build a pressure plate on one of the doors and put loads of TNT underneath it. So whenever you were toddle into the structure the pressure plate would go off and blow everything up. So there was a certain er malicious aspect to it there.
I: But you see you're yeah OK see you've put a pressure plate with TNT on it on his server would he laugh?
P: No erm I would laugh but he wouldn't it was just a case, it wasn't something he couldn't fix, it would be something where he could just backtrack the server.
Transcrition edited at this point
P: Yeah, but it's quite funny there'd be you can be quite creative with your traps. Like have trapdoors and they can fall to their death in lava pits and things.

Interview 3

P: .. I remember a typical one is if someone goes away if someone goes AFK goes to the bathroom or goes to make a cup of tea or something like that and they're away from their keyboard erm or controller in this respect. Erm the other players will build blocks around them and block them in so that when they come back they're like 'where, where am I?' its just black they can't.
I: Yeah.

P: Like ‘cause it’s so dark in there they just think their screen’s gone black and they’re ‘What’s going on?’ And it it’s funny watching people like take a good minute or two before they realise that they’ve just been blocked in and all they have to do is mine themselves out but they’re confused is. They’re like ‘oh what’s happened, why is it so dark?’ sort of thing and they haven’t realised that we’re all sitting there giggling cause we’ve just put blocks basically just put them in a box.
I: OK

Transcrition edited at this point

P: So you know I think you put that risk on yourself er you know we’ve we’ve blown up each other’s stuff before. It’s funny if I think, the fun comes in like doing it without them noticing. So yous’ll be chatting away and it will be like ‘er der’ and you’ll be like ‘oh yeah yeah,’ building away ‘oh what are you doing? You’ve been quiet I haven’t seen you in about 20 minutes, erm you been on the other side of the map wait, what have you been doing?’ Then you go back and they’re like they’ve done something awful to you and they’re like.

Interview 6:
P: Er yeah sometimes we kind of set traps for each other and stuff like TNT under the floor with a pressure pad on top of it or something.
I: That’s quite standard is it?
P: Yeah it’s just funny it’s just funny to prank each other and stuff is just like pranking someone in the real world except it could be a bit more ludicrous because you know, you can’t TNT someone in the real world.
I: Do you ever see someone kind of losing it when they you know getting upset with it?
P: I’ve never seen someone get upset I’ve never seen someone get upset when they’ve been trolled.

Common Resources and Common Practice

Interview 1:

F: Yeah, we found this maybe a month ago, the Tekkit, we've been playing Minecraft for about a year or two.

M: But not constantly, on and off because we get bored of it at times 'cause we're like 'what can we do now?'

F: Er but we found Tekkit and it kind of erm almost like renewed Minecraft to like, it made us want to play it again because we kind of got a bit oh it just normal Minecraft was,

M: A bit boring all of a sudden.

F: Yeah 'cause we played it so many times and like I don't know.

M: 'Cause we'd run out of things to do.

I: OK and so you don't go onto forums and show people what you've made or?

M: Naah, you get a lot if you just YouTube Tekkit, the amount of stuff that people make.

Interview 2:

P: Erm there's a lot of yeah we done. Another thing that we found out on a YouTube video erm Yogscast erm you could make a a turret of TNT and it was basically just fire TNT across the map so you could have like battleship battles.

Interview 4:

P: Yeah like you can start on your own servers. There's like a Hunger Games one where the whole thing is like you kill whoever come by and there's not many resources available. 'Cause nowadays there's hunger in Minecraft.

I: OK.

P: So you can die.

Empathy

Interview 1:

P1: There's a cow stuck in this, he's like he's stuck in one block so like that sort of.

I: Can you feed it at all?

P1: No, he just sits there.

Transcription edited at this point

I: So, you seem, you seem squeamish about this and you're divorcing yourself from.
P1: Yeah [female's name].
I : From taking part in this.
P2: Well,
I: D'you.
P2: I know er it's OK it's an imaginary cow,
I: Mm hmm.
P2: But I thought I I'll make the sorting machine and I'll do that stuff.
P1: The more ethical stuff.
P2: I was making the power thing at the time.
P1: So I made a cow machine.
P2: And so it and he was like 'oh I'm gonna make a cow machine' I was like 'right you get on with that then' I just didn't get involved.

Interview 3:

P: … And it was just floors above floors to keep the villagers in and these little prisons and it was just like tiny little box rooms as well. They could barely move in them and it's really quite cruel, but it was quite mean but I don't know why it's because it's a game. Its sort of becomes acceptable but erm yeah it was weird because it was quite dark like to see that erm.
I: What would you I'd mean I mean if that was somebody that you knew would you think differently about them as a person?
P: No not really I think to be honest what's what's weird about it is it's a lot of effort to go to like you know. With erm pigs and sheep and stuff like that you can er you can attract them to places with hay you can like hold a hay bale and attract them. But like villagers, you're literally going to have to like shove them about everywhere you want to go and hope that they kind of go in the rough direction and it would have taken a long time to do that er.

Interview 5:

P: Erm I don't like killing animals in it like. I'll I just I don't erm I prefer, this probably sounds stupid, but I prefer like erm you know growing plants and stuff like that for food. Because I don't I don't know it's sort of a moral thing. I don't like killing things in games like they're animals and things like that even if they're just like pixels all whatever but.

I: So you're a virtual vegetarian?

P: Yeah sort of, whereas in real life I'm not but I don't have to worry about killing things in real life to get food I just eat it.

Interview 6:

P: (laughing) Yeah one of my friends on Xbox live er we made a world and there were like three villagers and he poured lava on them I just thought that was evil, really mean of him.

I: OK.

P: He just took a lava bucket and like burnt all their houses down.

I: So that was unreasonable?

P: It was quite funny but still I wouldn't do that I would leave them to do their own thing, I feel bad killing them off.

Appendix vi. Vignette Descriptions from Chapter 6

Vignette 1 Young Mother.

Video Recorded 30th August 2013 Between 11.30 and 13.00.
Length: 8 minutes 45 Seconds.

Animo is in its rest state, the primary table is clear of pictures. A mature male and female couple walk up the ramp and enter Animo. The female glances at the primary table, stops and looks around the space. The male briefly reads the instructions and then presses the button. The sequence starts, the female looks around whilst the male watches the table.

The female walks to the secondary table, points at the box of images and says, "Look, there's these things 'ere." The male watches the countdown on the output wall. The male continues to watch as the interactive moves on to prompt taking the second picture. The female moves out of shot and the male starts to walk, continually looking around, to the secondary table. He briefly looks at the secondary table and walks away. Animo continues its sequence with no participants.

The male expects some form of result from pressing the button, this starts the automatic sequence but he seems to have no understanding of what's expected or desire to explore. However, he is prepared to wait until the second frame before leaving, his stance is that of an observer and he visibly leans back to watch. The female notices the pictures on the secondary table but does not take any action. This would lead to the conclusion that Animo is somehow lacking a "call to action" for these people. This type of behaviour is common throughout the video data and it has been decided that activity such as this be coded as 'lean back button pushing'.

As Animo starts to prompt for position 6, a female Visitor Assistant (VA) enters from the ramp, shortly followed by a young mother pushing a buggy containing a young girl. The mother glances at the empty output wall as she turns the corner toward the primary table. Two mature women enter Animo from the ramp in conversation. The

mature women stop and look around at the blank output wall. The mother wheels the buggy to the primary table, presses the button and examines the table. The sequence starts again; the mother folds her arms and reads the instructions.

From dialogue later in this vignette, it can be ascertained that the mother is familiar with Animo and has an understanding of how to use it. Her act of pressing the button mid sequence is quite common, the effect of this is to cease Animo at its current point and start the sequence at the beginning. Participants do often push the button, sometimes seemingly with little or no intention. Pushing the button with a lack of intent is coded here as 'just pushing.'

The mature women traverse further up the ramp and the mother moves over to the secondary table. The mother selects some images from the top of the pile, not paying particular attention to what she takes out. The mother walks back to the primary table, presses the button and starts laying images on the primary table. The mature women approach the mother and one of them asks, "Do you know what you're doing?"

Here the mother demonstrates a lack of care in what pictures she retrieves. This is typical behaviour; the majority of participants will not pay particular attention to the images they use, though some do. Often, participants will repeatedly use whatever images are left on the table. What is interesting is that in her later dialogue ("it's a bit like a short film" and "It should make a story") the mother demonstrates that she is aware that there is a narrative dimension to Animo but does not put care into developing one. This is possibly because her daughter is very young and the mother struggles to get her to fully understand their actions, trying to create a narrative as well may be too much effort. The mature women demonstrate an eagerness to understand how Animo works and are prepared to approach someone they don't know to ask.

The mother replies "Yeah, I've been here before. What you do, you put pictures. Then you literally run by the pictures and it takes your photo. So it's a bit like a short film. So you can pretend like you're standing under the rain like that;" She mimes holding an umbrella. "Or you can point it at the burger and it comes up with," she

continues to explain the interactive but this is inaudible. She suggests that they watch her and her daughter. She leans into her daughter saying "shall we have a go?" unstraps her and lifts her out of the buggy. Adjusting the position of a picture of a rain cloud on the table at position 1, while the child watches, she says "move that out of the way." She then lifts the child, cradles her in her right arm and presses the button.

Here, the mother confirms her previous experience of Animo. Adjusting the picture of the rain cloud suggests that she has an understanding of where the pictures need to be to make a satisfactory final image. What the mother is demonstrating is coded as 'lone operation.' The time between shots is too short to afford running back to the table and adjusting images so they need to be positioned before hand. Another example of lone operation occurs in the vignette Families not transcribed here where a boy makes composite images using just the primary table; no actor takes part.

The mature women take up spectating positions, one at the primary and the other at the secondary table. The mother hurriedly walks round to the output wall and takes up the first position under the rain cloud, still holding her daughter. She says something inaudible to her daughter and points in the general direction of the camera. Animo takes the first picture, the mother moves away from the wall where a composite image of her holding her daughter under a rain cloud remains. The mother points to the image in order to bring her daughter's attention to it. One of the mature women says "Oh look" and moves, possibly to gain a better vantage point.

The mother is demonstrating an awareness of how and when to pose by encouraging her daughter to look in the direction of the camera. The mature women are enjoying spectating.

The mother moves to the second position where there is a large picture of a burger, she tells her daughter they are "gonna eat the burger." The mother makes an exaggerated biting action and encourages her daughter to "take a big bite." The child mimes taking a bite and then turns smiling, toward the camera. The mother again mimes taking a bite and points at the burger, the child looks around and the picture is taken with the mother looking at the daughter and the daughter looking at the camera.

The mother steps back, pointing at the composite image on the output wall. The mature women make positive noises and one of them says "Oh that's great."

Here, the mother is trying to guide her daughter into miming and gesturing effectively. The daughter does not fully understand what is expected, this is likely due to her young age.

The next image is of a birthday cake. The mother tries to get the daughter to mime blowing the candles out. She tries to manage this by counting down "1,2,3 blow" but does not manage to time this with the camera. The following image is a result of poor camera alignment and is the back of the mother, obscuring the child. Gesturing her hand in the direction of the wall, one of the mature women says "So you can put things on the table." The other mature woman says, "Yeah they're stroking the cat," the next image is of a cat. The first woman then points out "You're seeing the back of their heads all the time."

Again, the mother is having issues timing her daughter's actions effectively. This is the third position and it is clear the mature women are beginning to appreciate how Animo works. They also demonstrate an understanding of the fact that actors need to look at the camera. This realisation of the operation of Animo is coded as 'getting it.'

The mother places her daughter on the floor, points to the picture of the cat on the output wall and instructs her to "Stroke the cat." The daughter does as instructed and turns round as the picture is being taken meaning the resulting picture is the back of her head. The mother laughs in a resigned fashion and takes her daughter's hand. They move to another picture of a burger and the mother picks up her daughter. The mature women move in closer, possibly to get a better look. The next image is once again of the back of the mother's head but this time, this is the position she adopted. She steps back, looks at it and states "Oh that's not a good one."

The mother is demonstrating her understanding that actors need to look toward the camera. This is coded as 'understanding positioning.'

The subsequent image is of a hot dog, the mother encourages her daughter to "hold it properly" and the daughter reaches out her hand, touching the hotdog. Because of the camera positioning, the composite image is of the daughter reaching for but not touching the hot dog. The final image is another rain cloud, the mother puts the daughter back on the floor and tells her to "put her hands on her head," placing her own hands on her head. The daughter looks at the output wall, puts one hand on her head and the picture is taken. The resulting image is of the back of the mother's head, the daughter does not appear in the picture because she was standing too far back from the wall out of camera shot.

The mother says to the mature women "It should make a story." The mature women thank the mother, they are smiling and have clearly enjoyed their experience. The sequence continues, highlighting individual frames, the mature women laugh and the mother picks up her daughter, points to the wall and says "look at your cheeky." One of the mature women says "You know I've been here so many times and this has never been working." They thank the mother again and walk away; the mother says "it's better if you've got more kids."

The mother points out a picture of the daughter to the daughter, the words The End appear on the screen and the mother says 'the end" and claps, asking "was that fun?" Mother and daughter walk back up the ramp, the mother pushes the buggy and they start to walk away. The mother presses the button as they leave, stops the buggy and the daughter climbs in. Animo's sequence starts, the daughter points to the output wall and says "look" and something inaudible. The mother asks, "Shall we go again?" She looks at the child who has now settled in her seat, says "oh" and walks away. Animo continues its sequence without participants. The primary table still hosts the images the mother left behind.

Vignette 2 – Group of Youths

Video Recorded 28th August 2013 Between 15.00 and 16.30

Duration: 9 minutes 28 Seconds.

The HD camera did not work for this recording and only three views were captured, a close up of the table, a close up of the first part of the output wall (side on view) and a close up of frames 4,5,6 and 7 (front view).

Animo is in its rest state, the primary table has several images laid on it, some positioned for use and others in a pile in the bottom right hand corner of the table. A young male (estimated age of 11/12) enters Animo from the ramp, followed by another male of a similar age and two older females. The first male is loudly boasting that he is faster than the others. One female, talking to the other asks "So what then?" She is answered by the other female with, "Then we take pictures." They all continue to walk up the ramp apart from the second female who points at the output wall and stops. The first female stops and the second female tells her "You have to stand there." The first male walks past the primary table, turns and walks back. The first female walks back to the second female at the output wall, the second male is out of shot.

It can be ascertained here that the second female is familiar with Animo.

A male VA approaches from the top entrance and in a loud voice asks if they have been here before. The first male, stood alone at the primary table appears to become tense; perhaps concerned that he is about to be scolded. The VA then asks, in a more gentle tone "Do you know what to do?" The first male points toward the females and says, "They do, yeah." The VA says "That's fine then, do it then," the first male appears to relax. During this exchange the females have been watching from the ramp and the second male has walked down the ramp, staying close to the input table in order to hear the exchange and stops on the other side of the railing, directly in front of the first male and the VA. The first male calls to one of the females by name; telling her to "come on," the VA says, "Press play."

The actions of the young people and their body language would suggest that they were unsure if they were going to be asked to leave. It is a reasonable assumption to expect that groups of young people are used to being moved on. This specific VA is one of the more proactive team members and has been observed, when on duty, actively encouraging visitors to use Animo.

The females walk across the ramp and lean over the railing pointing at the primary table. One of them instructs the male to push the button. The first male asks, "which one?" One of the females answers, "the green one." The first male asks, pointing at the button, "this one?" The female answers, "Yeah." During this exchange, the second male runs up the ramp to the primary table and joins the first male. The first male presses the button, looking around and smiling and the sequence starts. The VA leans in and adjusts a picture on the table. The first female leans back looking at the output wall, the second female crouches down, the first turns and looks at the second. The first male says, "cool" and the second female says, "gonna take a picture." The first male puts his hand on the table and quickly removes it; the VA says "Watch what happens." Animo takes the first picture and the VA leans in, explaining to the males "See all these things on here," he moves a picture with his index finger, "you can move if you want to." Here it is possible to claim the youths are "getting it".

The VA uses bodily action to help the males understand how Animo works. He is taking a passive stance, particularly using language such as "if you want to." The males seem unsure whether to put their hands on the table or not.

The females step back to view the output wall and the first male says loudly for the females to hear "You could be holding that." The second male puts his hand on the table, placing his arm between the first male and the table. The first male shoots his hand out and moves the image the second male was about to manipulate into shot, the second male moves his hand away.

The males communicate non-verbally, using their hands. The first mail picks up an image before his friend, this activity is coded 'claiming images.'

Because of the camera's side on view, it is not possible to see what images are being manipulated in the first three frames but it is likely that position 2 has a picture of food because of the positions the females take. They lean back on opposite sides of the frame with arms outstretched and mouths wide open. The first male continues to manoeuvre the image, possibly to position it more succinctly, the second male moves his hand in to try and make adjustments but the first male does not let go. Animo takes the shot, the first male still has his hands on the table, he says "I'll put my hand out of the way." It is unclear if his hands appear in the final output picture.

The second male walks around the back of the first male and starts to manipulate pictures on the other side of the table. The second male manipulates pictures of a butterfly and a flower at position 4 while the first male manipulates a picture at position 3. The first male says, "right position three," and then loudly for the females to hear, "someone bite it." The females take up a position on either side of the frame leaning their heads in and opening their mouths wide as if to bite something. The first male watches with his hands on his hips, the second male leans back, keeping his hands on the base of the table. The females move back from the wall and the second female points and laughs. The first male smiles and moves his hands towards the pictures of butterflies at position 4 on the table. The second male removes a picture of a burger from position 5 and the first male adjusts the pictures at position 4, moving in a picture of a flower. The females step back and watch the first male's hands on the output wall. The second male slides the picture of the burger back into position 5. The females pose at position 4 as if they are holding the flower and the picture is taken. The resulting image is of the side of their heads.

The second male has acquiesced control of table to the first male but is evidently interested in Animo. He demonstrates this by advancing to position 4 whilst the first male is at position 3 but moves on to position 5 to allow the male control over position 4. What the second male is doing is preparing the table ahead of time this is coded as 'looking ahead.'

The first male says, "Burger, burger and ice cream there," pointing at the table; the second male says, "That's what I thought." The second male touches the first males hand, gently blocking it. There are pictures of an ice cream and a burger on the

output wall at position 5 and the females take up positions that make them look as though they are eating them. The second male adjusts the burger, bringing it further down, the first male moves around the back of the second male, he takes up a spectating position, physically leaning over the secondary table.

Here, the second male is no longer willing to allow his friend control. His "That's what I thought" statement combined with his blocking motion is his way of pointing out that he had prepared that image and wanted to construct it. There is no active aggression here, both males are clearly engaged and the second male believes it his turn. The first male accepts this and moves away from the table.

The females laugh as the picture is taken and step back to examine the output wall. The second male moves along the table and starts to remove existing images from position 6. The resulting image is of the back of the females with the second female blended with the picture of the burger, the second female points at the picture and laughs. The second male slides a picture of a cat into position 6 and the females look at the resulting picture on the wall as they approach position 6. They pose as if stroking the cat; the first male exits Animo from the top of the ramp. The resulting image is of the first female with her arm over the cat and the second female's hand appearing in the right of the frame.

The first male appears to have lost interest and has left Animo, the second male remains engaged.

The second male calls out to the females, calling a name and then saying "come up here and show me what to do." He places a pile of images that he had been holding on the table and exits Animo from the top of the ramp. The females run up the ramp, there are three images on the table in position seven, they show up on the output wall and Animo proceeds to take the photograph. The females exit Animo from the top of the ramp, briefly looking at the output wall. Animo continues its sequence with no participants ending in its rest state.

The second male appears now to have lost interest and follows his friend. Interestingly, as the females leave, they pay little attention to the images they have

created. What is pertinent to notice throughout this vignette is the lack of verbal communication between actors and directors. The females take their cues from the images the males place on the table and pose accordingly. There is little sense of organisation or narrative construction, they are simply acting.

Animo sits unused for several minutes, the investigator walks down the ramp and counts aloud "1,2,3,4" then claps and walks back. This counting and clapping was used to aid synching the videos during editing. A young boy of roughly six or seven years of age runs up the ramp, stopping at the top; he is closely followed by a young woman. The young woman walks up the ramp, looks in the direction of the input table and then at the wall. The boy says "[woman's name] there's some magic," "I know," she responds. He walks up to the primary table and presses the button (just pressing); the woman is close behind him.

The boy walks toward the top of the ramp and the young woman stops to read the instructions on the primary table. She looks around and he approaches her taking her hand. He says something inaudible and they walk away. The VA approaches them, asking "Alright?" They exit; the woman says, "You don't want to do it? You press the button and" the rest of the conversation is inaudible. Animo continues its sequence with no participants. As Animo reaches the end of the sequence where it highlights individual frames, the young people return from the top of the ramp.

The second female swiftly clears the pictures on the table, brushing them off with her hand. Some of the pictures fall on the floor. The first male says, "can we eat the burger?" The second female presses the button. They walk round as a group to the first position on the output wall. The first female says, "Take the pictures," the second male continues walking down the ramp and the first female calls him back by saying "this one, this one." They all pose making the shape of hearts with their hands and Animo takes the first picture. The second female says, "Let's try the next one."

This is an example of appropriation as repurposing. They are not interested in using Animo in the manner in which it was intended. In fact they take very little care of the images on the table and exert their interpretation of Animo, using it to make a series of group images. This is similar activity to the youths encountered at the initial study,

described in chapter 4. The difference is that the youths in the initial study placed personal items on the table to augment their images. This is coded as 'creative misuse.'

They stand back and look at the output wall, the second male walks around the group and instructs them to look at him (meaning the picture of himself) and says something inaudible that starts with "I look." The first male walks on down the ramp and the rest of the group stop at position 2, he turns and runs back to join them saying "wait there, wait there." The group start to pose, the second male raises both arms, the second female leans against the wall pouting and pushing her chest forward, the first female is not visible to the cameras and the first male jumps to his knees in front of the group, raising his arms. They step back to look at the image and the second female laughs saying, "look at me."

They group together in front of position 3 and make hand gestures, similar to the hand gestures popular rap artists make. They step back, look at the picture and the first female says "in a army tank." They move to position 4, group together and the first female instructs "funny face." They all pull grimaces. The first female says "look at my face, everyone look at my face." The first male laughs and gestures with his hand. They gather at position 5, the first female says "bunny" and they lift their arms and position their hands directly underneath their chins in order to mime a rabbit. They step back to look, the first female points at the resulting picture and laughs saying, "look at me ooh."

They move to position 6, the second male removes his hat and looks at the camera, the first male crouches down and the two females lean over him facing each other. They stop to look at the picture; the second female is not in the picture due to camera positioning and the fact that she was standing out of frame. They move to the 7th and final position, the first female crouches saying "whatever you want." They pose and the picture is taken, they step back to look and then exit Animo from the bottom, the first male skipping. The first female stops briefly to look at Animo, which is performing the final stages of its sequence. The second male turns his head, still walking away. They run down the ramp and Animo finishes its sequence with no participants.

Vignette 3 – Family

Video Recorded 28th August 2013 Between 15.00 and 16.30
Duration: 17 minutes 53 Seconds.

The HD camera did not work for this recording and only three views were captured, a close up of the table, a close up of the first part of the output wall (side on view) and a close up of frames 4,5,6 and 7 (front view).

Animo is empty and in its rest state. A young girl of approximately eleven or twelve enters from the bottom of the ramp; she is spinning and dancing, occasionally looking at and touching the wall. She appears completely relaxed and not self-conscious. Her father shortly enters the ramp, he is walking on the side of the ramp furthest from the wall. The girl looks at image 2 on the output wall and places her hand on it, mimicking the pose of the hand that is in the rest state image. Keeping her hand raised, she walks backwards, away from the wall, looking at the shadow she is creating.

This interest in shadows is a common occurrence. In the vignette Long Sequence a mother stops with her family to specifically make shadow images. This activity is coded as 'shadow play.'

She walks to position one, mimicking the image with her hand. She rests her left hand on her hip and looks at the wall. The father stops to watch her. She turns to walk away; her arm movements would suggest that she has given up. The father asks, "Shall we give it a go?" She continues up the ramp and turns to her father asking, "Huh?" He repeats, "shall we give it a go?" They stop just before the primary table, where a pillar obscures line of sight of the table. She says something inaudible whilst holding onto the railing and rocking back and forth. She turns and skips back to the output wall, the father takes up a spectator's position, leaning on the railings on the other side of the pillar from the table. She spins round several times and asks, "I wonder what the objective is of [inaudible]?" The father nods at the study video camera and says, "It's for recording people." She steps back looking at the wall and

says, “So that’s one.” She approaches the wall, places her left hand across her stomach, supporting her right elbow with her hand under her chin, signifying that she is concentrating.

The father has not seen the primary table and his actions and conversations would intimate that he assumes the study camera is part of the installation. The girl is concentrating because she is trying to understand how to interact with Animo. Because of the direct, interactive nature of the other exhibits in the building it is likely that she assumes that Animo is directly engaged with.

The girl then attempts to emulate the physical positions of the man depicted in Animo’s rest state. The father gives instructions such as “Other leg” or “Hand up.” The father turns walks around the pillar toward the primary table. The girl runs up to a study camera and waves at it saying “Hello.” The father presses the button and the girl walks toward him. The Animo sequence prompts to “Go to position one,” the father says “Oh, go to position one,” the girl runs round to position 1. The father counts “five, four, three,” the girl arrives in front of the output wall as the audio instructions say, “Get ready.” The girl stands away from the wall looking confused and Animo takes the first picture. The girl puts her hands over her head and the father says, “Too late, it’s taken it.” The father leans his hands on the primary table, taking up a spectating stance.

The actions of the girl trying to emulate the positions of the person on the wall are of great interest. The girl may well be trying to get her shadow to match the picture and it is clear from her conversation later that she thinks this may be how she started the sequence. The father presses the button (‘just pressing’) but assumes a spectating stance and does not explore the table. He is content to spectate his daughter but when the audible instructions start, he makes attempts to direct her actions.

Animo prompts to move to position 2, the girl moves down the ramp and the father tells her to “Get closer.” The girl walks down the ramp looking straight ahead. The father instructs her to look back, she steps back and looks at the output wall in position 2. The girl moves to position 3, raises her arms up and looks in the direction of the camera. She briefly looks at the composite image and moves to the next

position. There is a picture of a cat at position 4, the father tells her to "Look at the cat." She looks at the wall at position 4 just as Animo darkens the wall so she does not see the cat. She turns and looks around, the father says, "The cat on there, there's a cat." The girl turns, just as the cat becomes visible, she ducks, looking at the wall. She turns to her side raising her hands to her face in mock surprise. The father says, "Point to the cat or something" then "Face this way." She assumes a position slightly crouched pointing at the cat, looking at the camera. She moves on to the next position without looking at the previous picture.

The father is demonstrating an awareness of the need for the actor to face the camera. He is content to spectate, giving some verbal instructions.

The next position has a picture of a basketball, she crooks her hand around the top of the ball. The father says excitedly, "Kick it, kick it, kick it." She balances on one leg in a kicking position, Animo takes the picture and she slightly loses balance, putting her foot down and giggling. She walks on to the next position, the father tells her to "Go look at it, look at the ball." The resulting image is of her kicking the ball but she is too far to the left of the frame to fully appear in the picture. She turns and looks, giggles and then turns away, moving to the next image. The next image is of a burger, it is not possible to see the girl's position from the camera view.

It is evident that the father is engaged and enjoying this interaction with his daughter. He is actively involved by giving directions.

The girl turns to look at the composite picture. The father starts to direct her for the next picture "Tongue out, lick the ice cream, lick the ice cream, next one." He stands up saying "position seven.." She moves toward the next frame, which is dark and asks "What's the next one?" "Ice cream, big bite," the father responds. A young couple enter Animo from the ramp; they stop in order to allow the girl to continue her activities. The girl leans into the picture. The father instructs, "Look at it." She looks but only the image of her appears in the frame and no ice cream.

People who walk through Animo will often stop so that they do not interrupt. Actors are highly visible to people walking up the ramp. This action of stopping is common

courtesy and is a similar action to stopping in the street to allow a person to take a photograph. This activity is coded as 'Not in shot.'

Animo starts the end section of the sequence, the girl moves to a more advantageous position for viewing, part way up the ramp. The couple watch from the bottom of the ramp and the father puts his hands on his hips, spectating. After looking with interest at the wall, the couple continue to traverse up the ramp. The man says, "Ah Mummy didn't see it." He then begins calling his wife telling her to "come, come, come, come." The girl says loudly, "Look at me, I'm everywhere, I'm famous." A boy, the girl's brother, enters Animo from the ramp; their mother follows him. The male from the young couple looks round and then glances at the female and smiles, they continue walking up the ramp.

The father is keen that his partner, the girl's mother, sees the image sequence. The couple are taking pleasure from seeing the girl's interaction. The girl is clearly excited and engaged with the output.

The boy asks the girl "Why are you there?" The girl answers, "[inaudible] I did it." The male responds "I want to do that." The father states that "Mummy never saw it," the girl asks the mother if she saw it and the mother confirms that she did see some of it. The boy says "I want to do it, how do you do it?" The girl says "I don't know, it just done it. I was doing the same poses. Then it said hello." The boy asks "How d'you make it go?" They speak to each other but this is inaudible. The boy walks toward the study camera and the girl walks up to the camera, leans in waves and says "Hello."

Here the girl demonstrates her belief that the interactive started as a response to her emulating the poses. Having seen the results of the output, the boy shows a desire to take part. By viewing, the boy gains some understanding, this understanding by viewing has been discussed before (chapter 4) and is coded as 'Scaffolding' after Hoenecker and Stifter (2006).

The couple walk up behind the father. They stop between the primary and secondary tables. The male puts out his hand and moves a picture of a burger that is on the primary table at position 6. The father asks, "Ready [boy's name]?"

The action above shows two examples of establishing turn taking. By physically touching the picture of the burger and manipulating it, the male is indicating his interest in having a turn. His interest in taking a turn is confirmed by the fact that the couple patiently wait (coded: 'Watching waiting') through almost the whole of the next sequence. Touching the table is tactically significant as a method of turn taking. In the short vignette titled Rude Boys, not transcribed here, the importance of this is highlighted. A mother and daughter are standing at the primary table discussing and choosing pictures when two boys run toward the table, place and move images and press the button. Pressing the button involves bodily reaching across the mother and daughter. The boys proceed to move the study camera and then run round to the output wall making gestures in a series of images. The mother is extremely angry and a heated exchange takes place. The father establishes that he wants to take another turn by asking his son if he is ready. This activity of establishing turns is coded as 'My turn: table touching' and 'My turn: verbal claim.'

The boy asks, "What do I do?" The mother walks up the ramp and the boy throws his jumper from the ramp upwards to his father. The father catches the jumper, throws it over his shoulder and presses the button. The boy points to the output wall, puts his hand on his chin and walks out of shot. The father tells him to "Go and do the first screen." The young couple is stood at the secondary table, looking at the pictures that are contained there.

The father and daughter give instructions. Having put the jumper on the table, the father is leaning on the railing watching the output wall saying "Go first, go first first." The daughter (out of shot) says, "Go, go all the way there and take. [Boy's name] no, the other way." The boy walks toward the wall looking left and right. He makes a pose and Animo takes a picture, he proceeds to make two more separate poses and the girl laughs. The female member of the young couple looks up from the secondary table and walks closer watching the boy.

The girl and the father are keen to explain Animo to the boy. It is clear that he does not understand when or how to pose. They resort to confusing verbal instructions. There is a sense of urgency because Animo is going through its automatic sequence including counting down.

The father says, "It'll come up in a minute. Oh that's too far away, go to the second one." The girl tells the boy to "do your thing to the other one." The father tells him, "Closer to the screen, closer to the screen." At this point the girl is repeatedly shouting "Go closer to the screen" the father is shouting "Look the other way" and there is a confusing cacophony of instructions coming from them. The boy stands in front of the wall, gets closer to the screen, looking around in a confused manner. Animo takes a picture with the boy's back turned to the camera.

The father tells the boy "Be behind you now, move round. Last time we do the picture now," he gestures at the wall, "there's a cloud there." Mother and daughter have moved but are standing in an area that is very dark and it is hard for the camera to see them in detail. The girl lifts her hands above her head and says "Just do this [boy's name]." The boy lifts his hands either side of his head, palms outstretched, he says something inaudible, Animo takes the picture. The boy turns, glances at the picture and moves to the next frame, it has a picture of a cat on it. The father tells him to stroke it, he puts his hand out to touch the wall, looking at the previous frame and turning. The girl tells him to get closer to the wall; he turns with his left arm at his side and his right arm in the air. Animo takes the picture, the girl says, "That doesn't look natural," he spins round looking at the resulting image.

The verbal instructions that are being given are not particularly clear but this document has previously discussed how difficult Animo is to describe and the nature of its distributed affordances.

During this exchange, the female from the couple has walked toward the primary table, holding a picture in her left hand. She looks at the table with her hand on her mouth in a thoughtful pose. She turns and walks away.

This may be an attempt to politely assert that they are waiting for a turn by making her physical presence known.

The boy walks to the next frame, which has a picture of a basketball. The girl tells him to "Pretend to like bounce it or kick it or something, bounce it." He poses with his hand on the ball. He continues to the next frame, which contains a burger. He moves to the final frame, the camera view is slightly obscured by a large piece of paper that the father is holding. It is possible to ascertain that this frame has an image of an ice cream from past and future statements. The father tells the boy to "forget this one," once the picture is taken, he then instructs the boy to stand on the ramp, gesturing with his fingers, to watch. Animo goes through the final part of the sequence and the girl says, "The ice cream never comes on." The boy responds, "So I'm licking nothing?" "Yeah, I did that too," the girl says.

The father tells the boy to forget this picture because the ice cream does not appear in the final shot. Though he is stood directly in front of the primary table, he has not made the association between it and the images that appear on the wall.

The girl states that she wants another turn, the boy says "I don't understand the first one," the father says, to the girl "Go on then." The couple walk up the ramp, exiting Animo.

The couple accept that they will not get a turn from the father and daughters' verbal exchange (my turn: verbal). This is not usually an issue as potential participants can return after looking round the rest of the third floor.

The girl says to her father "Daddy you do it," "on the way back," he responds, "no" "if you do it Mummy might do it," the girl says, "Mummy's scared," he replies. The mother walks into shot, standing by the first position. The father says "Ready?' The girl replies "Yeah." He presses the button. The girl states, "I'll pretend to be a passer by," she walks over to join her mother, the boy follows her stating "we're the passers by." The father counts down from 5.

The father is jovially goading the mother into interacting with Animo and her children but is not prepared to take part himself.

They create the second image with the father giving directions such as "hand down" and counting down, they continue in this manner until position 5. Position 5 has a picture of a burger on it, the girl says to her brother "You do this," patting her stomach "and I'll do this," rubbing her stomach, the boy follows her instructions and the mother leans in with her mouth open. They continue and finish the sequence with the father leaning over the railing spectating. As the final part of the sequence finishes, the father says, "come and have a look babe."

The boy says, "let's do us all." The boy, girl and mother move back up the ramp looking at the output wall. The boy starts dancing and moving erratically. The girl walks over to where the father is leaning over the railing saying, "let's all do one, just family photos." Then she says, "let's all just do family photos ignoring the pictures." The boy agrees and they encourage the father to join them (creative misuse).

This is the third example of creative misuse involving ignoring the images on the table and taking group portraits. This begs the question of whether Animo's simple affordances are to produce group pictures.

The father tells them to "hold on, I've got to push the button first." He pushes the button, the girl says, "family photo, come on dad quick." The father walks round and they pose with their arms round each other. As they walk to the next position, the girl says, "we have to all just be original like." When they get there, the girl says "peace all peace please," they all hold up two fingers in the style of a peace sign. They step back to look, the girl says "let's all just do natural," but the boy disagrees saying "same the same," the father agrees saying "same."

The girl gives conflicting commands; she is keen that they express themselves but is also keen that they adopt similar poses. The boy and father want to adopt similar poses.

They continue to do a series of group portraits paying no attention to the pictures that are on the wall. They communicate very little, relying on looking at each other for cues as to how to pose. They step back and watch the sequence. The father says "I wonder what they do with these pictures, you might see them in ten years time [inaudible]." "I'd love if they gave it to you," the girl says then "I love our family photos." They walk back up the ramp; the boy takes up position at the first point but leaves as he sees his family have not stopped.

The girl expresses her desire for a souvenir. This is a commonly expressed wish when using Animo. People sometimes satiate this desire by taking pictures with a smart phone.

The girl walks to the primary table and goes as if to press the button. The mother tells her to stop. "Can I do one more just plain?" She presses the button adding, "no one get in it." A different father and daughter enter Animo from the top of the ramp, they will here on be referred to as Father1 and Girl1. Father1 and Girl1 take up a position at the secondary table, looking at the table and watching the action (watching waiting).

The boy and girl run down the ramp, the mother says, "I knew you two were going to do it again. The father looks at the primary table and says "Oh I see what it is, put a cake in it" pushing a picture of a cake onto the table at position 2, "and a dinosaur" he picks up a picture of a dinosaur from lower down on the table and places it at position 3. "No wonder the ice cream's not in it," he says, adjusting the position of the picture of a cat at position 4 (getting it).

The children take up positions at the first point on the output wall. The father says "You're chasing a bat guys," the boy looks at the 2nd position and says, "I didn't know it was a cake." The father is adjusting pictures on the table in order to position them for future shots (looking ahead). The father walks over to the secondary table and says, "There you are, look baby." The mother is standing, watching with both hands on her walking stick. The father picks up some images and says, "Ah it's supposed to be in the cat already innit," he places an image on the table. The father picks up an image of a football from the secondary table saying, "Right, one for the boy." He places the picture on the table at position 6. The mother prompts the

children that the next image is a cat and they pose as if stroking it. A man walks up the ramp on a mobile telephone.

Now that the father has understood the association between the table and the output wall, he is actively engaged with changing and moving pictures. The boy and girl still haven't made this association which is why the boy is surprised to see a cake.

The father is leaning over the secondary table. Father1 turns to the father and asks when they will be finished (my turn: verbal). The father says something along the lines of "well, when we're finished." They have a light-hearted exchange and laugh; the father says, "we'll make sure we don't do a next one, no worries." The mother slides a picture of a burger from the bottom of the table to position 4 and removes the picture that was there. The girl asks her father for her jumper, the boy turns to touch the picture of the burger on the wall, the girl claps her hands and cries, "Pass it quick" the father throws the girl her jumper. The mother very quickly swaps the picture of the burger for a picture of a basketball. The children pose with their heads under the ball. The mother adjusts the picture of an ice cream at position 6.

The children move to position 5 where there is a picture of a football. The boy glances at the wall at position 4 to look at the previous picture. The boy turns and looks at the girl and she says "come on kick it, kick it, it's a football." The girl steps back on her leg and poses as if she is about to jump then brings her leg forward and stands under the ball. The boy stands next to her. The father removes the picture of ice cream from the table at position 6 and replaces it with a butterfly, saying, "We've had that one, put a butterfly on" (looking ahead). The children raise their legs as the picture is taken, making it look as though they were kicking the ball. The children laugh and walk down the ramp looking back at the picture they have just taken.

The children are at position 6, standing under the picture of a butterfly. The father says, "Put your hand on it [boy's name.]" The boy reaches his hand up and the father puts his finger on the butterfly in order to move it down the frame, within the boy's reach. The father's finger shows up on the out put wall as he is moving the picture. The father says to the mother, in a conspiratorial tone, "Put your finger in there." The mother makes an agreeing sound and places her hand, index finger outstretched, over

the butterfly as the picture is taken. The resulting image is an enlarged picture of her hand obscuring the boy with the girl at the edge of the picture. The father says something to the mother about obscuring the boy, she says to him, "There's my finger," and then louder, for the children to hear, "there's my hand."

The mother is amused by the inclusion of her hand in the image and it is interesting that she does not make further attempts to include her hand. It is rare for directors to include their hands in shots, despite the fact that the director's hand appears in almost every shot in the example displayed on Animo's rest state.

The final position has a picture of a hot dog. The children are looking at the wall preparing to pose. The father moves the picture one way and at the last minute adjusts it again. The children laugh; the boy raises his fists and says, "Great." They start to walk up the ramp. The father says, "Guys watch the show, come back watch the show quick." The children walk up to the primary table to join their parents. The mother tells them, "That's enough." The girl replies "I know." The boy looks at the primary table and says, "Oh you can choose" (getting it). The father says, "Yeah there's more over here, that's what we found out at the end." The girl looks at the primary table and exclaims "Oh" (getting it).

The father says to Father1 "All yours, you push that round button there to start, yeah." Father1 says, "Say that again." "You push this to start," says the father, "Start, yeah" responds Father1, "So if she gets in position and then push that to start, and change pictures around" says the father. Father1 says, "You change pictures, oh right yeah, thank you very much anyway." The father tells him, "There's more up there though," Father1 responds, "Cheers now, thank you, thank you very much." Father1 walks to the table saying "Let's put this drink here," placing a drink on the primary table.

The father expresses a desire to explain his understanding to the next participant. Again this is common activity coded as 'Passing down.'

Girl1 moves over to the primary table, she looks down, smiling. Father1 asks, "What do you want?" whilst sliding a picture of a cat from the bottom right hand corner of the table to position 6. He slides a picture of a basketball down the table with his left

hand. Girl1 has both hands on the bottom edge of the table and is grinning; she says "I don't know, I'm not sure." He picks up a picture of a hamburger with his left hand, holding it ready to put on the table and says, "Hamburger." Girl1 says, "No, you've got to put the things on," he responds with "OK." He touches a picture of a hot dog at position 7 with his right hand, as if he is about to move it. Father1 then swaps the picture of a butterfly at position 6, moving it away with his right hand and replacing it with the picture of a burger in his left hand. Father1 then moves the picture of a hot dog away with his right hand and slides the picture of a butterfly into position 7 with his left hand. Father1 moves out of shot, the cameras have started to run out of battery and the video now only has footage of the primary table and the second half of the output wall.

Girl1, who is wearing a football shirt, asks, "Can we have a football?" Father1 responds, "Don't have a football." Girl1 is bodily leaning on the primary table with her arms stretched across the table, her hands feeling the picture at position 3. Girl 1 moves away from the primary table, presumably to look at pictures on the secondary table with her father. Girl1 says, "They've already got a football on there." Father1 asks, "Ice cream?" Girl1 says something inaudible. Father1 leans in, holding a picture in his right hand, he places it on position 4. At this point the video of the primary table ceases and what remains is a video of the latter part of the output wall. The video cuts and there is a lack of audio. It is possible to see the side of Father1 posing at position 3, he and Girl1 both step back to view the picture.

Father1 and Girl1 take a lot of time planning (looking ahead) their pictures. This is because the father is going to appear in the pictures with the girl, this conforms to lone operation but is mildly extended.

Posing at position 4 where there is a picture of a cat and a football, they crouch. They continue to make pictures. Father1 steps back to take several pictures of the wall with his telephone; this is coded as 'Souverniring.' A young woman and boy walk down the ramp but stop in order to not get in the shot being taken with the telephone ('not in shot'). Animo finishes its sequence, going into its rest state. The boy stops at position 7 to adjust his sock and the woman looks at the out put wall. The video finishes.

Vignette 4 – Long Sequence

Video Recorded 28th August 2013 Between 13.00 and 14.00
Duration: 42 minutes 6 Seconds.

A participant stops one of the cameras, giving a front on view of the first frames early on in the recording. This means there are only three working cameras, the HD camera, giving an overall view of the table and the first four frames, an SD camera giving a close up of the primary table and an SD camera at the top of the ramp giving a sideways view down the ramp.

This vignette is more than twice the length of the longest sequence so far. The reason this vignette has been chosen is because it demonstrates turn taking and swapping between groups. This is of specific interest because it demonstrates how groups learn Animo's operation from one another, how they negotiate turn taking and how, if at all, they communicate with one another. What is particularly of note is how little verbal communication or protracted attempts to explain Animo there are.

The primary table is littered with images at the bottom with a set of carefully placed images set in position. Two females and a male approach Animo from the ramp. One of the females is pushing a pram, the male is holding a baby. The female that is not pushing the pram is the dominant member of the group and has used Animo before. The two females stand at position 1 and the male is instructed to "push a button over there somewhere." From their conversation it is possible to establish that the dominant female (DF) plans to make a series of images on her own but her friend states "I want to stand with you." DF acquiesces explaining Animo thus "You've got to do different poses all the way down. It's quite hard to explain it."

This exchange is important to this investigation. Rather than explain Animo in detail, DF decides to wait for her friend to see it in action to understand it.

The male makes no attempt to change any of the images on the table. The females proceed to make three images where they take up mildly sexually provocative poses.

For the fourth frame, the male joins them with the baby and then walks back up the ramp. The females then continue making provocative images. The male continues to spectate although the pram, which has been placed in front of one of the cameras, obscures the view of him but he exits before they are finished. The females exit, collecting the pram and walking up the ramp. Another large group of people come up the ramp, who appear to know the females, as Animo goes through the final part of its sequence. Once the sequence has finished, a male from the large group presses the button (just pressing). The male keeps his hand on the button, twisting it, as the sequence starts, he leaves the area by the top of the ramp. Animo continues its sequence with no participants.

The females provocative posing is interesting because it demonstrates that they are clearly aware that they are on view. One could assume that they are posing for the male and he does comment at one point where they pose kissing each other but they must also be aware that their images are on general display. DF is clearly the leader of the group and uses Animo to assert this position.

A mother enters Animo from the ramp. She has three children with her; a boy of roughly twelve, two girls aged six or seven and a girl who seems to be under five, and is in a pram. The mother stops at the top of the ramp and encourages the children to engage in shadow play. The mother tries to operate Animo through one of the study cameras, only stopping when the investigator intervenes. Meanwhile the boy presses the button on the table and moves images on the table. Two of the girls join him and copy his movement repeatedly pressing the button. Through moving the pieces and pressing the button, the boy makes the association between the images on the table and the projections on the wall, he points to the wall. As he is adjusting a picture in position 1, he moves his hands away quite late and his hand is caught in the image. The mother then leans in and puts her hands fanned out, floating above position 2. Her hands appear in the second frame.

The younger children are wandering around the top part of the space asking the mother what she is doing. One of the girls puts her hands over the table emulating her mother and the boy presses the button again. The mother is looking at the secondary table and explains to one of the girls that "these are all like tattoos," meaning the

pictures stored in the box. The boy continues to make images on the table using his hands and the images as combined props. The family walk away from the exhibit, as they leave the investigator explains how Animo works to the mother. Animo has been running through its sequence and is at position 3. The family turn to come back, the boy running ahead and positioning himself at 3. The mother takes up the Director's role at the table and begins to slide images around. The resulting image at 3 has the boy and the mother's hand in the shot.

The girls struggle to understand the nature of the composite images. A VA walks down the ramp and points out their image to them. A woman (Mother1) and a young boy (Boy1) have come into the space from the top of the ramp and spectate 'Watching waiting.' The boy is particularly interested in the study camera pointed at the table, touching it and handling it, eventually switching it off, leaving two working cameras. Another girl in a green top (GT) has walked up the ramp and is spectating from the bottom of Animo 'Not in shot.' At one point the mother places a picture of a dinosaur on the table and tells the children to "pretend to be scared." The family get to the end of the image series and Boy1 repeatedly asks the mother if she wants him to put a hot dog on. The mother encourages him to have a turn. Mother1 tries to patiently explain to Boy1 that he "has to start at number 1," she then asks the mother "what did you just do?" To which she responds "Well I was working from the table to do it."

Here Mother1 establishes turn taking by simply waiting in an overt position. This is a standard tactic in Animo and queuing and waiting is a common social skill. The original mother establishes that she is happy to pass over operation by asking Boy1 if he wants a turn. Because Animo is structured and has a clear end, groups use this to swap. The original family are happy to acquiesce control to people waiting but then wait to take another turn.

GT gestures to some people further down the ramp, beckoning them to come to her, then walks up the ramp, on the other side to the output wall, holding onto the hand rail, gazing at the output wall. Boy1 runs down the ramp and jumps into position 1. Boy1 and Mother1 make a series of images. Boy1 asks several times to make a "scary one," he seems to struggle to understand where he is meant to look. As he is ending his sequence two women, accompanying GT, stop at the bottom of the ramp to

spectate ‘Not in shot.’ It can be assumed, by their appearance that these women are Green Top’s mother (GTM) and grandmother (GTG). When Boy1 has finished, he runs back up the ramp to his mother. The original family then take a turn with the mother and two girls taking up the actor role and the boy as director. An interesting event occurs when they are constructing image 3. The mother poses, holding an umbrella; at the moment the picture is being taken, the boy swaps the umbrella with a rain cloud. The mother glances back and does not really notice.

This action of the boy’s is interesting because it shows a playful action. By switching the pictures quickly, he reinterprets the final composite piece. It is unfortunate that the mother does not notice. Action such as this is witnessed in the vignette Families, which is not transcribed here. In this part of the vignette, a young girl has been making several image series with her mother and a boy walks up the ramp entering Animo. Animo has just finished its sequence and he takes advantage of this by standing at position 1. Standing like this in position 1 is definitely turn claiming but is the only example seen in this study of standing in the actor’s role to make a claim, this is coded as ‘My turn: wall claim.’ The girl seems put out by this but presses the button anyway. The boy is standing in position 1 with a picture of a cup cake. He adopts a pose that looks as though he is holding the cup cake. The girl and her family move to leave and just as Animo is about to take the picture, she leans in and swipes the cup cake away, making the boy look as though he is posing with nothing. He looks extremely confused and does not realise what has happened. The girl and her family leave down the ramp. This interesting activity is coded as ‘Sabotage.’

GT and the women accompanying her have adopted a spectating position at the secondary table. GTM looks through the pictures stored there. The mother seems particularly keen for the boy to create images that the girls will understand and she asks him to make a scary picture with the dinosaur or one with butterflies. The girls struggle with the butterfly picture but actively take part with the scary dinosaur. Throughout this sequence, the mother is giving limited verbal instructions to the boy. For example, with a picture of a football she states, “I need it five o’clock.”

It is interesting how little information the mother communicates. Her request for the football to be at five o’clock, references where in a conceptual 360-degree circle to

place the picture of a football. This is a sophisticated concept to expect a young boy to understand in such a short space of time.

As Animo is going through the final part of the sequence, three mature people walk up the ramp. August 28th 2013 was a Wednesday, which is the day that the tea dances take place and there is a large amount of traffic making their way up the ramp for this. GT takes up the actor's role in position 1 while her mother adopts the director's role. The original family are around the primary table, the girls are shouting and running around, they also press the button just as GT finishes creating her first composite image.

The tea dancers take up a spectator's position and watch GT make a series of images. GTM takes care over which images she selects gives preparation instructions such as "Hot dog coming." Some more people have entered from the top of the ramp and there is a considerable crowd around the secondary table. The original family are also still there and one of the young girls consistently states her desire to take part. GT consistently fails to face the camera and makes a picture where she appears to be frightened of a dinosaur. A male and a female can be heard verbally establishing a turn 'My turn: verbal claim.' The two boys who cause trouble in the vignette Rude Boys are also there making antagonistic comments but their comments get lost in the confusion. Because there are only two cameras functioning, it is difficult to fully make out how many people are there and who is associated with whom.

As GT's sequence finishes, she walks up the ramp and a considerable amount of people leave Animo by the top of the ramp. A girl in shorts takes up the actor's role with a woman acting as director. The director makes some carefully constructed images, cooperating closely with the girl. The girl gives instructions such as "down a bit," the director does not speak but takes care over which images to place on the table and where they are positioned. The girl consistently fails to face the camera. Some more tea dancers come up the ramp. The verbal claimants form earlier now take up position with the female as actor and male as director. They use the images that are already in position. The director makes few attempts to move the images and the female often has to crouch as she is considerably taller than GT. The tea dancers stop briefly to spectate. The female consistently fails to face the camera. Two young

females walk up the ramp while the female is making image 7, one of them physically pulls the other toward the handrail side of the ramp in order to not interrupt the activity (not in shot).

Another family enter Animo from the ramp, an adult female (AF) and teenage female (TF), followed by a young boy (YB) and girl (YG) and an adult male (AM). AF and TF are halfway up the ramp with YB and YG entering from the bottom and AM behind. Someone presses the button causing TF to run, ducking down; the rest of the family walk past looking at the wall.

There are a male and female at the primary table using the sequence, minus actor to prepare their images 'looking ahead.' In fact they are cooperating in a 'lone operation,' preparing images together in the director's position and then taking up the actor's position together. They have an adult female with them who takes up the director's position and adjusts the images to aid them. They finish their series and Animo empties of participants. After some time, the original family return and proceed to make some image series with the mother acting as director and the children as actors.

The mother mainly uses the images that are in position but takes care to try and compose images. The children adopt a tactic of standing back and looking at what images the mother is placing, they then walk up to the wall and pose. The girls, who are young, struggle to understand where to pose and tend to follow the boy's physical action. Two young males enter from the top and stand behind the primary table 'Watching waiting.' The mother offers to explain how to operate Animo saying, "Do you want to do that? Press that, you know which one?" One of the males tells her he has done this before.

One of the males takes up the director's role and the other runs down and takes up the actor's role in position 1. Taking care not to interrupt the males' actions, the original family exit down the ramp. The males engage in a lot of verbal communication and at position 2, where there is an image of a football, the actor male calls the director male down from the ramp to appear in the picture. He runs down, gets in the image with the actor male and then runs back. He attempts to do the same at position 3 where he

has placed an image of a basketball but does not make it in time to appear in the image. An adult female, who is with the boys, takes over the director's role, the boy who was acting as director runs back to the table but is physically pushed away by the female. He runs back down to the output wall to join his friend. Throughout their activity, their excitement and pleasure is clearly expressed in their body language. They run, jump up and down, shaking their arms. The boy who was acting as director continues to try and control the adult female by leaning over the railing, pointing and vocalising commands. As Animo finishes its sequence, the boys run back up to the primary table. The boy who was director starts to negotiate a set of images for another sequence; his friend declines to join him. This boy is now taking up the actor's role and the other boy deliberately disrupts the sequence by, for example, putting his hand into the composite image pretending to strangle the boy who is now actor. They continue to make an image series with the boy in the actor's role shouting and giving forceful instructions. As Animo finishes, he runs back up the ramp and takes up the director's role. The other boy stands in position 1 and the boy acting as director tries to join him but he walks away, refusing to take part. He is then encouraged to start again in a series of his own but gives up half way through, walking away. The button is pressed again, and the boys make another set of images, with a young female directing from the ramp.

This vignette established the following codes:

'Sabotage'
'My turn: wall claim'