TRACES OF DIGITAL TRUST: AN INTERACTIVE DESIGN PERSPECTIVE

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Student Declaration

"I, Natasha Dwyer, declare that the PhD thesis entitled 'Traces of Digital Trust: An Interactive Design Perspective' is no more than 100,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work".

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Abstract

This thesis explores ways that the complex concept of trust functions between users in digital environments who are strangers. Although it can and has been argued that 'trust' is central to the functioning of society (Watson 2009), it is difficult to apply a static and complete definition of the term. I argue that trust is neither a fully objective nor subjective state but is formed through interaction. If users are to communicate via the mediation of digital environments, how will trust relationships form? In this thesis, I draw on a recent theory of trust: the enablement of trust. The agenda of trust enablement allows users to reach and maintain trust or distrust on their own terms.

The means of studying trust need to meet what I argue is the context-dependent and interactive nature of trust. To study trust, I argue, requires an investigation of users' practice. Ethnomethodology and critical interactive design offer research approaches that suit the exploration of trust enablement. I also draw on the enquiry mode of 'research through design' (Forlizzi et al. 2009), a research approach that seeks to problematise a design context.

As a result of my explorations in this thesis, I argue that digital environments that allow users to share context are a solution to the problem of trust enablement. Trust (or distrust) is only possible in a familiar world, and thus the process by which users create familiarity is the key to understanding how trust is enabled. Shared contexts enable trust because they allow participants to seek the trust evidence most important to them in a specific context and also shape how communications are understood. A shared context also attempts to enable equal and negotiated relations between users instead of reinforcing hierarchies between different types of users.

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List of Publications Produced Before the Submission of the Thesis

Dwyer, N & Cofta, P 2008, 'Understanding the grounds to trust: game as a cultural probe', *Web 2.0 Trust (W2Trust) Workshop: 2nd IFIP WG 11.11 International Conference on Trust Management*, Trondheim, viewed 29 September 2008, <http://www.ntnu.no/videre/konferanse/IFIPTM08/>.

Dwyer, N, Clark, T, Randall, D & Cofta, P 2010, '"Where everyone knows your name": trust in a localised media environment', *Truloco Workshop: 4th IFIP WG 11.11 International Conference on Trust Management*, Morioka, viewed on 26 July 2010, <http://www.ifip-tm2010.org/>.

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Introduction

The departure point for this research is how the complex concept of trust functions between users in digital environments who are strangers. This thesis is an example of 'research through design' (Forlizzi et al. 2009): a mode of exploration that attempts to problematise a design question. Trust and distrust are core issues for the design of digital environments because they affect how users form and maintain relationships. Researchers from different areas have brought a myriad of definitions to the term, 'trust'. Although it can and has been argued that 'trust' is central to the functioning of society (Watson 2009), it is difficult to apply a static and complete definition of the term. Trust is neither an objective nor subjective interaction, but in the view of this author, a combination of viewpoints formed through interaction. It is not possible to distinguish the boundary between subjective and objective thinking. If users are to communicate via the mediation of digital environments how will trust relationships form?

As a result of my explorations in this thesis into how trust works as a practical accomplishment, I argue via praxis that digital environments that allow users to share context are a solution to the problem of trust enablement. Trust (or distrust) is only possible in a familiar world, and thus the process by which users create familiarity is the key to understanding how trust is enabled. A shared context is an environment within which users are able to negotiate trust on their own terms. Shared contexts enable trust because they allow participants to seek the trust evidence most important to them in a specific context and also shape how communications are understood. A shared context also attempts to enable equal and negotiated relations between users instead of reinforcing hierarchies between different types of users.

The type of trust and relationships that are possible via digital communication are shaped both by the nature of the medium and the interactions undertaken. Technology, and what people do with it, is provisional, impermanent and in flux on many levels including the speed of development, and the type of relationships people are having when mediated by technology. Digital

environments are designed to provoke users to disclose a significant amount of information. This material is creating a flood of data that can be saved, searched and distributed in an infinite number of ways. Information about others is nevertheless often fragmentary and spread over a number of contexts. Meanwhile, technology is becoming increasingly configurable by users. It is possible that in the near future, users will be able to fundamentally alter how information is organised and exchanged. The nature of design is, however, problematised by these new conditions. What it should be aiming for and how it should reach these goals is significantly challenged by these new conditions. Design has become an uncertain activity and its engineering roots increasingly challenged. The problem-solution orientation of more traditional forms of interactive design is arguably being gradually replaced by a more creative understanding of the design process. As Reymen and Romme (2008) argue, technology design now involves a designer using his or her creativity within which others can apply their own creativity.

My research works with and attempts to expand upon a relatively new theory of trust: the enablement of trust. This is when users are enabled to reach and maintain trust or distrust on their own terms. To date, trust enablement has largely been explored in limited ways through, for instance, engineering (Cofta & Hodgson 2009) and cognitive psychology (Lacohée et al. 2006) perspectives. The thesis expands on a newer and more interactionally- or situationally-based view of trust and relates this to the design of digital applications through a combination of methodological innovations in relation to how design can enable trust for and with the user.

This approach will require attention to three basic issues. Firstly, we will need to address the conceptualisation of trust and the fundamental differences we discover between rationalistic and situated understandings. Secondly, and in turn, this will have methodological consequences. In the more rationalistic approaches, as we shall see, understanding is derived through quantitative measures and the result is a formal approach to modelling or the production of metrics. In contrast, situated views are largely associated with qualitative stances and more particularly derivations of an ethnographic treatment. In chapter 3, I will discuss the way in

which ethnomethodology has been appropriated for design purposes, the issues that arise from this, and the way in which an ethnomethodological view of data analysis can be used in conjunction with new approaches to design, notably the approach sometimes referred to as 'critical design'. Thirdly, there is a need to relate methodological choices to design.

Cofta (2007, p. 14) has argued that trust can be loosely and informally described as a relationship within which a trustor is confident that another party (the trustee), to whom a trustor is in a position of vulnerability, will respond in the trustor's interests. However, such descriptions do not contribute to our understanding of how trust is *actually* engendered in a practical situation. In order to better understand how trust relations work we need to recognise that trust is also provisional; it shifts and is only valid at one point in time. It cannot therefore be defined precisely in advance of a situation. I present a position on trust, context, familiarity and the connections between these concepts that emphasises trust-enablement. This, as indicated above, is a notion that has been recently posited in the literature to correct the view that trust for the user should automatically be encouraged. That is, it encourages a more sceptical and open view of trust.

Importantly, the concept of trust-enablement allows us to sidestep the problem of providing a precise definition of trust. As I explain in this research, it is not possible to arrive at any one comprehensive, satisfactory definition in any case, since each person has his or her own personal working understanding of trust. What is more, these personal understandings vary from one particular circumstance to another. Attempting to apply a precise definition is not necessary, as this thesis shows, because we are able to explore trust in ways that allow for the highly variable and personal understandings of this key term.

If enablement of trust is interactionally achieved, and context bound, in the ways I suggest, then we arguably need a new methodological sensibility. More traditional 'user-centred' design implicates interviews, mock-ups, and so on. The enablement of trust, I suggest, requires a study of practice and moreover, some kind of intervention in practice. This is why my research is grounded in the fields of ethnomethodology and critical interactive design. Ethnomethodology is a

branch of sociology that claims that the notion of 'context' is best explored by limiting enquiry to the interactional accomplishments of those within the situation, and thus side-steps questions of how perceptions are formed, what 'motives' or 'mental states' might or might not be present and instead emphasises the visible and accountable character of behaviour. It is a form of enquiry, then, that proceeds from the idea of the 'situated'. It is radically counterpoised to orthodox sociologies in so far as it rejects any theorising about the nature of the social world and replaces it with the explication of, in ethnomethodological terms, members' methods. What this means is that, rather than imposing conceptual frameworks on the world, it attempts only to describe the experiences of people who inhabit it. It tends to focus on the skilful production of expertise in given situations (Garfinkel 1967; Randall et al. 2007). As will become clear, the approach used in this thesis is not ethnomethodological in any pure sense. I am not attempting to take the approach of radical sociology. Instead, I only claim that the thesis is 'ethnomethodologically informed'.

In turn, design perspectives that are less mechanically geared to problem specification and solution might be necessary. This implies moving away from the classic 'engineering' approach to design problems as well as diverging from some of the more psychologistic versions of user-centred design. The design focus advocated here is what can be loosely termed 'critical design'. This entails the recognition that designers have a responsibility to engage with problem specification as well as solution; to reflect on assumptions about the design space, and to adopt flexible and creative stances to the potential ambiguities inherent in the design process (Satchell 2006). Critical interactive design grew out of more traditional interactive design concerns of automation, efficiency, and user-centredness, and in response explores how self-reflection and alternate relationships between users can be facilitated. Critical design argues that as technology expands into more diverse areas, the conventional aims of interactive design are not appropriate for all design contexts. New ways of understanding and designing are therefore required for the development of digital environments. Critical interactive design combines theory and practice and explores strategies

such as ‘incompleteness’ to engage participants. This type of design, as we will see, has ramifications associated more with creativity than with engineering.

Thus there is a commonality between the aims of critical design and those of trust-enablement, as both research paths pursue the option of critique for the user. My research utilises the cultural probe (Gaver et al. 1999), a tool developed at the intersection of ethnomethodology and critical design concerns. In broad terms, a cultural probe is a data-gathering tool by which participants are able to self-collect data. They are a form of intervention and suit situations when observation is not possible, which is often the case with trust situations.

To pursue how trust works as a practical accomplishment in digital environments, I undertook five projects that explored trust in different contexts, some utilising the mode of the cultural probe to various degrees. Theory and practice were blended to explore the challenges for the conceptualisation of trust, for methods of identifying trust, and for the implications for the design space in actual digital environments. In summary, the major issues are related to the degree to which trust is contextually dependent. That is, we discover that its application is both idiosyncratic and slippery to define across contexts, but also relatively structured within a context. These more or less consistent ways of engaging in trust behaviour within a given context can be tapped into in order to design the enablement of trust in digital environments.

The five project cases demonstrate the ways in which ‘trust enablement’ is context bound, and how developing artefacts to support it depends on recognition of what is relevant in each case. An insight from the combination of these exercises is that trust is always constructed in a unique context by a particular set of individuals (Bohnet & Meier 2005). Thus trust can only be defined and understood by a participant in situ. However, users seek out and use trust evidence in relatively structured ways. These processes adopted by users to create context, familiarity and trust can be used to design affordances and opportunities for configuration into digital environments that trust enable. I argue that a shared context, within which users can manage and negotiate trust evidence, is a digital environment that *enables* trust.

This thesis presents an argument for an interactive design proposition which facilitates the enablement of trust: the design of digital environments that are shared contexts for participants. This would be a context within which participants can configure the nature of the environment, including how information is presented and prioritised to suit their preferences with regard to trust or distrust. The characteristics of such a shared context include affordances (elements placed in an environment) and opportunities for configuration. The affordances are designed to assist users to build familiarity, in particular to cross gaps, and self-manage data. Participants should be able to negotiate the type of subject matter, aesthetics and language used in a shared context. Flexibility is a key element to allow an environment to change in response to the needs of its participants. Technology is now at a point where such an environment is possible, as declared by researchers such as Paulos (2009) and Bhattacharjee et al. (2006).

Contributions of this thesis

In summary, this thesis explores the problem of how to design for trust-enablement within the current state of digital technology; in particular, I explore how theory and practice mesh. The contributions of this thesis are the following:

To date, trust enablement has only been explored through engineering (Cofta & Hodgson 2009) and cognitive psychology (Lacohée et al. 2006) perspectives. My contribution is to explore how interactive design can enable trust for and with the user. I also contribute to an understanding of how theory and practice intersect in the examination of digital trust. Some interactive design researchers have explored this area (for instance, Riegelsberger 2005), but I argue that the areas of practical challenges encountered when implementing trust, in particular trust-enablement, have not been fully addressed. In this thesis, I aim to pursue the implications of what happens when trust is designed, and review external factors affecting the trust interaction (for instance, the motivation of the user). As part of this exploration, I examine the shortcomings of traditional user-centred approaches to design when attempting to understand the complex challenges developing as technology moves into more and more areas of users'

lives. I propose that more open-ended approaches, allowing the users (rather than the designer) to shape understandings together, hold potential.

I present a methodological contribution to the conceptual confusions surrounding the notion of trust (sidestepping the problems of how to precisely define trust) by developing the concept of trust-enablement as an interactional achievement. I argue that it is users themselves, in the contexts in which they are to be found, who should define trust. I then argue that an interactive design solution to this condition is to create digital environments that allow users to share context. Within this type of environment, users can understand, form, negotiate and maintain trust on their own terms, including exchanging the trust evidence they value. I also explore in this thesis, via the undertaking of practical projects, how users create a context in a digital environment. Although users have idiosyncratic understandings of trust, I argue that users tend to approach the process of trust in relatively structured ways. The ways users arrive at trust are neither entirely predictable nor unpredictable; it is a semi-structured process. In this thesis, I attempt to provide detail into what resources users bring into play to form trust and distrust and how these procedures can be converted into design elements that create a shared context. The characteristics of a trust-enabling shared context are outlined.

I also attempt to challenge the notion held by the trust research area that users are generally not interested in the mechanics of trust, except when they need to control a situation. During the creation of the practical projects I describe in this thesis, I found that participants were actively interested in how trust works and keen to reflect on what trust means to them. As Möllering (2006a) writes, there is something ‘mystical’ about trust, and it is possible that users are engaged by the concept. While I do not wish to argue that all users are interested in all trust decisions, I do believe there is a spectrum of trust decision types that users are drawn to (for instance, perhaps on-line dating participants wish to observe how trust unfolds between potential dates). In the future, I intend to pursue research into what underlies the categorisation of the spectrum and how decisions are differentiated from each other.

A last contribution of this thesis is the use of the 'cultural probe' – a research tool within which users self-collect and shape data in response to stimuli, or provocations, provided by the researcher. In this research, the value of the digital cultural probe to explore a shifting and elusive concept such as trust is explored.

Overview of the thesis

In summary, this thesis is divided into three parts. In the first part, I establish the research area and methodology. Chapter 1 presents a position on trust, context and familiarity, and the connections between these concepts. It explores the characteristics of the current digital environment, and the implications for trust interactions and trust-enablement are discussed. Chapter 2 concerns methodology. It draws on some ethnomethodological insights in order to examine the notion of context, and on conventional and critical interactive design explorations for a better understanding of technology development. These two research agendas have influenced each other significantly and have established a field of practice that continues to challenge design practice both in industry and academia to provide an innovative view of design. As mentioned, the approach used in this thesis is not ethnomethodological in any pure sense. The relationship between ethnomethodology's descriptive focus and the constructive emphasis of critical interactive design are the focus of chapter 3. Careful description of the kind that ethnomethodologists conduct allows us to problematise theoretically-driven versions of trust and to replace them with a contextually relevant version. I then discuss cultural probes: a technique that gathers data for a design (Gaver et al 1999).

In the second part of this thesis, I present data from a series of projects that relate to the issue of conceptualising trust and involving participants in the design of trust-enabling technologies. Each project explores trust in a particular context. With the knowledge gained from a project, I re-frame the next project. In every project I found that trust and context cannot be separated and context is crucial in the consideration of trust. Chapter 4 is an initial exploration of how participants understand the grounds to trust. In chapter 5, I discuss the production of trust in a

situation where evidence concerning the motivations and potential behaviours of others is severely restricted. To put it simply, the chapter examines how trust functions between strangers. The purpose here was to identify the kinds of information that people might initially require in order to judge the characteristics of a stranger and create familiarity. Chapter 6 continues the themes of how strangers establish familiarity and explores trust in the domain of virtual teams and the categories of information trustors prioritise when seeking trust. It is a work-based scenario, within which participants need to choose the type of information to use in the familiarity process that may enlighten a decision to trust. Chapter 7 examines the ways in which film professionals perceive information that is part of their everyday work. The purpose here is to make sense of the kinds of judgment that professionals might use in order to make decisions about the quality of information. The specific context is film reviewing. In the fifth case, described in chapter 8, a web-based interactive using documentary material is envisaged which facilitates the examination of trust in situations where highly emotive material is examined. Specifically, this deals with reactions to a film about road accidents in Tasmania. In summary, across these contexts, I find that although trust is an idiosyncratic and personal accomplishment, it evolves in relatively structured ways. These processes can be tapped into to inform the design of digital environments that enable trust. Part 3 presents a design proposition that is a solution for trust-enablement: the creation of digital environments that are shared contexts. I explain why this proposition has potential, based on my insights gleaned from part 2.

Chapter 9 also presents an argument for the type of design I adopt in this research: ‘research through design’ (Forlizzi et al. 2009). Problem setting rather than problem solving is posited as an aim. This discussion leads into more detail about what constitutes a shared context in chapter 10. I present a selection of affordances (elements in an environment that provide functionality) and configurations (elements that a user can set to his/her own preferences) that together form a vision of trust-enablement, allowing the user to build familiarity on his/her own terms. The discussion of a shared context is in the abstract and chapter 11 provides a more concrete example of how the shared context

proposition could work in a particular situation to allow a user to become trusted within a community. In the conclusion, chapter 12, the main argument of the thesis is reviewed, and the problem of trust-enablement is set.

PART 1: SETTING THE SCENE: TRUST IN A DIGITAL ENVIRONMENT

Chapter 1: Setting the agenda of trust-enablement: What type of trust is being sought and why?

It is a commonplace that all analytic work relies on some position in relation to similarity and difference. That is, in the formulation of concepts, we can either emphasise the many ways in which contexts are specific and unique or we can seek to find features that enable us to generalise. In the case of 'trust', any consideration of what the concept might mean has exactly that difficulty. We either look to find the many ways in which trust can be considered to be entirely context-specific or we can, conversely, look to provide generic and context-independent concepts. Either decision depends on the purposes of those undertaking the analysis. My purpose here is design-related. Langheinrich (2003) explicitly argues that a working definition of trust depends on the outcome sought by a researcher. To re-iterate the problem stated in the introduction, the problem I am exploring in this thesis is trust-enablement: how can interactive design enable a user to conduct trust-based relationships on their own terms?

In order to better understand how relations become 'trustful', we need to recognise that trust is also provisional. Trust in one situation can be somewhat transferred from one situation to another, but not entirely. For instance, when a patient meets a doctor for the first time, some of the patient's trust understanding is applied to the new context. However, the patient also understands the situation to be a new context and suspends trust until the situation becomes more familiar. So although previous experience can influence and produce relevant data for decision making, trust cannot be defined precisely in advance. Trust is a complex concept that draws on both rational and more idiosyncratic perceptions of a trustor (Möllering 2001). Design for 'trust-enablement', then, will depend on the degree to which we can find generic features or not. We should not assume too early that we can do so. How then do people understand trust in particular within a digital

environment, and how can this knowledge inform the design of technology that enables people to make a trust-based decision?

In this thesis I take a *critical interactive design* perspective on this problem – a discipline that investigates how a digital environment is experienced by a user. The consideration includes aesthetics, how information and events unfold in a digital space, and opportunities included within an interface (for instance, incentives for the user). Interactive designers have to also consider, from a practical perspective, how a project is made and delivered to a user. As it has been traditionally influenced by commercially-driven agendas, interactive design has pursued the principle of user-centredness, which is defined as the provision of an experience that is as expedient and simple for the user as possible. In this thesis I argue that such ways of approaching designs have shortcomings as technology moves into more and more areas of users' everyday existence, and I provide suggestions on the means I believe are appropriate to study a concept such as trust.

This chapter establishes the definitions and meanings of understanding trust that are commonly in play in the research area. A background needs to be established before I can explain my position on trust, in particular the agenda of trust-enablement, and how exploration of this agenda requires unique methodological approaches. I then review the notions of familiarity and context that form a crucial role in the design of trust-enablement. Finally, the effect interactive design might have on trust-enablement, including the conditions for design created by digital environments.

1.1 Defining and detailing the notion of trust used in this thesis

As mentioned above, static definitions of trust do not contribute much when considering how to design a trust-enabling environment in a practical setting (as the notion of trust is only meaningful when understood in context). The difficulty of defining trust was raised by Luhman (1979), who pointed to society as the place where trust interactions are grounded. Building on this notion, Clarke et al. (2006a) describe attempts to deal with trust in the abstract as a 'pitfall' and instead call for investigations into trust 'in action' that are embedded in a social world. In

section 1.3, I outline the philosophy of trust-enablement, which is how the concept of trust works in a practical implementation. In this section I explain some general aspects of trust that I believe help inform trust-enablement.

An initial position would be to specify trust as a relationship rather than a 'mental disposition' (Castelfranchi 2004). Understanding trust as a relationship helps to explore trust as an element within a situation which may change. Trust is, in such a view, always an 'interpretation by the trustor of the social context in which s/he is embedded' (Möllering 2005b, p. 3). To understand trust, exploration needs to be undertaken into individuals' 'idiosyncratic interpretations' (Möllering 2006a, p. 357). As stated above, there is an element of trust that is always unaccountable and 'mystical' (Möllering 2006a), otherwise the concept under consideration is not trust and could more aptly be defined in terms such as 'calculation'. Relying solely on 'rationalism' will always 'explain trust away or explain everything but trust' (James 2002; Möllering 2005b, p. 7). Trust is at the very least a combination of 'rational' thinking and what is known as 'feeling' or intuition (Möllering 2001). Although it may be argued that it is impossible to separate these different ways of thinking, it is clear that trust draws on an assemblage of sensibilities. Möllering (2006a, p. 371) argues that an unusual function of trust is that a trustor can often justify and account for a decision, and that this explanation is so as to be able to 'uphold' self-respect. This adds a level of difficulty when undertaking first-hand research into how trust is understood and negotiated.

Trust involves interpretation, suspension and expectation (Möllering, 2001), and can develop gradually (Barber 1983, p. 21). Because I define trust as a type of confidence, then it follows trust cannot be fully forced on another. If there is an external party that can enforce trust, then the interaction is not about trust but about control. Deutsch (1973) provides a demonstration of trust interaction in the form of the story about 'The Lady or the Tiger'. In summary, in this fable, a princess has a suitor that her father believes is unsuitable. The father places the suitor in a pit with only 2 exits. There is a tiger behind one, and a lady (not the princess) behind the other. As the suitor is deciding which exit, he notices the princess motion secretly to one door. The suitor takes the princess's advice and

the reader is left to imagine the results. Does the princess wish her suitor to survive, even if it is with another woman? Deutsch uses this story to illustrate how there are many aspects flavouring a trust interaction including faith, despair, and conformity. However, I argue that the story indicates that no matter how much external pressure there is on a trust interaction, there is always a space, no matter how small, for a trustor to hold an independent opinion about trust. The suitor may decide to follow the advice of the princess, but there is still a space for him to question the motives of the princess.

This research pursues the beginning of the trust relationship, its interpretation, and how it is mediated in a digital environment. As claimed by Luhmann (1979, p. 26), 'trust always extrapolates from the available evidence'. In my research I explore how participants in a trust situation create context and what processes they engage in to gather understanding. Trust reduces complexity for an individual. Otherwise an individual might be 'paralysed', unable to proceed or decide, weighed down by exploring options and possible outcomes (Cofta 2007, p. 11). Trust results in the foreclosure of some future possibilities (Goffman 1974, p. 499). This is why trust is viewed as a type of confidence, regardless of whether the confidence is well placed or not. In chapter 4, I define and discuss some of the dimensions of trust, continuity, competence and motivation, and a trustor may have confidence in regards to any of these dimensions. For instance, a trustor may be confident that a trustee is motivated to work in his or her interest. This benefit of reaching trust or distrust quickly is a challenge for trust-enablement because, as I explain in chapter 2, my design agenda seeks a more balanced and open approach to the trust relationship. There is a tension between the aim for speed and efficiency and the aim of keeping options open (letting trust enable one to disregard some questions, while allowing one to address others).

1.2 How the research area understands trust: A myriad of perspectives on trust

Researchers have explored trust in a variety of different domains including health (Shore 2007), international politics (Kelman 2005), economics (Bohnet & Baytelma n 2007), social psychology (Tov & Diener 2009) and computer science (Ulivieri 2005). I will argue, however, that there is a fault line that runs through

all the different domains and perspectives, and this fault line relates to the validity of the 'rational man' hypothesis. Psychological perspectives typically characterise trust in terms of such matters as attitudes and expectations, internal states that produce and lead to various behaviours. Economics and organisational disciplines adopt a stance in which trust is understood as a 'probability of a desirable action', i.e. they treat trust as a matter of calculation. Often these disciplines share a fundamental commitment to a rationalistic stance. This is broadly true despite the fact that trust has been examined from a number of angles. There is, for instance, the element of 'computer to computer' trust, where the trust issue is whether technology used for a communication is secure and reliable (see for instance, Lenzini et al. 2008; Anderson et al. 2008). Another aspect is why and how users trust the technology they use, explored by researchers such as Clarke et al. (2006a) and Lacohée et al. (2006).

Nevertheless, the issue of how human beings communicate trust and mistrust between each other is arguably of much more importance, at least in any environment which is not substantially automated. How this is mediated in digital environments is precisely the issue on which my research is focused. In contrast with those perspectives which emphasise universal rationality, Marsh and Dibben (2003) provide a nuanced argument concerning the many understandings of what trust is and the subjective 'expertise' that everyone has in relation to it. They suggest that many researchers respond to the subjective nature of trust by exploring how trust can distil into a formula. However, they write, it is still necessary to explore this path to see what may be possible and to learn about trust along the way.

In this thesis, I take another approach, and instead attempt to embrace the subjective nature of trust within the medium of computer technology by arguing for a 'trust-enablement' perspective. This mode emphasises the 'processual' over the calculative (Clarke et al. 2006a). In keeping with Marsh's insights, this subjective path requires some exploration to investigate its potential. In this section, I review the underlying themes important to the trust research area (which is taken up again in chapter 4), showing how debates about rationality underpin

much of this work, and this leads into a discussion in 1.3 of trust-enablement and how it builds on and is also different from previous work.

An underlying point of difference in trust research is whether the researcher believes that there is such a thing as 'pure trust': that trust can exist separate from context or situation. This is an essentialist and reductive notion which tends to be associated with more 'scientistic' approaches. In contrast, and bearing in mind that there are substantial disagreements within social science, the latter tends to take a more emergent and contextual view, one which views trust as a social construction, and thus resistant to any precise definition. This debate is played out along a number of dimensions, which are worth summarising here.

1.2.a Trust to be automated?

Some researchers regard trust as an embedded part of everyday life, part of the general assumptions that allow for social life at all. For Quercia (2009), for instance, this implies that issues of trust are not normally things that we consciously attend to and thus that the appropriate role of technology is to 'disappear' those occasions where we might otherwise be directly faced with trust issues. Trust, according to this view, is something that as far as possible can be managed in the background, and automatically handled by the digital system. Quercia's research is explicitly oriented towards finding and implementing policies that manage trust for the user. According to Bødker (2007), similarly, trust in a digital environment should be existentialist – a fluid state in which it is not explicitly addressed by the user. Rather than a focus on isolated trust interactions negotiated by users, trust becomes embedded in the environment as a holistic experience. This is to allow participants to attend to activities that are their priorities, whether that is shopping, finding a date or exploring a research topic. Thus from this perspective, the role of technology is to assist users through automation. This approach reflects the aims of more traditional approaches to human computer interaction, which seek to make life as easy as possible for the user.

Other researchers pursue the line of enquiry that holds that technology can assist and automate up to a certain point, but then decisions and power need to be

handed over to the user. Trust is foregrounded at least for certain purposes. This approach reflects an area of technology research that argues that technology should be designed to work with the capabilities of humans, not to replace human thinking, and thus should combine the strengths of humans and technology. Jensen (2010) argues that when considering trust, responses are not binary (yes or no) decisions or easily resolvable; that a lot of interactions happen in the 'grey area', the space where it is not immediately clear what to do and may not have been encountered before. The potential is unknown. Thus the application of pre-prepared policies is limited. His suggestion is to hand people their data so that they can make their own decisions. Jensen states that he got this idea from observing how people are given their own biometric data by medical professionals to make their own health decisions. Why not provide people with their own trust data, he asks? The work of Marsh (2010) is an example of trust in the foreground. His interface, 'Comfort Zones', allows the user to customise their device so it is known if the user is in a safe environment or a hostile one. Certain activities and relationships are permitted within set locations, and the rules change depending on where the user is. The user is contacted by the system if a new scenario arises or if the user is pursuing an activity that is not usually associated with that place. An example message from the system to the user may be 'Are you sure that you really want to do this?'

This branch of trust research is new and there are many questions to be explored. For instance, at what point can technology assist before it is at a point where information handling is given over to the user? Marsh (2010), as an example, investigates what happens when decisions are given to the user in a new situation. How can trust information be presented to a user in an interface?

1.2.b Trust as an individual propensity or societal norm?

Some researchers focus on either trust as an individual propensity or trust as a societal norm, or some combination of these factors. Individual propensity is whether a trustor is disposed to trust or not, and this in turn shapes how an individual will interpret a trust context. The inclination is shaped by past experience: what results has a trustor had from previous trust interactions? This

experience is relevant, even if a trustor is interacting with a stranger; knowledge from some of the trustor's past interactions will be applied to the new interaction. Mcknight et al (2002) argue that disposition to trust is also influenced by a personality tendency to depend on others, a factor that applies somewhat across different contexts. According to Gefen (2000), disposition to trust plays a forefront role in the beginning of an interaction, when those in a context are unfamiliar with each other. Additionally, individual propensity is culturally bound and is a shaped through socialisation.

An important theme, although a concept that is often not well-defined, for those interested in societal norms and trust is the role of social embeddedness and social capital. Social embeddedness is the amount someone is involved in their particular community. It is argued that the amount of social embeddedness and the propensity for positive trust interactions are linked (Granovetter 1985). Elements affecting trust within this focus include the source of societal conventions (Macy & Skvoretz 1998) and community population density (Sato 1988). The role of reputation is of considerable interest to researchers of trust in digital environments who understand trust as a social norm. Reputation has been cited as a reason behind the success of e-commerce and auction sites such as eBay (Cofta 2007, p. 226). Research perspectives include the effect of reputation on trust within either open or closed communities (Yamagishi & Matsuda 2003; Cook & Hardin 2001).

1.2.c Outcome versus intention

Research tends to highlight either the outcome of a trust interaction or the intention of those in the trust interaction. Within a trust interaction, trustors look for reasons to trust or not and build anticipation and expectation. This is to form a picture of the intention of whom or what situation the trustor is risking. 'Whoever wants to win trust must take part in social life and be in a position to build the expectations of others into his own self-presentation; trustors and trustees build and maintain their positive fiction. This is referred to as a 'shared delusional system' (Mitchell 1996; Möllering 2008, p. 18). What people do in a scenario (such as a trust situation) depends on what they predict other people are going to do. Intentional or attitudinal research usually assumes that people try to

understand and predict each other's motives and respond accordingly (McCabe et al. 2003). Nooteboom (2002, p. 24) writes, 'It is not what happens in relations so much as how that is interpreted, and how people infer and attribute competencies and motives to people that matters, in the formation or destruction of trust'. For instance, if we trusted someone with our money, but that person was robbed of our money, then although a failure has occurred, this is not necessarily due to a breach of trust. It is this valuing of perceived intention over outcome that makes the ways in which people think different to how computers regard trust. Computers can only measure outcomes and do not process the subtleties of intention. This process of gathering evidence may or may not be a conscious process or be able to be articulated by the trustor. Within this interaction, there is evidence to trust that exist within frames, which is the context within which the interaction is occurring. Within this research interest, there are certain focuses; for instance, trust as a 'self-fulfilling property' and 'trust responsiveness' (which is the propensity for people to behave in a trusting fashion because they believe they are trusted). Kindness and altruism are also part of this perspective (Bacharach et al. 2007).

Post-structuralist theorists have also examined how people anticipate, hold expectations, and base decisions upon what they think others might do. Bourdieu (2005), for instance, proposed the idea of the 'field', in which participants hold a position, depending on their capital and the type of power hierarchies relevant to a particular field. He gives the example of the profession of journalism. Journalists create narratives for others to interpret. This interpretation itself draws on specific resources, or 'intellectual capital'. Newspapers and other news providers conduct market research to understand these interpretation processes and to fine-tune the messages they generate. As part of everyday life, people are involved in several of these fields concurrently. Within a field, participants negotiate and struggle for their needs and desires, sometimes over the same resources. A 'habitus' comprises the expectations and anticipations participants hold within a certain field, which in turn shapes how people think and behave within that field (Sulkunen 1982, p. 108).

Outcome-oriented research focuses on the results of a trust transaction, and concludes that different sectors of the population are either constantly altruistic or vengeful, or have certain thresholds of inequity aversion (McCabe et al. 2003). In my thesis, I attend to the manifest intention of trustors in an interaction. In keeping with a broadly Wittgensteinian stance on the ordinary language status of words like 'intention' and a denial of any cognitive status, intention is only of interest here to the degree that it is visibly and accountably present.

1.2.d Trust as a rational decision

Trust research, along with other research areas, has been heavily influenced by the 'rational man hypothesis'. This notion was first debated in the eighteenth and nineteenth centuries by classic thinkers such as John Stuart Mill and Adam Smith. Both economic theory and trust theory have been heavily influenced by these writings. Writers in the area of trust have focused on how the rational human might trust and have examined trust as a function of 'rational choice theory' (see Ostrom 1998 for an overview). This position assumes that a person makes a trust decision based on the premise of what benefits the person the most. For instance, work by Blau (1964) and Coleman (1973) argues that trust is driven by the rational thought process and that users always act from a position of self-interest, even if the self-interest is sometimes difficult to identify. Recent research challenges this notion and argues that trust is complex and is a combination of 'rational', 'emotional' and 'intuitive' thinking: for instance, driven by 'exploitation-aversion' rather than 'risk-aversion' (Bohnet & Zeckhauser 2004). Researchers are now finding that many motivations drive trust-based decisions, not just self-interest, including the valuing of justice (Chiu et al. 2009) and reciprocity (Cox 2004).

In contrast, a more interpretative treatment associated with interactionist versions of sociology (see for example, Goffman (1974); Cicourel (1964); Garfinkel (1967) would entail some consideration of context. In such a view, the connection between trust and rationality is more complex than it might first appear (Ashraf et al. 2006). Although people may well pursue what is in their interest some of the time, it is also apparent that people behave differently in

different contexts. This has led writers such as Cofta (2007), Möllering (2006b), and Ashraf et al. (2006) to argue that trust is always a combination of complex factors which may or may not include such things as: the attitudinal, the rational choice, the contextual, the biographical, and so on.

1.2.e Signal theory: an influential force

Signal theory is an influential position in trust research that examines human behaviour, including trust, as an exchange of signals (Donath 2006). Based on the assumption of rational and predictable behaviour by participants, the focus of the signal theory perspective is on the motivation of those in a situation (Lachmann et al. 2001). The underlying premise is that humans play, either consciously or unconsciously, a constant game of signal exchange. For instance, a man on a date might drive an expensive car to signal that he is moneyed. Often signal theories are mechanistic, providing explanations for phenomena that have physical or biological claims. Theories are developed around the motivators for the goal of an exchange and the transaction costs for those involved.

'Behavioural cues' are what people communicate with each other, either consciously or not, regarding their intentions and how they perceive others' intentions (Six & Nooteboom 2005). Thus a communication cycle generates in which interactors respond to each other. In this view, people relate to each via a range of 'modes', for instance, self-interest or solidarity. Because trust can need maintenance and may dissipate if not tended to, a regular exchange of cues between those involved in the interaction can support the trust relationship (de Laat 2005). Additionally, as trust is linked to an acceptance of vulnerability and is a reciprocal relationship, a participant can communicate both a willingness to trust and trustworthiness by exchanging communications that indicate vulnerability (Six & Nooteboom 2005). Rothstein (2005, p. 210) adds that willingness to genuinely consider others' perspectives is predicated on believing that the other party will reciprocate.

I find signal theory problematic for several reasons. The perspective works with assumptions about behaviour and motivation, but I believe that it is impossible to definitively claim that these assumptions are always true and

correct. I have not chosen signal theory as a base for my research because I believe formulaic approaches to trust are not useful if one accepts a more contextual approach, and that trust cannot be pre-determined. Also, my interest is in social and cultural explanations rather than mechanistic approaches claiming scientific accuracy.

However, it needs to be noted that signal theory does not have a monopoly on interest in the evidence people use to establish a relationship. It is just that signal theory attaches certain meaning and motivations behind the exchange. For instance, ethnomethodology sometimes focuses on the artefacts people use to achieve everyday life as a practical accomplishment (Button & Dourish 1996). Goffman (1959) posited a division between the cues people unintentionally emanate versus the cues we deliberately flag to others. He argued furthermore that unintentional cues are regarded as valuable because they are an indicator of what people are 'really' thinking. My research interest concerns how trust is constructed and the processes people use to form trust. Thus there is an overlap with the area of why people trust and where trust perceptions are derived from.

1.2.f Trust as evidence

Some researchers emphasise the weighing of trust evidence as a relevant consideration (for instance, McKnight & Chervany 2006; Cofta 2006). Although it is impossible to draw a stark distinction between different elements of a message, some researchers focus on what the delivery of a message reveals about its sender (how the message has got to the receiver) while other researchers focus on the content (the story held in the message). In chapter 4, I explore how the 'evidence to trust' is understood and can be categorised. Pentland (2008) is in the group of researchers who are concerned with how messages are delivered and he argues that the elements of a message that are revealing include how the message was sent (for instance, what technology was used and how quickly a message was delivered), how much influence a message is having over others (for instance, whether the message is widely distributed and if a message is being referenced by others). Gambetta and Hamill (2005) focus more on the content of the message and the intention that can be read into the message. In particular, they look at how

people judge the authenticity of messages. Trust evidence is, then, a fragment pointing to a larger story with which the trustor builds a picture of the trustee. As demonstrated by Goffman (1974), it is part of human interaction to build stories around evidence and draw interpretations.

The micro-evidence of trust divides into two categories, 'symbols' (direct) and 'symptoms' (indirect) (Riegelsberger et al. 2005, p. 75). Symbols are deliberately intended to communicate trust and are thus 'learned signifiers'. Examples are warranties, seals and ratings. On the other hand, there are indirect indications of trust. 'Symptoms' are by-products of trustworthiness. For instance, Gambetta and Hamill (2005, p. 13) give the example of how a black man in New York city has worked out a way to successfully flag cabs in his city. He flags the cab with a copy of the *Wall Street Journal*, a newspaper with an educated and wealthy readership. By using a newspaper in such an integrated fashion, the cab driver understands the man to be educated and moneyed, and in a cab driver's view, less likely to be trouble. Gambetta and Hamill (2005) discuss how different taxi drivers, trustees, try to de-emphasise what might be at risk for them in an interaction or what might be their points of vulnerability. For instance, taxi drivers in areas divided by religious strife remove the symbols of their religious allegiance. Other taxi drivers say that they mention to new rides that they have just dropped off their takings for the night, to give the impression of not being worth robbing.

Trustors automatically sort and synthesise evidence, deciphering whether it is genuine or not. They value indirect evidence because it takes energy, motivation and creativity to be able to generate these types of signs and so the likelihood of the evidence being faked is reduced (Bacharach & Gambetta 2000). In chapter 7 of this thesis, the value of indirect indications to trust will be discussed in more detail. The perception of trust is also a 'moving target'. After certain trust evidence has existed over a period of time, a growing number of people work out how to demonstrate what is the 'right' indirect evidence in a situation, and at what point that evidence is no longer valuable. If the word got out about how black men could successfully flag cabs with a *Wall Street Journal*, then it would become a well-known technique between both trustors and trustee. It

would not be assumed that the holder of the paper was a fake, but would draw attention to the possibility. The originator of the evidence would then need to develop a new strategy to get home. Möllering (2008, p. 12) writes how Human Resources departments receive training to spot when job candidates are presenting fake indications to trust. Candidates, through word of mouth, have heard about these strategies, and are thus prepared to mask any indications that may reflect negatively on them. Thus a game evolves, whereby candidates generate the appropriate evidence for a certain employment role and the employment industry in turn rewards certain behaviours (Shulman 2007; Möllering 2008, p. 12).

There are two main approaches posited in the literature by which participants can exchange trust evidence. One approach draws on the traces of activity left by a participant to draw inferences about how that participant might construct trust (or distrust). Tummolini and Castelfranchi (2007) examine how a history of past interactions and encounters of a certain user can be read as traces by those interacting with that user. Trust perceptions form on the basis of this evidence. In this model, there is little or no opportunity for individuals to query or explain evidence or a context.

Another approach, posited by Karahalios (2004), is to use a design to provide 'catalysts', which are opportunities allowing participants to exchange evidence spontaneously. The catalyst approach has the potential for evidence to be less contrived as an exchange is created with limited opportunity for thought or planning. It also allows participants to explain or provide reasoning around the information they communicate. Using the present moment to exchange evidence allows participants to shape and negotiate the nature of the encounter together, and thus 'catalysts' are a more appropriate choice for the design of shared contexts. However, catalysts require a level of resources and commitment from those involved and are thus expensive to undertake.

1.2.g Methods of studying trust interactions

How trust is conceptualised in the research area has shaped how trust is normally studied. There is a strong tradition of quantitative and experimental research into trust across several domains including economics, game theory, psychology and

sociology. Although I do not draw on this quantitative tradition extensively in my thesis, this area is now quickly reviewed to provide an overview. The dominant themes in quantitative research into trust include cooperation, reciprocity and familiarity, or social distance between participants. Often researchers hone in on one aspect and try to filter out other effects in order to obtain 'clean' data.

Experiments that are a type of trust game experiment (TGE) (such as those established by Berg et. al. 1995 and Rabin 1993) are the most common way of exploring trust via the experimental method. These types of games include social dilemmas, such as what is known as the prisoner's dilemma, where a participant must make a decision contingent on what they perceive an opposition might do. Another type of TGE is the bargaining game. This usually involves the participant giving some sort of financial incentive to a second player. Data is gathered from the responses of players. Willingness to respond positively with a financial contribution or support to another is regarded as willingness to trust. Different elements within this structure can affect the data. The provision of financial incentives in a game, such as a prize, can increase effort and attention (Holm & Nystedt 2005). Anonymity for participants is another variable that can alter the outcome.

Although a widely used tool, the limitations of the TGE are well documented. As an experiment situation is always somewhat contrived, the decision-making undertaken by a participant will always have a level of artificiality. It is difficult to access what the participant would really do (Sasse 2011). Bohnet and Meier (2005) believe that the industry standard of the 'prisoner's dilemma' emphasises the logic used by the financial domain and focuses on defection and the result of 'no trust'. It is also argued that the TGE does not access the intricacies of trust, because it does not question why someone trusts, risks, or makes themself vulnerable. Framing effects always influence a TGE. This is when the presentation of the game affects how the participant perceives the situation and thus their responses. Some researchers refer to these effects as 'noise' or bias (as documented in Brülhart & Usunier 2004) and seek to filter out these effects. I will argue, in contrast, that a 'context-free' situation is not possible. Rather than seeing the effects of framing as a problem to be eliminated

when studying trust, these factors are part of how trust works and thus a necessary element to be studied. In chapter 5, I describe a practical project that attempts to adapt the TGE to explore framing effects and through this explore the contingencies that affect participants' judgments of the game at hand.

1.3. A contrastive approach: the philosophy of trust-enablement

1.3.a The agenda of trust-enablement

Put simply, the agenda of trust-enablement is to allow users to define what trust means to them in a certain situation, and to allow a user to conduct a trust relationship that is in their best interests and on their own terms. This philosophy was developed by Piotr Cofta and his team at British Telecom Research (e.g. Cofta 2007). As I argue in section 9.6, technology is now at a point where such a vision could be actualised. The position of trust-enablement side-steps problems outlined above (in sections 1.2). That is, it seeks to avoid problems of definition, motivation, measurement and so on. The approach of trust-enablement is specifically designed to be flexible and responsive to changing conditions, which suits the state of current digital environments (as I describe shortly in section 1.4.a).

Trust-enablement is agnostic about whether trust or distrust have positive or negative qualities. Cofta (2006) argues that distrust has an unwarranted negative connotation and too often it is assumed that trust is beneficial. The valid position for a user may, in fact, be to distrust rather than trust. Equally, a position of trust may not be beneficial for individuals because it may place them in a situation that could be exploited. On the other hand, distrust may not be beneficial because it may result in the individual declining future possibilities and losing opportunities. Part of facilitating 'trust-enablement' in a design is to allow for 'mixed-trust', such that users do not automatically default to either a trusting or distrusting state (Cofta 2006).

There is debate about whether people are 'good' at forming trust perceptions. Some researchers believe that people are well equipped to draw conclusions from ambiguous, complex and sometimes contradictory information (Petersson et al. 2004). On the other hand, other researchers, such as Song (2005), argue that people are poor at estimating what they might do in an unfamiliar

situation and also what others might do. Nooteboom (2005) points out that accurate assessment can only occur if a person is able to fully recognise the situation they are in. Often this recognition process draws on past experience. This means that individuals tend to understand new situations in terms of existing familiarity. In turn, actors may be over-reliant on assumptions drawn from previous encounters.

Regardless of whether trustors are effective decision makers, the position of trust-enablement holds that trustors must be able to make a decision on their own terms. A trust decision is inevitably subjective, so it is impossible to judge what a 'correct' perception for an individual might be. Trust is always an 'idiosyncratic achievement': a transient view an individual has acquired at a particular point in time regarding a unique set of information (Möllering 2008). When one of these elements is altered, then the outcome may be different. Thus, the agenda of trust-enablement does not attempt to instruct users in what it is best to do. Before addressing how trust-enablement works as a design principle, I review two concepts closely connected to trust-enablement: familiarity and context. Familiarity refers to the way in which a user builds trust (or distrust) on the basis of prior knowledge. Context can be usefully thought of as being related to the kinds of prior knowledge relevant to the user. Making sense of how users go about developing 'structures of relevance' (Schütz 1970) should provide a means for designers to design environments that enable trust (this is the subject of part 3 of this thesis).

1.3.b The link between trust-enablement and familiarity

The strong association between trust and familiarity is important to my conceptualisation of trust and how to enable it. According to Luhmann (1979, p. 20), trust is only possible in a familiar world. Familiarity is when a particular situation or context is understood and needs no further investigation (Schütz 1972, p. 74). To put it another way, it is 'taken for granted'. Familiar situations can be considered in relation to past situations, via a process of 'passive synthesis'. An integral part of trust is familiarization, as this is how someone moves from being unfamiliar with a situation to a less ambiguous state of familiarity (Möllering

2005b, pp. 20-22). The process of familiarity can in itself beget trust. It may happen as people begin to cooperate (Luhmann 1979). As part of the familiarisation process, trustors may, for instance, develop a feeling of empathy for others involved or there may be identification with the position of others. Trusts may develop encapsulated interest between each of the trustors (Nooteboom 2005). A trustor may come to understand that his or her interest is interlinked with the interests of another.

It is debatable whether people are effective at balancing the transition from familiar to unfamiliar and the ambiguous state of not knowing. Some argue that people are 'rather skilful' at doing this (Möllering 2005b). Möllering (2005b, p. 20) claims that, 'the main points of interest here are how actors deal with and overcome unfamiliarity and how they may be able to develop trust (gradually) in contexts of low familiarity through a process of familiarisation.' This interest leads to the question: what kind of evidence might people seek in order to establish trust in any given situation?

1.3.c The link between trust-enablement and context

For the purposes of this thesis, context is understood from an ethnomethodological perspective; it refers to what is significant and relevant in the 'here and now' (Maynard & Clayman 1991) for the participant. 'Context' in this view may be shaped by a whole range of factors that people may be attentive to, such as power relations, social conventions, traditions, expectations, habits and memory (Zack & McKenney 1995), but in each instance people will exhibit the relevance of these factors in what they do and say. Ethnomethodology, then, holds that context can only be comprehended in terms of how the participants within a context understand it (Petersson et al. 2004).

In this version, context is not something that exists independently of what people are doing and saying, but is defined in and through what they are doing and saying (Suchman 2002). This is a problem in respect to design decisions, because it provides designers with no clear 'typology' with which to work. Nevertheless, it has served the very useful function of orienting design towards the detailed and practical ways in which people go about their business. Ethnomethodology has taken a rigorous view of the production of context, one

that is predicated precisely on the accomplishment of interactions on a moment-by-moment basis. This position is founded on a principled objection to the idea that there can be any rigorous, scientific approach to the issue of belief, motive, purpose, and so on. In other versions, such as Goffman's 'Frame Analysis' (1974), context becomes an analytic construction that, on the face of it, provides an outline approach to delineating what might differentiate 'context' from other concepts. Certainly this is true, and it is arguably a failure of ethnomethodology in relation to design (though not in relation to sociology). Ethnomethodology has demonstrated little interest in matters such as biography. Like Goffman, ethnomethodologists argue that apparently 'psychological' matters are in fact always a matter of inference. Trust, then, cannot be viewed as an inherent property of the individual's psyche, but as something that is itself an accomplished matter. From this perspective, trust is an inherently social phenomenon, and an idiosyncratic accomplishment (Möllering 2006a), always to be constructed between people in a particular situation.

In the 1980s and 1990s, this approach to context began to influence technology development. Lucy Suchman's book *Plans and Situated Actions* (1987) was a groundbreaking text. Suchman argued that technological development ignored context, resulting in unsuccessful technology. Other writers added that there was often a mismatch between designers' understandings and the context in which technologies were actually used (Bentley et al. 1992). There was a call to recognise the heterogeneous nature of situations and why 'readily packaged' technological solutions were not always going to work (Hughes et al. 1994). Scientists and technologists have a much more demarcated and reductionist understanding of context that is used as a residual category for unspecified variables (Dourish 2004). In this view, 'context' is everything other than the aspect the researcher is interested in. An example of the technologist's understanding is in the definition of the relationship between trust and context presented by Sydow (2008): 'The context of trust in a social network can be understood as all the information available in the social network except the trust information itself'. Liu et al. (2006), pursuing a notion of a reductionist context,

discuss how data gathered from social networking sites can be 'sanitised' and made 'context-free' so the insights can be applied easily to different situations.

Nevertheless, the notion of context has become popular with technologists due to the rise of 'convergence'. Convergence refers to an agenda within technology development to make computing ubiquitous, invisible, automated and pre-emptive (Allen 2008). Following a reductionist understanding of context, researchers and developers create policies that can be applied in different situations in order to manage technology innovation (Toivonen & Denker 2004). Technology, then, can be used by engineers and designers to deliver tailored and flexible solutions (Whittaker et al. 1997). Part of this agenda involves researching specific situations in order to deliver tailored technology within a scenario (for instance, Bardram 2004).

1.4 The unique properties of digital environments and trust

My research focuses on the types of trust interactions possible in digital environments now and in the near future. To understand how trust-enablement might work in these types of environment, it is necessary to explore what constraints and possibilities exist in digital environments today. Some researchers describe new digital environments as part of a convergent scheme. 'Convergence' is a contemporary (perhaps fashionable) term used to describe a current development in IT where a variety of services, information or functionality is available within interconnected, distributed systems (Dennis & Wisely 2007).

The characteristics of current digital environments that are relevant to trust include their provisional nature, the role of the user in controlling environments, the ability of users to configure technology, and the production of a flood of data. The paradoxical, provisional and shifting nature of digital environments calls for tailored design strategies. I argue in chapter 2 of this thesis that conventional approaches to interactive design are now no longer appropriate for the type of digital environments that exist. Designers now need to radically re-consider the relationship between technology, users and the designers of projects and develop strategies for coping with increasing complexity. It is worth briefly surveying some of the leading features associated with these changing dynamics here.

1.4.a Provisional technologies and identities

A fundamental characteristic shaping digital media is their provisional nature. In this type of environment, according to Garud et al. (2008), 'problems are ill-defined, preferences are fluid and solutions emerge in action'. Computing power, including memory storage, processing speed and the resolution of files is increasing at an exponential rate, thus technology is continually achieving new capacities. Driven in part by technology vendors, consumers and professionals alike expect new technology to become outdated and assume that systems will be updated in the near future. Put simply, the pace of change leads to uncertainty (Olsen 2007). For instance, Amazon now sells 143 electronic books for every 100 paper books (Giles & Turner 2010).

Furthermore, technology projects are increasingly geared to a shorter shelf life (Papadimoulis 2007). The life history of applications such as 'Second Life' and their replacement by spaces such as myspace and Facebook (Canning 2008) demonstrate the rapidity of change. This pace of change generates a sense of 'failure' – a perceived failure to deliver what these technologies might have promised in the first instance. If this is true then the provisional nature of digital environments requires new design approaches. Design used to involve clear boundaries, preferences and predictions. Now, according to Garud et al. (2008), there is no clear boundary between what is being designed and the context in which it will be deployed; design therefore needs to learn how to position itself in these rapidly changing contexts.

1.4.b Increasing power for the user? Users configuring technology

Digital environments allow the user to configure and re-purpose (to varying extents) technology to meet their own needs and preferences. This trend is happening across user groups with various levels of expertise in technology. There is an increase in the amount of configuration and influence over an environment possible for users who do not necessarily know a considerable amount about technology. In the near future, it is possible that 'average' users will be able to configure their digital environments in fashions not imaginable now.

Some research questions this claim. For instance, Chetty et al (2009) argue that home network technology design is modelled on business use, and requires certain behaviours on behalf of home users that may not be appropriate for home interactions. A radical re-consideration of technology design is required for systems to be more useful. However, I believe that users indeed understand and have an active interest in some digital technology that means that users are willing to research and coopt technology for their own purposes. In a recent report I prepared for British Telecom (Dwyer 2011), I interviewed families about how they use technology in the home. Project participants, who could be described as 'average users' demonstrated a sophisticated understanding of what different modes of technology can offer. They also demonstrated an interest in pursuing knowledge and research about how some forms of technology works.

Some technology and digital environments have been designed so that end users with little expertise in technology can change the nature of their environment. In some cases, the changes just affect the user's environment, for instance, a user can configure the graphic design style of how google appears when s/he uses it. In other cases, a user has the opportunity to change what others experience, see, read or think. For instance, 'tagging' is an on-line activity that users can undertake to label pieces of media such as photos on the internet. Other users can then access these photos by using search terms that link to the labelled material. The action of tagging shapes how material is accessed in digital environments (Körner et al. 2010). Wikipedia, a common and widely-used online encyclopaedia, created by users who can update the site with little specialist knowledge, is an example of how profoundly users can currently influence how knowledge is shaped. The configuration movement affects more than software. The realm of computing hardware was once the province of highly-specialised experts. Now that hardware creation is becoming more accessible, developers are making products that allow others to create their own systems (Kobayashi 2009).

Much has been made of the 'user-empowering' quality of technology, for instance Bruns (2009) argues that the user is now the 'produser', rather than just the consumer of content. However, the issue of user-configuration of environments is problematic. For instance, how much control does a user have, in

actuality, to make a significant change in an environment? How much investment by the user (i.e. commitment to gain knowledge in a particular area of technology) is required to participate in configuration? Configuration can be a confusing and time consuming process (Spillers 2005), which has led researchers (for instance, Heslop 2007) to recommend techniques that ease the load on users when configuring. Some technology tries to pre-empt what a user's preferences might be and personalise the delivery of a service to an individual. For instance, Google keeps a record of what searches a particular user has made in the past. This information is used to filter that user's searches in the future, and to present the user with options made on assumptions drawn from their past interests. Privacy advocates have a problem with this as Google users are automatically subscribed to this service (Fernback & Papacharissi 2007).

The open source and free software communities, groups who work collaboratively to create free and accessible source codes, are a model of how users with technical knowledge can together shape digital environments (Schweik 2006). The distinction between user and developer becomes blurred (Berglund & Priestley 2001). Linux and Mediawiki (the underlying software for Wikipedia), are well-known examples of systems made by and for users. Although the open source movement started mostly outside of corporate project development, the processes and philosophies of the open source community are now adopted by mainstream project developers (Fitzgerald 2006). Due to the success of these communities to build robust digital environments, researchers such as Shibuya and Tamai (2009) and Scacchi (2007) seek to understand how these types of communities initially motivate and then maintain relationships with their users. Although participation in these communities takes a considerable amount of time and expertise development, these communities are large and keep attracting new members.

'Cloud computing' is a new development that may revolutionise how computing technology can be configured by users (Vile 2010). It is a usage model by which users' environments are virtualised. Rather than running applications off a local computer, data and services are maintained by a third party provider, perhaps on a subscription model. Service providers supply services to a range of

tenants and communities. This practice, now in its infancy, may mean that users can choose and configure services to their needs. Until now, cloud computing has been focused on business needs. As a prediction for 2010, Yee (2010) argues that cloud computing will now explore how wider personal and social needs can be delivered via this model. However, it is possible that this movement may instead result in service providers locking in their subscribers to arrangements and limiting choices once users have handed over the control of their data. Stallman (2010) believes cloud computing is a trap. Only time will tell what this movement means for user configuration.

1.4.c High levels of disclosure

Originally digital technology, for most users, was an isolated experience interacting with pre-determined material. Now the forefront of technology is people, in small groups and larger communities, interacting over an increasingly wide range of contexts. Social interaction has become the 'primary building material' (Bourriaud 2002); the participation of humans is necessary for the work to be completed (Brewer et al. 2008). Harper (2010) points out how textured the different opportunities for communication are in our current digital environment. Users are aware of the nuances they indicate by how they choose to communicate, (for instance, sending a message via text holds a different gravity to a communiqué offered via video conference). The nature of converged and Web 2.0 technologies has created an environment whereby people freely offer large and varied amounts of personal information in a quick and informal fashion that can be archived and searched by undisclosed parties. Social networking environments such as Facebook and Ning are prime examples of these developments. How and why people will disclose a large amount of sometimes candid and personal information will be of increasing importance to designers of these spaces (Joinson et al. 2008).

One reason why users offer so much information is because the design of the digital environment facilitates a high level of personal disclosure (Van House 2004). Participants are given the message by the design of the system that the richer the information they provide, the more 'attractive' they become and the

greater the chance of their interaction and social influence (Pekárek & Leenes 2009). The social networking creators actively support this cycle in order to gain commercial interest in their endeavours (Pekárek & Leenes 2009). There are, however, substantial privacy risks involved in these interactions (as explained in 1.3.d). The fact that some target audience groups are at some level aware of the possible risks, but still disclose information within social networking applications, demonstrates how persuasive digital spaces are for people to reveal themselves. It is clear that these technology applications tap into some sort of human need for disclosure.

Blogs are a good example of what has become normal practice in these spaces. Blog writers tend to be very self-reflexive in their writing, posting personal insights and critique. The blogs also seem to blur the boundaries between work and personal life. Blog writers tend to write about matters that are of interest, with little demarcation between audience and what domain of life the issue addresses. Likewise, on a social networking system such as Facebook, participants will have friend lists that will include associates from family, work and social activities, all on the same list and all receiving the same information about a person.

1.4.d Flood of data

Convergence produces a flood of data because technology allows the collection of records of interactions and transactions, and also the storage, inter-linking and sharing of this information. The potential for detail and cross-linking between this data is endless. Hill (2008) provides a narrative to illustrate the cross-connections in an everyday situation:

> We can't see how the street is immersed in a twitching, pulsing cloud of data.…This is a new kind of data, collective and individual, aggregated and discrete, open and closed, constantly logging impossibly detailed patterns of behaviour.
>
> Such data emerges from the feet of three friends, grimly jogging past, whose Nike+ shoes track the frequency and duration of every step, comparing against pre-set targets for each individual runner.

> This is cross-referenced with play list data emerging from their three iPods. Similar performance data is being captured in the engine control systems of a stationary BMW waiting at a traffic light, beaming information back to the BMW service centre associated with the car's owner.
>
> The traffic light system itself is capturing and collating data about traffic and pedestrian flow, based on real-time patterns surrounding the light, and conveying the state of congestion in the neighbourhood to the traffic planning authority for that region, which alters the lights' behaviour accordingly. (That same traffic data is subsequently scraped by an information visualisation system that maps average travel times on to house price data, overlaid onto a collaboratively produced and open map of the city.)

A predominant behaviour within convergence is 'the search'. Users are able to search within this information and then 'find, filter, and forward' (Pesce 2008). The 'targeted search' has become a new form of advertising. The profile of a user is known, via a record of past spending and internet behaviour, and advertising is presented that is targeted to their needs. It is yet to be seen whether users accept or trust this development (Metz 2009).

From a technical perspective, there are several ways in which information can be collected. For instance, web browsing usually involves the use of 'cookies', which work in the background, usually unknown to the user. These 'cookies' store the browser's clicks, which can create a history of the user's purchasing trends, political leanings and even sexual inclinations. These cookies are accessed by different websites that the user visits (Chacksfield 2009). Knowing this information about possible customers allows advertisers to gather knowledge about customer habits, interests and behaviour, which in turn can influence pricing decisions (Odlyzko 2003). The information-gathering process is often a one-way process. Although customers and individuals can have a lot of information gathered about them, there is little chance for individuals to collect consolidated detailed first-hand information about organisations.

Sometimes, this data is harnessed to provide a reputation profile of a user that is then made available to other users. Drawing on past behaviour by a user, a

profile is generated automatically by the software that can help other users predict how the user might behave in the future. An example of such a feature is the interface of eBay. Buyers can access a number value that gives a sense of the honesty and reliability of different sellers. This feature has been touted as one of the reasons behind the success of eBay. Although reputation systems are of great interest to trust researchers, the aspect of conventional reputation systems is not addressed in my research. This is because I argue that these types of systems are not dealing with trust, but a related concept of reputation. I am interested in how an individual develops a trust interaction rather than how someone receives advice from a community.

1.4.e Trust and risk in converged and provisional digital environments

Convergent computing and new digital environments allow a wide variety of people to enter into a diverse range of transactions with people from all over the globe, sometimes in a one-off transaction with a fast result. However, the information that helps an individual build a context such as rules and customs is limited. There may be little or no build-up to the situation or opportunity to gather more information (Cheshire & Cook 2004). There is a limited number of exchanges for parties to get to know each other and understand each other's perspectives (Nooteboom 2005).

Some of the risks or losses at stake for an individual engaging in a trust interaction can be identified, while others cannot be foreseen (Lacohée et al. 2006). In the area of health information digital exchange, a user might be given incorrect information that may have adverse effects. Within the context of on-line dating, somebody may pretend to have certain qualities (for instance, being single rather than married) that may result in disappointment for another. On-line dating might result in a meeting that could result in physical danger. Other risks are more difficult to identify. These risks include violations of privacy (control over personal information) and security (safety to self and devices). For instance, a user with a mobile device enters a shopping centre, which is wirelessly connected to the internet. Unknown to the user, her contact details are taken from the device and listed in a database that can be accessed by a range of people. Past purchases

made by the user are automatically calculated and the user is given advertisements tailored specifically to her desires. She makes a new purchase of an item flagged as an object that can be utilised by terrorists, thus an alert is activated that her behaviour should be documented. Her photo and purchase time are uploaded to a database.

Other risks include 'information injustice', which is when information provided by an individual is taken out of context and used to draw interpretations that may be unfair (van den Hoven 1999). For instance, a comment reflecting religious beliefs on a social networking site could be used in a job selection process. There may be an imbalance in the amount and access different parties in an interaction hold. Also, information provided by individuals may be used against their interests. For instance, data about an individual's preferences is used by advertisers to create targeted campaigns that motivate the individual to part with his or her money. So, trust needs to be constitutive of every practice and experience and is not simply a matter for unusual or particular settings.

In summary, current digital environments have the following characteristics relevant to the design of digital environments that attempt to enable trust: a provisional status (resulting in an expectation of temporariness for users); increasing power for users (more aspects of technology can be created and configured by non-professionals); provocation for the user to disclose a range of information, some private; and the creation of a flood of data that can be searched and archived in ways that cannot be predicted. The type of trust and risk interactions that can evolve in these types of environments is infinite, as users can enter into a limitless range of interactions with an increasing range of potential partners. Some more prosaic examples include the on-line purchases of items by a user. Without the user's knowledge, his or her transactions are observed by a third party and the pattern of the consumption is sent to advertisers who can target the user based on the background knowledge about the user's predilections.

1.5 The response of interactive design to trust and trust research

This section explains how the field of interactive design has worked with the nature of digital environments, and how interactive design can create a trust-

enabling digital environment. The history of system design is arguably a history of changing objectives. Early systems were largely concerned with data processing. Later, system design oriented to individual user understandings of the system, and interface issues came to the fore. More recently, system design has become more concerned with how many users interact in large-scale systems. More recently still, this has transformed into interaction in digital, online environments. It is this last concern that characterises interactive design. This does not mean that there is any precise definition for interactive design; instead, it describes a constellation of issues. This section examines how interactive designers have responded to the nature of digital environments and trust theory. Chapter 2 returns to the issue of interactive design to review strategies that can enable trust.

Like other forms of design, interactive design is never ideologically neutral; it always involves the support of one type of worldview over another (Thaler & Sunstein 2008), and the welcoming of certain sorts of users and uses over others. For instance, a designer who is employed by a client is paid to work in the client's interests, which may conflict with the interests of those who actually use a design (an issue pursued in chapter 9). Clark et al. (2002) provide an example of how the bias of a designer plays out and how bias can affect many elements of a production. Perhaps a designer regards a consumer as a 'little guy' who is taken advantage of by the 'big guys' (such as large service providers). That designer will attempt to put policies in place that protect the 'little guy', such as reminders to a consumer that she or he is about to be charged a lot of money for a service.

Interactive design creates for digital environments and the characteristics of these types of environments. As discussed in section 1.4.a, the user is an unusual position in these environments. On one hand, it could be argued that users have increasing power; they can configure technology in ways not possible before. However, as discussed in 1.4.a, digital environments encourage users to input large amounts of personal information on a regular basis. Often users cannot control the data once handed over and sometimes users are not aware of the ramifications of their disclosure. Thus, trust has emerged as a core concern in the

fields of human-computer interaction (Adams et al. 2006). Different designers engage with the technology and how the user should be positioned in different ways depending on the designer's agenda.

Trust is an attractive problem to solve for developers (particularly those working in the area of e-commerce) who pursue automated solutions, because one of the functions of trust (and distrust) in society is the reduction of complexity, which in turn expedites transactions. As I explain in the section on interactive design (chapter 2), there is pressure on digital designers from all backgrounds to automate technology in order to achieve efficiency for users and systems. Technology developers also seek solutions that are flexible (can be applied or adapted to a wide range of situations) and also scalable (can work with a large number of users) in order to seek commercial viability and success. If trust could be solved by a formula, then digital transactions could be hastened. I argue that in pursuit of the goal of an expedited and simplified solution, interactive design often seeks to either assume and demand the user's trust or to defer trust to a third party.

1.5.a Deferring trust

I argue that some owners of digital environments attempt to defer trust: passing on the trust decision to and drawing on the trust judgment of another party, without necessarily engaging with the validity of that third party (Alcade 2010). In this situation, trust is dealt with outside the parameters of the system within which the user is engaged. Alcade (2010) points out that in the research field and industry, there are no accepted standards for what constitutes a trusted third party or for how trusted third parties are chosen. Jøsang (2009) suggests a solution to assess the sources of trust-related information whereby the role of individuals' subjective judgments are recognised and drawn on.

The use of reputation formed through interaction with others is a common technique to defer trust to a third party. In this technique, a site aggregates the opinions of different people about an individual. An example is the reputation system used by the online auction site, eBay. Marsh (1994) argues that if reputation is used as a means to explore trust, then a balance of other forces

should be brought into play to allow depth to a judgment. In particular, he believes that notions of regret and forgiveness should be allowed consideration in a trust interpretation. Industry provides another example of a different form of trust deferment as a market solution. Wikipedia, the online collaborative encyclopaedia, has introduced a 'trust plug-in' (Leggett 2009) to their service, perhaps in response to commentators who challenge the authority of the encyclopaedia because it has been written by 'non-experts'. This trust service is based on a calculation of how long a certain piece of text has existed within the site without being edited. I argue that the association between trust and the amount of time is not directly linked and that it is a questionable way of judging trust. By presenting trust as a formula to users, users are discouraged from considering what trust means on their own terms and perhaps also from interrogating how Wikipedia judges trust. Rather than deferring judgment or ignoring the complexities of the concept of trust, the agenda of trust-enablement allows space for the multi-layered, rich, intersubjective and sometimes contradictory concept of trust that underlies all human interaction. The position of trust-enablement also argues that it is a self-defeating task to enforce trust on users, as has been noted by technology acceptance and trust researchers, for instance the work of Lacohée et al. (2006). In part 3 I present a proposition that seeks to explore how trust-enablement works as a practical accomplishment.

1.5.b Trust as a positive asset

In order to design, designers need methods to gain insights into the nature of the problem and the intricacies of the specific design situation. As mentioned in section1.2.d, a popular choice in the trust research area is the tool of the trust game experiment. Underlying this method is a belief that trust can be separated from context, and factors affecting the trust decision can be filtered away, which is a position incompatible with a view of trust that holds trust to be context specific. (This point is pursued in chapter 5.) I argue that traditional methods of exploration within the area of interactive design, such as surveys and user testing, also have limitations when attempting to access an open-ended understanding of what a user might think, feel and do about a complex and shifting concept such as

trust (as I argue in chapter 2). What methods can be adopted by interactive designers seeking how to design the enablement of trust? More specifically, as I argue in section 1.3, context and the process of familiarity is central to the concept of trust-enablement. In that case, how can designers study how users create context and familiarity? This question is investigated in the next chapters, chapters 2 and 3. In summary, research areas of ethnomethodology and critical interactive design hold potential because these domains focus on how participants critically construct and achieve context as an everyday and practical event.

1.6 Conclusion to chapter 1

This chapter has set out the basic terms of reference for the thesis and has provided an overview of the trust research area; this overview outlined the philosophy of trust-enablement and examined how it differs from previous approaches to the design of trust in digital environments. I argue above that digital environments involve some profound shifts in the relationship between technology, its providers and its users. This is, at least in part, a function of the move away from work environments and into public and 'social' contexts. This has both empirical and conceptual consequences. Firstly, it indicates, as I have argued, that the problem of what we mean when we talk about trust has to be taken seriously, and above all that we have to think carefully about how to conceptualise it. Our thinking about trust has to recognise, for instance, that trust is an interpretation of a social context by an embedded participant (Möllering 2005b); that trust is an extrapolation from a present circumstance and reduces complexity for an individual; that there is always something inexplicable about trust, in the sense that it cannot be reduced to a calculation; and that ultimately it is a contested concept that evades a precise and static definition.

These conceptual problems led me towards the concept of trust-enablement, which sidesteps these problems. This theory is new in the research area, and its aim is to allow users to conduct trust relationships on their own terms. It is a position that is agnostic about whether trust or distrust have positive or negative qualities; this judgment is dependent on the user. The process of familiarity underlies the agenda of trust-enablement as the end state of the process

is when a situation is understood. The understanding is strongly linked to context, as context has a significant impact on shaping a participant's understanding. Although context is another highly contested term, I am working within a broadly ethnomethodological understanding, meaning that the focus is on what is significant and relevant in the here and now (Ritzer 2004, p. 256). In part 2 of this thesis I describe a series of practical projects I conducted to explore the processes participants use to construct a context for trust-enablement. Then in part 3, I apply this knowledge to propose a trust-enabling digital environment.

Secondly, how trust is conceptualised in this research has consequences for how we go about collecting data in order to further our understanding of how people go about exhibiting trust (or not) in digital environments. These matters, as I have suggested, help define the 'problem space' in which we can begin our consideration of design. In chapters 2 and 3 of this thesis, I explain further the approaches I believe are appropriate for trust-enablement. In this initial chapter, I suggest that an ethnomethodologically informed approach to data has the potential to engage with the highly-contextual and participant-driven nature of trust.

These conceptual and empirical problems, in turn, imply a radically different view of the approach to design we might take and arguably involve a rejection of some classic (engineering-dominated) views of the design process. I take a critical interactive design perspective in this research, an approach which is predicated on the need to account for the changing relationship between the user and the system we outlined above. The fact that users can now configure environments, that technology is becoming increasingly 'provisional' and that persistent change has become the norm arguably implies a new complexity in design research; this thesis therefore attempts 'research through design' (Forlizzi et al. 2009), a mode that specifically uses design to approach problems critically.

Chapter 2: Theoretical perspectives: Ethnomethodology and Interactive Design

As mentioned in the introduction, this study is based on a broadly ethnomethodological approach. Ethnomethodology is a form of sociological enquiry that has become popular within the interactive design community as a means to understand the social context of design. It is argued that forms of research grounded in social enquiry can produce a finer layer of understanding and reveal more subtle observations than simply technical understandings (Clarke et al. 2006a). The aim of using this mode of enquiry in my research is to gain a stronger understanding of how trust behaviours can be understood in a range of contexts. This understanding is applied in part 3 to provide suggestions for how trust-enablement can be designed into a digital environment.

Ethnomethodology is an analytic position that is grounded in the lived experience of people. It allows a rendering of everyday experience which is 'processual'. That is, it views experience as constantly shifting as people orient to the context in which they find themselves. The resources – in terms of knowledge, experiences, assumptions, and so on – that participants visibly bring to a situation are key to gaining insight into 'what might be going on'. It follows, as argued below, that ethnomethodology typically provides considerable contextual detail. This is one aspect of the ethnomethodological analytic approach that intersects with how design as a discipline has been traditionally approached (Randall et al. 2007). In design-related contexts, ethnomethodology has refocused attention on the practical ways in which artefacts are used rather than the focus (associated with cognitive science) on the internal mental workings of the user (for instance, motivation and personality disposition).

This chapter also examines new approaches to interactive design, notably that of 'critical' interactive design, and argues for an integration of ethnomethodologically informed approaches to data collection and analysis with critical reflection on the design process. Mainstream interactive design has traditionally pursued aims that support business principles of efficiency and automation, championing the notion of 'user-friendliness' (Sengers et al. 2005). However, theorists and practitioners are increasingly challenging these aims and

motives. As technology moves into more areas of everyday life, it becomes apparent that business driven aims are not always appropriate. Hence, critical design research concerns itself with reflection on what aims can or should motivate design in more fluid environments.

Strategies to create new possibilities for users (and designers) include reflection on the degree to which automation is desirable or necessary (for instance, Kocaballi 2009; Mentis et al. 2010), and on whether the provision of finished solutions to users are appropriate aims for design. Further, revealing to users the possible contradictions and logic of a space can assist the user to consider his/her experience within technology, thus creating an ambiguous space that allows users to draw multiple interpretations. This might lead to the notion of participants 'being together' and sharing an experience rather than a purpose in a digital environment (Boehner et al. 2008).

2.1 What is ethnomethodology?

Ethnomethodology is a branch of sociology that was first developed in the 1960s by Harold Garfinkel and Harvey Sacks. It grew out of the legacy of phenomenology, which claims that an individual's reality is constructed from their experience (Prendergast 2006, pp. 511-513) and that the objectivity of social reality is produced out of the interactional features of experience. As mentioned in the overview to this thesis, ethnomethodology is a field within the social sciences that interactive design has drawn from in order to learn more about how humans interact in various situations. Fundamentally, ethnomethodology uses the 'everyday' and the ordinary to study and micro-analyse how people organise their worlds and create shared social realities and lived experiences (Weilenmann 2003, p. 34). It is the study of interaction as a social occurrence rather than a mental event (Randall et al. 2001).

Ethnomethodology is widely misunderstood, especially in mainstream sociology, largely because it refuses to engage with the orthodox concerns of the social sciences (Sharrock & Anderson 1986, p. 10). That is, it is unwilling to impose theoretical constructs on social reality, and unwilling to engage in issues of epistemology and ontology, i.e. philosophical problems of what is 'really' the

case and how we know it. In contrast, it assumes that the social world is, for all its members, including sociologists and other experts, a world made up of our ordinary, commonsense knowledge of it. For this reason, inspecting the commonsense procedures by which people in a social context do what they do requires no special methods. Indeed, ethnomethodologists (ironically, given the word) are resistant to the idea that there are any methods worthy of the name in the social sciences. Rather, they would be willing to adopt anything practical, such as the examination of official and personal documentation, history and observation. Their point would be that it is not the 'method' that gives them their results but the analytic choices that they make.

There are a wide variety of approaches within ethnomethodology, united by a common claim that raw experience has no organisation until it is apprehended and interpreted through a stipulated frame of reference (Maynard & Clayman 1991). Thus meaning is constantly constructed by those who participate in a situation. Context is central to this claim. Context, the environment in which understandings are made, can only be constructed between people as they read it, participate within it, and work out how they might function in a specific situation. This understanding is grounded in 'background expectancies', which are the expectations a person brings to a situation.

Within this claim, ethnomethodologists differ in how much the 'internal mental processes' of an individual dictate understanding over the 'embodied' actions of an individual. This has been called the sociology of cognition (Maynard & Clayman 1991). Schütz and Cicourel, early 'proto-ethnomethodologists', explored how people can create meaning together but nevertheless retained an interest in cognitive processes, albeit in a somewhat unusual fashion (Rogers 1983, p. 82). Schütz and Luckmann (1973, p. 100), for instance, were concerned with the way in which 'recipes' and 'stocks of knowledge' informed peoples' behaviour. It was Harold Garfinkel (1967) who explored the 'radical' alternative: that behaviour could be examined with no reference whatsoever to internal mental structures and that methodologically we could choose to understand behaviour purely in terms of what is naturally available to us. Garfinkel (1967) de-emphasised internal processes and instead studied how an individual's

understanding of context can be documented. His thinking was influenced by both Schütz and Husserl, according to Lash (2001, pp. 167-168), and also bears a resemblance to that of Wittgenstein (1953), who examined the speech act as a 'form of life'. This perspective looks at ways to study the 'member's problem', which refers to the way in which people use their knowledge and skills to deal with 'normal, natural troubles'; in the contexts I wish to investigate, this would refer to how people visibly and accountably go about exhibiting their trust (or otherwise) in others. It follows from this that trust here is not seen as a mental construct, but as an action.

Ethnomethodology is a sensibility and a form of analysis rather than just a set of techniques or an observation tool. 'The ethnographic imagination at work' (Randall et al. 2007, p. 32) is the intersection of 'the looking, the thinking, and the reflecting' (Randall et al. 2007, p. 211) and is concerned with the 'elusive issues' of how people 'tend to see things' and how people communicate shared understandings (Randall et al. 2007, p. 6). The ethnomethodologist can create 'aids to a sluggish imagination' (Spiegelberg, cited in Garfinkel 1967, p. 38) to gain reflections 'through which the strangeness of an obstinately familiar world can be detected' (Garfinkel 1967, p. 38). The aim is to open up a space for inspection for a designer or developer from which a problem or question can be informed.

2.1.a The claims of ethnomethodology

Ethnomethodology is interested in 'social phenomena' and is focused on how meaning is created on a micro-level and remains indifferent to proving any social or political agenda. Lynch (1999) explains:

> When studying…the orderly production of automobile traffic, an ethnomethodologist examines how traffic patterns are 'achieved' by local cohorts of drivers. This differs from trying to determine if specific orders of traffic are safe, efficient, rational, or democratic.

By neither claiming an interest in nor investigating the notion of a universal 'truth', ethnomethodology sidesteps some of the questions that other types of

sociologies and disciplines investigating the social world have had to deal with. Ethnomethodology (in particular, the writings of Garfinkel) does not try to explain where the societal norms it examines come from. For Garfinkel, explanation is not something that ethnomethodologists would seek to do at all. His preferred term is 'explication'. In other words, the only concern is the particular set of skills and expertise that participants use in the context they inhabit and a rigorous limitation to the explication of members' methods (Baert 1998, p. 88). This gives the impression that ethnomethodology is inherently conservative and resistant to change on account of a focus on the current situation rather than the exploration of alternatives. Ethnomethodology is neither conservative nor radical in respect of its attitude towards participants. Participants are not 'right' or 'wrong' but can be examined as doing what they do. This does, of course, mean that ethnomethodological practice does not entail any kind of critique.

Ethnomethodology focuses on inter-subjectivity and intra-subjectivity: how individuals reason, share and construct reality between each other. Ethnomethodology holds that all people undertake practical sociological reasoning as an everyday activity, discerning what other people mean and what they need to enact to 'get things done' which is referred to as the 'natural attitude' (Schütz 1970). A person in an interaction is constantly orienting to how the person they are interacting with may be considering the world. To some degree, a person is also considering the motivations and intentions of the other and how this affects what s/he wants to do (Randall et al. 2007, p. 117).

An individual's reasoning is shaped by an interconnected system of 'relevances'. According to Schütz (1970), a writer who has inspired many ethnomethodologists, there are three systems of relevance: motivational, topical and interpretational. Topical relevances are the themes that are of importance to the person at that time: what is the problem at hand? Interpretational relevances are the person's framework of knowledge, shaped by prior experience. Motivational relevances refer to the priorities amongst the options that seem to be the most persuasive. This scheme of relevances can be used as an entry to understand how people prioritise information about trust in a decision or interaction. Schütz (1970) developed the premise that while no two people can

have identical viewpoints, they can nevertheless interact and share perspectives through shared language, understandings and environment. A distinction is made in the ethnomethodological tradition between first order and second order observations (Lynch 2002). A first order observation is when a person is embedded in a situation and interacts from a personal perspective. A second order perspective, on the other hand, is when a person has a sense of awareness that they are making a decision. In other words, it is the observation of an observation.

Ethnomethodology analyses how people make these perspectives or understandings comprehensible to each other. Heath and Luff (1991,1992), for instance, have studied how the personnel of the London Underground use the image stream from surveillance monitors to draw conclusions about what commuters are doing both onscreen and as they move away from the camera's view (Luff et al. 2000, p. 195):

> The world they are presented with is not complete, it is disjointed and fragmented, transformed by the technology available to them. The supervisors have to make use of what is available to make sense of the remote environment and then act accordingly.

Specific instances of organised action can uncover the means by which people produce the rationality they exhibit. Sometimes the organised action is in the form of creation of an ongoing document or artefact such as the type used in coordination-centres. For instance, Hughes et al. (1994) explore how pieces of paper known as 'flight strips' are used between traffic controllers to check and re-confirm the location of planes. The strips are handled via a process of writing on, notation, and distribution. Knowledge about how people understand and create trust can be gained from the study of these processes.

Ethnomethodology uses the term 'indexical expressions' to describe the language people use to communicate within a context. Meaning is derived from the circumstances in which the communication happens, for instance, using words such as 'you' or 'yesterday' does not make sense unless both the speaker and the listener have a shared idea of what those words mean (Maynard & Clayman 1991). Interpretations can only make sense in a specific context (Heritage 1987, p.

235). When people enter into a situation, they implicitly understand how to behave and manage their behaviour. For instance, Livingstone (1987) describes how a queue is created and maintained by those who formed it. There are unspoken rules that are applied; for instance, how much distance to keep between people, and how to reprimand those who do not behave. Sometimes the way to function is hard to document or otherwise formalise, as shown in Orr's 1996 study in which Xerox technicians preferred to collaborate rather than demonstrate or seek expertise via the use of manuals.

2.1.b Why might ethnomethodology be a useful framework for understanding trust?

'Ethnomethodologically informed ethnography' is the type of analytic practice I adopt in my explorations. It is a term coined to allow a more flexible use of ethnomethodology than its original exponents may have intended (Randall et al. 2005, p. 110). This usage was coined in order to distinguish the descriptive analytic aspects of design-related work (which can be thought of as ethnomethodology tout court) from the more constructive, design-oriented work which the ethnomethodologist may nevertheless be involved with. In design-related contexts, ethnomethodology has refocused attention to the practical ways in which artefacts are *used* contextually rather than a focus on the *user* as a psychological construct.

Like other sociological disciplines, ethnomethodology has techniques that allow investigations outside of a laboratory environment and 'in the wild', thus providing insights into interrelations between participants in 'real' rather than contrived situations. As they aim to understand how sense is made of a situation, the tools of ethnomethodology may be particularly useful for the study of new technology that does not yet exist. Knowledge of ad hoc practices devised in situ by participants may inform us as to what behaviours new technology may need to support (Crabtree 2004). However, Randall et al. (2007, p. 210) caution that we need to maintain an interest in existing technology. Thus ethnomethodology is useful to study a range of digital technology phenomena that rely on human interaction and are difficult to access, such as security and privacy. Traditional,

and arguably more direct, means of gathering insights can only glean information that users are both aware of and wish to disclose to the researchers. Ethnomethodological approaches can access more nuanced interactions. For instance, a documented problem when designing security is how users manage passwords (Yapp 2001). Users are renowned for 'mistreating' important private passwords, for instance, sharing them with friends, and writing them down in places visible to others. An ethnomethodogical study could help a designer access 'what might be going on' when users partake in what might at first glance to appear as 'irrational' and inexplicable behaviour.

However, the notion of trust holds a special place within ethnomethodology because trust underlies the 'everyday' and the 'ordinary'; it is the driver underneath all social interaction (Garfinkel 1963). Trust forms the compliance and perseverance people display when establishing a shared reality and when holding certain constitutive expectancies. Expectancy is an acknowledgement that there are certain rules or methods that should be adhered to in an interaction. This includes the order in which the different aspects of the interaction unfold (Garfinkel 1963). Trust is the confidence that one's expectations will be met in some form. If there is a breakdown of understanding, participants will endeavour to restore a sense of shared reality, reflecting the centrality of 'procedural trust' to everyday interactions (Heritage 1987, p. 240).

Ethnomethodology, then, may help designers understand how and why people exhibit trust in certain situations and this can be used to inform design. This does not mean that the results of a broadly ethnomethodological enquiry point to design solutions. Indeed, the relationship between description and prescription remains problematic. As Rogers (2004) writes, evolving interactive design methods need to be critiqued for their acceptability, reliability and usefulness. Some of the issues underlying the fusion of design and ethnomethodology are addressed in the next chapter after a discussion of interactive design. Below, in section 2.3, the area of interactive design is covered in more detail; in particular, those areas which have the most potential when considering the design of provisional technology and trust-enablement. The core argument here is that if ethnomethodology provides us with a rich and

sophisticated resource for describing user practices, we also need resources for delivering design solutions.

2.2 Interactive design for trust-enablement

This section outlines the other research perspective at the basis of this thesis: critical interactive design, a field that draws on and intersects with ethnomethodology. Interactive design works with and responds to the different types of technology being introduced. As explained in chapter 1, the nature and scope of technology is shifting away from a closed relationship between a single user at a terminal working on business aims into wider areas of human lives, such as recreation and the home. Technology is also shaped by its provisional nature: as argued in chapter 1, it is impermanent, in flux and likely to be usurped. The aims of interactive design are now problematised. New approaches, some of them adopting what have been called 'critical approaches' in the literature, are needed, and hence designers and researchers are seeking new relationships and outcomes for users.

A complex and critical field of debate has grown around interactive design. Some positions are more conventional and seek to support a goal of efficiency and successful financial transactions. Other positions are more critical, questioning conventional goals and presenting new endeavours (for instance, interactives that encourage self-reflection). As technology moves into more and more areas of human life, different goals for the result of a design are appropriate. I argue that the goal of a designer is linked to the context of and audience for a project. If an interactive project is for a bank, then the goal of efficiency might be relevant. However, if the interactive project is for a children's television show, then the same goals do not apply.

As mentioned in section 1.3.b, the current state of technology also allows the questioning of the notion of what a designer is. Technology once involved the creation of projects made by experts that had a defined development and completion time. Gradually, technology has developed that has allowed users more and more of an integral role in the shaping of digital environments. For instance, in the last five years we have seen the rise of 'do it yourself' (DIY)

media. Users with little training have accessed media-making technology, such as cameras, and uploaded the results to be distributed widely over the internet. Users have become, in the words of Toffler (1980), ‘prosumers’: a blend of customer, consumer and producer.

If our descriptions of context, derived from ethnomethodological studies, can show how users visibly engage in acts of trusting or not, then this should provide us with some basis for the design of trust-enabling technology by putting in place support for the processes and strategies used when people engage in interactions requiring some degree of trust. It is my view that such digital environments will entail some constraints, even if they also contain elements of configurability, for the simple reason that users may not have the interest or time to configure a trust-enabling environment in all respects. Rather their reliance on some allows them to foreground others and thus make certain acts of trust constitutive of the mutual topic of interest for those concerned that enable that focus. Hence people may trust in the rules of turn-taking on conversation so as to allow them to talk about the topic of trust in conversation.

This chapter explains the traditional approach to interactive design, and then the more recent critical developments that build on traditional earlier work. I argue that the aims of the more critical approaches are more relevant to the design of trust-enablement within these new provisional technology environments. This includes the aim of self-reflection between user and system that critical design seeks. I review some of the strategies developed in the literature to achieve self-reflection including ‘ambiguity’ and ‘incompleteness’. The chapter closes with a discussion of creativity and how it is a useful resource for the strategic agendas of critical design.

2.3 The links between conventional interactive design and business

This thesis is located in the domain of interactive design research. Interactive design, also known as ‘user experience design’ or human computer interaction (HCI), is a field that is concerned with users’ experiences of an interface. An interface is the communication layer between a user and digital communication technology. Theoretical knowledge about the user is applied to improve the design

of interfaces (Tognazzini 2006). Interactive design research is often inter-disciplinary, in particular drawing inspiration from the fields of sociology and psychology. The aim of this research is to provide insight into how people experience and understand their worlds, which can then be applied to the development of interfaces. The links between HCI research and commercial industry have been strong and often the success of HCI has been determined by the achievement of 'better' interface products that support 'better' business imperatives. Solutions are required within business constraints, pressures and timelines. This has led to a practice that has an acceptance of business and commercial values (Blythe 2008) such as efficiency and expediency. Clarke et al. (2006a) point out that in practice, users prefer systems designed around relevant processes embedded in existing procedures, even if these systems take more time.

All types of interactive design strategies make assumptions about what a user might want and how much agency a user has. This in turn affects how trust-enabling a digital environment can be. Interactive design strategies also make assumptions about the relationship between user and designer. The more separate the roles, the less agency the user has to make fundamental changes to how an environment is formed and how it responds to needs as a project matures.

Computer interface design has been evolving since the 1950s. Interfaces were made by and for hardware engineers. As technology developed in the 1960s and 1970s, the development of higher-level programming allowed software engineers to develop software without dealing with the underlying hardware. The interface had started to become important, however the focus was on ergonomic issues such as keyboard and monitor layout. In the 1980s, the first 'non-I.T professionals' began using computers as end users at terminals, for instance using word processors. In this era, cursory understandings were made regarding the contexts in which the systems were to be deployed. This resulted in system developers making the same mistakes, but faster. I.T developed a reputation for creating systems that were hard for people to use (as acknowledged in Grinter 2000).

In the 1990s, several strands of development emerged. In some areas, interface design became viewed as a dialogue between user and machine.

Technology design is now entering a third phase, where technology is colonising the social context, and providing spaces where people can communicate in a wide variety of digital contexts. For instance, a form of video conferencing is now used for individuals to participate in online dating. Theoretical design developments concerning technology have not kept pace with technical development. A lot of work still needs to be done and the area remains problematic. There are still fundamental interface design issues to resolve even though new products are being developed. This is evident because system 'failure' remains a common theme in I.T. development (Glen 2002). Large amounts of money are lost as managers consider technology as a problem disconnected from business concerns and struggle to understand how innovation and I.T. can be administrated. From this starting point, it is difficult for the perspective of a user to be able to be embraced. It is apparent that systems have not always conferred the benefits expected from them by those who have commissioned them (Grudin 1990).

In turn, this led to an interest in what social science might be able to do in relation to design, and more particularly what ethnographic and ethnomethodological approaches can offer. This shift can be dated approximately from the publication of Lucy Suchman's book, *Plans and Situated Actions*, in 1987 and subsequently from a number of design-related studies conducted in Europe and the USA (see for instance, Hughes et al. 1992, 1993; Heath and Luff (1991, 1992). The foundation of this work was a demand for a more 'situated' or contextual take on workplace routines. Over a period of time, this led to the development of the field called 'Computer Supported Cooperative Work', which is largely characterised by an interest in new methods, computer mediated communication, and the coordination of complex workflows in command and control centres of one kind or another.

There might be many reasons for the failure of technology to deliver on its promises. Although massive resources have been devoted to create the vision of ubiquitous converged computing, this has not as yet been achieved. Greenfield (cited in Shute 2009) claims that 'we don't do "smart" very well yet' because the creation of this type of computing involves problems that are hard to solve. Rogers (2009) argues that this is because the mainstream view of convergence is

developing in a direction that clashes with how humans work best. Instead, she maintains that convergence should seek to support human endeavours rather than trying to create an environment where humans do as little as possible. Furthermore, Bødker (2007) calls for more questioning of what convergence means. He claims that the question for the present is not merely 'how we experience through technology' but also 'how we experience technology' (Bødker 2007).

Nevertheless, if Grudin (1990) was right in his assertion that the computer was 'reaching out', and Hughes et al. (1994) that design innovation needed to 'move out of the control room', then we are now arguably in a third phase, one which involves moving out of the workplace altogether. A lot has happened to justify this, including the rapid development of the Web and huge increases in computing power that allow casual use of images and movies. New methods for understanding the internet are generated by the enhanced possibilities inherent in mobile devices, and new semantic possibilities (so-called Web 2.0 applications, which entail the use of semantic structures like folksonomies and ontologies). This has in effect been the motive behind the growth of 'interactive design'.

An important part of interactive design has been the understanding of design situations. Thus there is a well-developed body of methods that suggests how to gather primary information to inform design. These methods include both qualitative and quantitative techniques. There are strong links between HCI research and the commercial industry (Knouf 2009). Often the success of HCI has been determined by the achievement of interface products that support business imperatives within business constraints, pressures and timelines. This commercial pressure has led to a design practice influenced by business and commercial values (Blythe et al. 2008) such as efficiency and expediency.

2.4 Critical interactive design: potential for new relationships?

Critical design, including the practices of 'reflective human computer interaction' (reflective HCI) and 'critical technical practice', is a current move in design research (Knouf 2009); it is included in the argument of this thesis because of its potential for trust-enablement. It responds to and challenges the directions

developed by the more conventional areas of interactive design, which as explained above can be summarised as automation, seamlessness, convenience, efficiency and 'short-cutting'. Critical design practitioners explore how societal values and ways of looking (for instance, from the perspective of race, gender and class) are embedded within technological systems. Rather than attempting to reduce complexity, this type of design practice seeks to work with complexity. The elements of an environment within the scope of critical design include not only the aesthetic appearance of a project, but attention to the type of experience offered, including how participants become invited, involved and motivated to participate. In order to design environments that enable trust, I seek technological design that facilitates reflection, critique and the co-existence of diverse ways of thinking.

Underlying this approach to design is a move away from the assumption that technology is the ultimate 'thinking machine'. According to Rogers (2006), there is a comparison between how mainstream technology has been designed to serve people and the lifestyle of the landed aristocracy in England, whose every need has been attended to with as little thought or action on the part of the individual aristocrat. However, although computing technology has been around for a considerable amount of time, according to Langheinrich (2003), technology automation has not been achieved, and this is an indication that technology that seeks to fully automate a user's experience may be working in the wrong direction. Instead, there is a move towards looking at how technology (which excels at the processing, storing and searching of data) can be combined with the sophisticated ability of humans to make sense and cohesion out of ambiguity and complexity (Sokoler & Svensson 2007), thus leveraging off the potential of both. Technology design should therefore aim to combine these two powers.

Researchers are also re-examining what the relationship with a user might be that can match the directions in which technology is heading. There is a shift from 'What do I or you want?' to 'What desirable places or situations are we forming together?' (Krogh & Petersen 2010). These new design explorations, which seek new relationships with users, are driven by the ways in which technology continually encroaches on new areas that have a variety of goals for

users (Martin et al. 2009), as mentioned in chapter 1. In the next section, I review the strategies developed in the literature that embody some sense of a relationship with a user. Strategies range from a subtle 'being together' to arguably a more intense state of self-reflection.

Critical design strategies owe a legacy to the research area of participatory design, which has striven to work out ways users can have a more central role in the design process. Participatory design grew out of a Scandinavian tradition that seeks to meaningfully involve the end users in the design of projects (Bødker 1996) and is now adapted in a broad range of design fields such as architecture and urban planning. Within this research area, researchers become the 'bridge' for participants to have a voice in the design process by feeding the user's needs back to the designer and the engineer. The notion of 'agency', i.e. that users can play an active role in design, is central to the participatory design philosophy.

Underlying the issue of the relationships between users and their environments is the question of what role design plays in shaping an environment. This needs to be addressed before moving on to the issue of what sorts of relationships are propagated by different interaction approaches. Does design determine interaction as argued by Greenfield (2009), or is the relationship more subtle? I argue that design can shape a situation, nudging people towards certain behaviours or ways of understanding, as suggested by Thaler and Sunstein (2008), but that the outcome or wider control is ultimately within the hands of the participants involved in a situation. Design can either affirm or critique society by either conforming to current expectations or by rejecting current expectations as 'norms'. It can also help in the search for alternatives (Bowen 2007). Design is not just a 'slot in the process' (Dunne 1999). Bell et al. (2005) give an example of technology design in the domestic domain, which can either 'passively propagate' the politics of the home, such as the stereotype that only women cook, or can instead encourage alternatives. Thus it is important for designers who wish to facilitate a wide range of interpretations to look for ways to embody alternative values in work.

Additionally, the desires and needs of users are not static but are complicated and shifting. What if users do not wish to either be pandered to or be

in a state of ‘engaged agency’? What if a user does not know how much involvement she or he wants and does not care or have much time to devote? What if the type of relationship that a user has with digital technology changes over time? A critical design approach that allows for these complexities is arguably a way forward. Gansing (2008) claims, in this vein, that interactive design research has often understood interaction via an active/passive dichotomy that is problematic. This is partly because this dichotomy values the active state at the expense of the passive.

Such ‘critical’ views have not gone unchallenged. The combination of ethnomethodology and critical design needs to be approached with caution. Crabtree et al. (2009), for instance, produce a scathing critique of the critical tendencies of postmodern sociology in design-related fields. If they are right, this critique creates a difficulty for my argument that some synthesis of an ethnomethodological orientation to description and a ‘critical’ approach to design is possible. These critiques, however, are not correct, as we shall see in chapter 3. Crabtree et al. criticise the postmodern trend in sociology, and use this to dismiss the possibility of critical design when they are in fact rehearsing issues of sociological analysis and not design choice. In much the same way, it can be argued that Satchell (2008) and others in their call for new ways of collecting data are not talking about design at all, but sociology. What is evident is that ethnomethodological forms have been largely associated with workplace studies and it has been suggested by Dourish (2006) that they are less appropriate as we move away from the workplace. From an ethnomethodological perspective, the reason for the shift is because of the context in which action is taking place, not the activities participants are undertaking. From a broadly ethnomethodological perspective, every action, whether it is something as personal as kissing or sleeping, is an accomplishment and requires ‘work’ on behalf of the participant. The important element for my work is the potential of critical design to offer the opportunity for self-reflexivity to designers and users.

That is, an argument is made for a shift away from an interest in the ‘processual character’ of interaction that ethnomethodology has been interested in towards a more aesthetic set of considerations. Satchell (2006), for instance,

argues that including cultural theory more extensively in the multi-disciplinary mix of interactive design culture can add a critique currently absent. Fiore et al. (2005) maintain that the philosophy of art has potential within critical HCI. This is because an art perspective should provide a catalyst to consider the relationship of the designer and the user in new ways and to liberate the user from being a 'human information processor'. As this type of practice is new, there are many questions and directions to be explored. Satchell (2006) writes that there is only a slim body of work suggesting how a critical practitioner should proceed. New ways of collecting as well as thinking about data need to be developed. Bødker (2007, p. 121) claims that the question that is central to the pursuit of critical interactive design is not merely how we experience through technology, but how we experience technology. Aesthetics are relevant to the design of trust-enablement as trust involves a user's subjectivity. This thesis draws on new developments in the research area that suggest how to approach design in a critical fashion. A consideration for trust-enabling design is users' relationships with technology and how users mediate relationships with each other using technology.

2.5 Strategies for new relationships

The strategies that I want to discuss at this point are design strategies, not strategies for an improved sociology. In part 3, where I present a proposition for the design of trust enablement, I draw on the strategies discussed in this section. Part 3 shows the ways in which the traditional approach to interactive design, user centred design, has limitations when attempting to design for trust, as trust is, in my view, a relationship rather than a transaction. Critical design strategies, then, do not necessarily lead to a politicisation of the trust relationship, but at the least help the designer imagine new ways that may be more appropriate for the conceptualisation of trust in context-specific ways. 'Critical' need not refer to reflection on major political and social movements but to the idea that we might usefully reflect more on the relationship between designer and user.

More than just overarching guiding principles and abstract theory, in-depth and detailed techniques are needed if design research is to build a critical aesthetic. Attention also needs to be given to how a series of strategies work

together as a whole. Again, this argument is not entirely new. It is to be found, at least in embryonic form, in the Scandinavian approach known as Participatory Design (P.D.) (e.g. Greenbaum & Kyng 1991). This thesis now reviews some of the strategies discussed in the critical design literature concerning the engendering of new relationships with users. Each strategy provides a different angle on how a relationship with a user can work depending on the context, a point I discuss again in part 3, because as I explain in the later parts of this thesis, context plays a major role in the design of trust-enablement.

2.5.a 'Incompleteness' as a strategy

One critical design strategy is to pursue the notion of 'incompleteness': to make projects and concepts that are not seen as 'final versions' but placeholders that are under constant development and are 'in-flux'. The strategy of incompleteness is appropriate in the consideration of trust, as I argue that trust is a dynamic situation, which may shift at any point. Trust cannot be forced, thus individuals can always can their mind, even after an event, about how they view the trustworthiness of a context. Trust is not a closed act. 'Incompleteness' also has potential to engage users in a fundamental fashion, as the user may have the opportunity to shape the technology that is under consideration. Inherent in the strategy is the notion that because the project is in flux, underlying structure and content is 'up for grabs' and thus could be informed by how the needs of users emerge. The relationship between participant and designer is fundamentally challenged by this model. If users are making crucial decisions about the direction of a project and providing detail about how a direction can be achieved, why is there a demarcation at all between user and designer?

The notion has its origins in a software development movement dating from the 1990s known as 'Extreme Programming', within which work is created in swift cycles that receive a high level of feedback (Beck 2000). An environment at one point in time functions as a tool to provoke more detail about what might be appropriate in a particular design space for a set of users (Bowen 2007). Ethnography can play a role to assist a design problem to remain open. Traditionally, Ethnography used to focus on 'what people do' and how they do it.

Newer forms of Ethnography tend to attempt cultural interpretation, and concentrate on the shifting processes of meaning. Crabtree et al (2009) recommend caution when adopting these new processes because sometimes practitioners attempt to develop new research methods, when existing approaches still suit newer interests.

Technology is at a point where the development of incomplete projects is possible and mainstream developers and communities have access to the knowledge and tools that allow their projects to connect organically with the work of others (Czarniawska 2004). 'Wikipedia' and 'Linux' are commonly cited as examples of this type of approach. These two projects are both community oriented and freeform, relying on the unpaid participation of contributors (Garud et al. 2008, p. 100). Considering a design project as incomplete is a radical shift from how projects are usually developed. A way towards achieving incomplete projects is to stop considering an interface as a static artefact, but rather as a node within the network, which has 'extensible' and 're-usable' parts (Reymen & Romme 2008). It is no longer appropriate to come up with 'optimal solutions to defined problems' (Pandza & Thorpe 2009). Garud et al. (2008) suggest that these nodes could exist across different domains, and hold multiple perspectives simultaneously. This identification of a need for hybrid spaces in which different perspectives can be held by users appears increasingly in the literature.

2.5.b 'Being together' as a strategy

'Being together' is a new approach to the design of communication in digital environments within which participants can share a sense of meaning and 'sympathetic awareness'. The writers use the concept of 'Mitbefindlichkeit', borrowed from the philosopher Heidegger, to explain the notion of a 'co-state of mind' (Boehner et al. 2008). Rather than set meanings, the focus is on 'hints and guesses' whereby people construct their own meaning. This runs counter to the notion of communication as a conduit that HCI usually draws upon, within which active and deliberate exchanges of information (such as facts or opinions) and 'accurate interpretations' are emphasised (Shepherd 2006, p. 24; Boehner et al. 2008).

Boehner et al. (2008) support the prediction of MIT researcher, Judith Donath (2006), who believes that we will need to allow for more subtle interactions between people in future digital environments. For instance, there will be niche social networking applications that will allow for more specific exchanges of information. 'Being together' and 'sympathetic awareness' have potential for users to become involved in how digital environments are formed and also for trust-enablement. If environments are designed with the facility of sympathetic awareness to grow between users, then there would have to be a kernel of the site that can change in response to what is required for awareness between users to grow. Some users may have different priorities to others and the environment would need to respond to these needs. In principal, attention to 'sympathetic awareness' allows for participants to understand the perspective of others and potentially for designers to get a better feel for user perspectives. Having said that, at present there are few applications that might demonstrate how this can be done in practice. However, I believe the approach of 'being together', because it does not force relationships between users, is applicable to the design of trust-enablement. I explore this further in part 3, where I discuss how it can be beneficial for the user to keep trust options open rather than to close down potential future possibilities.

2.5.c 'Seamful' design as a strategy

'Seamful' design works with the 'messiness of the real world'. The 'seams' of a design are its constituent parts, and how it integrates with other systems (Chalmers et al. 2004). Here, it is argued that it may be useful to expose the weaknesses and contradictory aspects of a system, as well as its shortcomings and inconsistencies, rather than allow them to be smoothed over by design. This strategy is used to engender a relationship of critique; the user understands the strengths and weaknesses of the interaction (Boehner 2006) and is then in a position to understand how technology might work, be adapted or re-purposed. 'Seamful' design requires identification of the 'seams' that out of all the possible data are important to a user. It also involves solving the problem of how to present information to a user and how she or he will interact with it. Currently,

there is little exploration in the research area into the parameters that affect these decisions.

The notion of seamfulness is usually applied to how users perceive technology via technologically mediated communication (Chalmers & MacColl 2003). However, the notion could be extended to how people perceive each other via digital mediation. The aim of this endeavour is for people to be able to see each other as holding biases, contradictions, and 'work in progress' which are everyday qualities. Users might understand more significantly how others function, integrate with their community, and assess the strengths and weaknesses of these other users. This potentially leads to richer sets of information for trust assessments, underpinned by recognition of complexity.

There are problematic aspects to 'seamful' information. What happens to trust relationships when people are encouraged to disclose information, for instance in social networking sites? Will people feel that they have disclosed too much information after the rush of participating in these sites has gone? Is the practice exploitative? Will participants find that judgments are made against them on seemingly insignificant data? As social networking is a relatively new endeavour, some of the problems are only beginning to become apparent. For instance, young people are known to be quite open with the amount and type of information they provide about themselves (Taraszow et al. 2010). With time, will these people regret the amount of history they have provided about themselves? Will their employment prospects be damaged? Design may provoke problems at the same time as providing solutions.

2.5.d Ambiguity as a strategy

Ambiguity is another strategy posited by critical design as a means to provoke new relationships between users, designers and technology. This strategy involves presenting information in an incomplete or contradictory fashion that encourages questioning rather than a certain or clear position (Boehner & Hancock 2006). The intention is a reminder to users that information can be fragmentary, shifting, and perhaps incorrect. The result is an environment within which multiple interpretations can co-exist.

An example of ambiguous information design is a project developed by Graeme Harwood (1994) called 'Rehearsal of Memory'. This project is a documentary about inmates in a psychiatric prison, featuring the inmates' diaries and close-up photos of their bodies. However, rather than the individual stories being complete entities, which is how stories are usually presented, the fragments from each story are mixed up. For instance, the user may receive some lines from one story, then part of another story crosses the screen and moves into the space of the older story. One image is created from a series of different images. This creates an element of confusion and also removes some of the voyeurism from the story. The viewer is left uncertain. Facilitating the acceptance of multiple perspectives and possible interpretation has potential for trust-enabling design. A design that enables trust needs to cater for the individual and idiosyncratic nature of trust.

2.6 Art: a resource for critical design

The history of system design is arguably a history of shifting paradigms. Interactive design was once considered from an engineering type perspective – one which entailed a problem-solution orientation. This was progressively challenged by the recognition that system design was a 'wicked' problem (Rittel & Webber 1974); by the 'soft systems' views of Checkland (1981) and others; and by the explicitly sociological interventions of the likes of Suchman (1987), Hughes et al. (1992, 1993), and Heath and Luff (1991, 1992). Now design is increasingly regarded as an inherently creative activity, one which draws on the information provided through sociological, psychological and other information-gathering approaches, but which nevertheless emphasises the inevitable gap between description and prescription. Such an approach draws on different fields to explore lateral approaches to understanding and communicating a situation. This movement is driven by technology's increasing encroachment on new areas as well as its provisional status, as explained in Chapter 1 (Martin et al. 2009).

This section reviews how, increasingly, art and design draw upon each other. Exploring this entails a paradigm shift towards creativity. How knowledge is developed in this research area can assist trust-enabling design. Designers of

trust-enabling digital environments can learn from research that explores how to facilitate freedom of interpretation. The domain of art has an established tradition of social and political critique and challenge of conventional understandings that can also be drawn on. Art tends to undermine automatism of perception and question the relationships people have with the world around them (Shklovsky 1965, p. 613).

Industry continually requires 'new', 'fresh and innovative' designs as a means to connect with new audiences, to establish difference, and be noticed in a culture over-saturated with information. Design needs tools to be able to explore these areas. There is now a push within the wider design community to focus on connecting with audiences. This comes at a time when digital technology is moving into new areas of human life such as entertainment and the home and pursuing agendas wider than efficiency and automation.

There are now calls for design to be less about the 'rational' and more about the emotional connections between people, to make an audience aware of its own humanness (Malouf 2009). Designers should be 'humanising' technology as an antidote to alienation and the deprivation of people's aspirations in a modern society (Gajendar 2001). Brenda Laurel's well-known text, *Computers as Theatre* (1993), established another liberal arts field, theatre direction, as a field that interactive design can draw on. Byrne (2008) claims that he finds the principles of stage design to be very applicable to interactive design and finds it helpful to think of the screen as a stage. Notions from theatre such as 'selection' and 'emphasis' assist a designer to create an interactive experience. Howard (2008) adds that Erving Goffman's interactive framework, which consists of breaking down an interaction into the stages of initiation, maintenance and 'leave taking', could be applicable to both theatre and screen-based interaction design. There are many examples of practitioners who blur the boundaries between fine art and design (see the work of, for instance, Ezer on typography (2009) and Rogers (2011) on shop design).

Currently, there is also a push for interdisciplinary practice reflected in the notion of 'design thinking', which has become something of a buzzword. In this way, 'art' and 'design' feed off each other in ways that may not always be

predictable. Thus, the Venice Biennale, a major art exhibition reflecting the state of contemporary art, has been altered dramatically by the availability of digital technology, changing the ways the artists 'reach audiences' and build mystery and aura around their work (Thompson 2008). Bill Gaver is probably the best-known of HCI practitioners who attempt some integration of artistic practice into design. His 'cultural probes', as we shall see, are specifically designed as provocations. Sengers and Gaver (2006) argue that often HCI still carries with it an automatic valuing of the rational which can be dismissive of claims concerned with aesthetics and mean that orthodoxies are difficult to challenge. Techniques, which in their view act as challenges and provocations, generate uniquely interesting material. One part of this might be the production of alternate meanings, predicated on maximising 'freedom of interpretation'. The relevance, in outline, to trust-enablement, is to open up a space for the user to develop his or her understanding of trust, whatever that might be. It allows for novelty and may involve making dimensions of a concept that are usually assumed or implicit, more explicit, exaggerated, or even reversed (Nova 2007a). Further on, it may open up a space for the 'unexpected interface' – see, for instance, the 'Edible Interface' (Elliot 2006).

2.7 The relationship between ethnomethodology, interactive design and the demands of science

In this chapter, I introduce the approach and methods I use to investigate trust from an interactive design perspective and how my perspective fits within the context of other social science research that investigates digital environments. The area of digital technology design is interdisciplinary, as it is a field where the nature of the problem is disputed, the context is complex and there is a lot at stake (Hadorn et al 2008, p.34). To find and solve problems, the input researchers from a range of backgrounds are required. This means that a researcher in this area needs to consider how his or her means of gathering and analysing data intersect with those of others. In this section, I briefly describe how my approach fits with the demands of science.

Blevis and Stolterman (2009) describe the spectrum between those who work in the area of visual/interaction design (social scientists) versus those who work in software design and the traditional sciences. At the social end of the spectrum, researchers consider the impact of culture on a design, whilst software designers focus on 'performance, correctness and function'. Programmers develop skills in processes while visual and interaction designers develop knowledge about idea generation. Thus the authors argue that there is a gap of understanding between the social scientists and programmers that makes transference of ideas difficult.

One of the core requirements of scientists and programmers is reproducibility. The means of gathering data should be able to be repeated, and the actual data collected should be the same each time a gathering exercise is run. This process demonstrates the validity of the data, that it is an accurate reflection of a situation. However, those in the social sciences, including myself, question the concept of accuracy and instead emphasise the cultural influences that shape a situation. Thus the methods I describe in this chapter have no aspirations towards reproducibility and instead aim to gather insights into how users approach a design and context.

A means through this impasse, according to Krohn (2008, p.375), is rather to attempt to eradicate the tension between the arts and science, is to 'coordinate the tension'. He argues that the solution is 'expert learning'. According to these authors, this is when cases of data collection are demonstrations of how the typical or general case can differ from each other. Rather than different disciplines arguing which position is correct, expert learning allows the strengths of both reproducible data and insights into the nuances of culture. I hope that my research can provide insights to the wider research community about how trust is contingent on culture and that while we can find similarities between how different users regard trust, there are also idiosyncratic elements that are difficult to pre-empt and these elements can be left with the user to configure.

2.8 Conclusion to chapter 2

To conclude, this chapter has outlined the possible fruitfulness of adopting a stance which integrates ethnomethodology and critical design. Ethnomethodology is, as I have pointed out, an analytic perspective based on the visible and accountable nature of the everyday lived experience of people, and thus is a strategy for understanding the detailed ways in which behaviours are contextually organised. In relation to trust, ethnomethodology provides us with both a radical view of trust, insofar as it suggests *that* trusting relationships are foundational to social life and also gives us a means to understand *how* trusting relationships are established contextually by those involved in a situation.

Nevertheless, ethnomethodological insights do not provide design solutions. The critical design research community, as suggested, grew out of dissatisfaction with the automation and efficiency ambitions pursued by more traditional interactive design practice. Critical design aims to explore the relationship between system and 'user' in innovative ways, seeking to create a space whereby a 'user' can make a reflective choice about their interactions with a system. This notion of critique of and reflection upon a system can be extended so that users can instead reflect upon other participants in the space. Thus critical design research has potential for trust-enablement design. Above, the typical strategies associated with the critical design perspective were discussed. These included the idea of 'seamful' design, deliberate ambiguity, 'being together' and 'incompleteness'. The point here, of course, is to argue that they have a specific resonance in the context of 'trust-enablement' and below (in Part 3), I will demonstrate how such ideas can influence design choices.

Chapter 3: The intersection and relationship between Ethnomethodology and Interactive Design

How can a designer approach the realm of design that enables trust? This chapter debates how to mesh ethnomethodology and interactive design in a fashion that is appropriate to and can inform trust-enabling design. The 'body politic' or 'corpus' currently developing in the research area combining interactive design and ethnomethodology is reviewed and I explore how the characteristics of the two disciplines can intersect. I suggest a model that seeks to simultaneously work with the sensibilities of the two disciplines, rather than a model that seeks to allocate one discipline at each part of the production cycle. The aims are to problematise the design space and remain flexible enough to cater for the dynamic nature of trust. The subject, outcome and presentation of ethnomethodological pursuits are then reviewed. Following this, the chapter focuses on the 'cultural probe', a tool developed at the intersection of interactive design and ethnomethodology. I believe that this tool has potential to provide guidance for trust-enabling design as it allows for an open-ended understanding of a design situation for both researcher and end-user. This tool has scope for adaption and is the basis of the practical projects undertaken in part 2 of this thesis.

3.1 Combining ethnomethodology and design

Traditionally, ethnomethodology has been seen as a practice separate from the design process. Ethnomethodological accounts feed information and suggestions into the process. These accounts work as a 'proxy' for the target audience or end-user, informing design of the needs and priorities that it should answer (Button & Dourish 1996). The accounts include 'furnishing concerns', 'illuminating examples', 'vignettes' and 'cautionary tales'. This data is 'handed over' to the design team who incorporate the findings into their previously established practice. This is often referred to as 'over-the-wall' practice (Randall et al. 2007, p. 32).

Recently there have been calls for ethnomethodology and design to become more integrated into a process of interdisciplinary collaboration, rather than being

separate disciplines (for instance, Hartswood et al. 2002; Dourish 2006). Martin et al. (2005) undertook a case study in the form of the introduction of an electronic patient record system in a public hospital in England. Different users and their needs were studied as the software was integrated and customised. Martin et al. found that a successful solution required a more holistic approach between the different disciplines and for this hybridisation to occur at all stages of the project. Interdisciplinary solutions are part of the ethnomethodological spirit. Garfinkel (2002) himself recommends the creation of hybrid disciplines.

Rather than understanding collaboration as relating to how the theory of one discipline could be applied to the practice of another, the question becomes one of linking different theories – the creation of a dialogue (Johansson & Linde 2005). Dourish and Button (1998) add that if the two disciplines are radically re-considered, there needs to be a consideration of each discipline's spirit of practice with each discipline challenging the other. Design, as a discipline that is concerned with outcomes, may encourage ethnomethodology to explore how it can stay relevant at every stage of the process rather than just at the beginning.

Ethnomethodology, insofar as it is the study of 'how things are done and understood', is a challenge for design because it asks designers to look at the fundamental nature of their practice in the entirety of its context and the environment in which these phenomena operate. This includes what constitutes design, designers and users. Button and Dourish (1996) give an example. They dismiss the question, 'What are the implications of this ethnomethodological account of the work of hotel receptionists for the design of a booking system?' Instead they suggest that the question should be re-arranged and have a different emphasis: 'What are the implications of the operation and use of member categorisations for questions of individuality and grouping in software systems?'

During collaboration, similarity and difference between disciplines become points of dialogue. Each discipline needs to be sensitive to how other disciplines working on the issue approach and identify problems, apply technical knowledge and work towards outcomes. Concepts can be used as 'illuminating' devices and the basis of discussions (Randall et al. 2007, p. 292). Mamykina et al. (2002) add that there is a need for language used by a discipline to be specific so those within

a discipline can develop specialised concepts and ideas. However, if the interdisciplinary process is to happen, one discipline needs to be able to communicate with another research area. Iterative development, within which projects are grown in incremental steps through a process of collaboration, has potential to achieve an interdisciplinary process (Randall et al. 2007, p. 300). The end result of a project should not be led by one discipline or another but should be one that anyone within the team can agree is a 'reasonable and adequate description' and encompasses all the opportunities and constraints affecting the project.

Perhaps full integration between fields of enquiry is not a desirable outcome. It is possible that tensions between different fields of enquiry can be useful rather than undermining the validity of investigations. Continual critical questioning can result in the use of the tools of enquiry in a specific situation being continually assessed. Randall et al. (2007, p. 64) describe this working arrangement as a 'fault line', which is a continually shifting and unpredictable intersection between areas that were once considered separate.

3.2 Combining the characteristics of ethnomethodology and design

How can ethnomethodological knowledge and design knowledge combine? An intersection is shaped by the characteristics of the two fields and how they are understood. The two disciplines have the following characteristics.

3.2.a Stance on the 'future'

Some researchers argue that design is concerned with the future and how an idea can be applied to create some sort of output or product (see Heskett 2009 for an overview). In contrast, ethnomethodology is concerned with meanings, interpretations or behaviours, and thus is an analysis of the present. Crabtree (2002) asserts, therefore, that there is an irresolvable tension between the two fields. However, I question whether the discipline of design is actually focused on a future state. Often design focuses on current user needs and wants and catering for these needs (for instance, see the work of Del Rio & Noethen 2009; Porter 2005; Scott 2009). This agenda reads as a concentration and confirmation of a current situation and does not seem compatible with extrapolation towards the

future. The interpretation of user needs depends on the nature of the project. If a project needs to keep exposure to risks low, it is unlikely that an unknown path will be taken. It is an experimental and well-resourced design that is able to properly focus on future states without meeting current expectations held by stakeholders.

I argue that to analyse a situation in terms of what is considered 'current state' versus 'future state' is not useful as there is no clear boundary defining what is current and what is the future. More importantly, such distinctions say nothing about what kind of present and what kind of future we are engaged with. Recently, the goal of 'incomplete design' has been posited as an appropriate response to design in a rapidly changing world. The approach of incompleteness dismisses the idea of a finish point, and instead declares that a project is always in the process of formation. Design becomes focused on process as well as outcome. The initiatives of 'Linux' and 'Wikipedia' are examples of incomplete design. The pursuit of completeness can mean a loss of an opportunity as it might 'foreclose' the possibility of a future opportunity.

As contemporary society is now an evolving and emerging network of association, 'incomplete design' is seen as an appropriate response to today's society (Garud et al. 2008). Boundaries in our contemporary society are fluid, perspectives are shifting, and expectations of results and performances are seen as arbitrary. Most importantly for this research, Garud et al. (2008) claim that complete design, design that has a clear finish and outcome, is only possible in situations where there is a 'clear and stable boundary' between what is being designed and the context within which something is being designed. Thus incomplete design, which is flexible and always 'in progress', is an approach that has potential to deliver the design of trust-enablement, contexts that are shared between participants and that take into account the shifting and provisional nature of the contemporary technology environment.

New technology encourages incomplete styles of working as flexible and quick development tools are available. New technology also depends on how participants interact with it and choose to incorporate it into their lives. Thus the designers of new technology have become aware that human behaviour is part of

the medium of new technology and that the nature of behaviour in a specific project will only become apparent across time (Garud et al. 2008). They recommend that designers should not see their work as static outcomes but rather as dynamic 'nodes within networks', which can connect with other areas of action. These nodes could function as boundary objects 'between different realms, belonging to all of them simultaneously, and seen from different points of view' (Czarniawska 2004). This theory, at first glance, seems abstract. Perhaps the notion of incomplete design can only become meaningful once put into action. On the other hand, these interesting theoretical concepts could prove impractical or not feasible, especially from the perspective of commercial design that often runs to a budget, in which context a minimum amount of exploration is possible. It will be fascinating to see how this design direction unfolds and its evolving potential for trust-enabling design.

3.2.b Generalisability: applying theory to practice

One criticism of ethnomethodology is that it is focused on the details of a current situation and is unable to move beyond this perspective. Findings cannot therefore be generalised. Abstractions or typifications from details are resisted. Garfinkel (1990, p. 77) writes:

> The reported phenomena are only 'inspectably' the case. They are unavailable to the arts of designing and interpreting definitions, metaphors, models, constructions, types or ideals. They cannot be recovered by attempts, no matter how thoughtful, to specify an examinable practice by detailing a generality.

There is a problem with combining ethnomethodology and design because design involves the application of theory to practice (Dourish 2006). However, Randall et al. (2007, p. 44) dispute that ethnomethodology resists generalisation. Instead, they argue that there is nothing essential to ethnomethodology that blocks the abstraction and application of ethnomethodological ideas. The issue is more about the type of generalisation as well as how the concept of generalisation is being used by researchers and in what situations. They defend a claim that

generalisations of the ‘normal’ or ‘typical’ kind are appropriate when they are consistent with the typifications made by members. Hence, working with the ways that individuals organise their everyday lives is an entirely appropriate way of applying ethnomethodology. Randall et al. (2007, p. 7) write:

> There is a sense in which every event is unique, just as there is a sense in which each event is pretty much like others. It is a part of applying the sensibility of discipline to know when it is appropriate.

The problem of generalisability from one situation to another is not unique to ethnomethodology. Other fields that design draws upon for influence and insight encounter similar problems, for instance, the field of psychology. Moving from insights gained in one instance to draw wider conclusions is always problematic. Sharrock & Randall (2004) argue that when deciding whether generalisation is appropriate we need to consider what type of generalisation and for what purposes. How participants in a situation generalise from a general situation to make decisions in a specific situation can inform researchers about how to generalise.

3.2.c Catering for both ethnomethodological and design perspectives on a project

Traditionally, design is judged (by both designers themselves and those they need to answer to) in terms of how well the final product has met the aims of the project. On the other hand, ethnomethodological projects are not assessed by how well the final project is received, but instead how well the initial requirements of a project (including aspects such as the user needs and context) have been conceptualised. This could include subtleties and connections not first understood as relevant by those on the wider project. Thus the findings from the ethnomethodological component of the project inform the goals of the final product, and the final design. Ethnomethodology avoids judgments and allows the data to guide interpretations (Randall et al. 2005, p. 141). Thus design is focused on the end-point, while ethnomethodology does not have this pressure. Shapiro (1994) questions this type of labour resourcing arrangement. He asks why the

responsibility for the design of systems is placed on designers while those who supposedly specialise in the analysis of work 'run for cover' (Shapiro 1994).

I agree with Randall et al. (2007) that an arrangement that promises continual problematisation of a design situation is valuable. It is also, I believe, consistent with the adoption of ethnomethodological and interactive design sensibilities throughout the project. This style suits the type of digital environments designers are working with: unpredictable, with no clear boundaries, and in constant flux. The balancing of parallel perspectives matches the sensibility of trust-enablement: keeping options open and working with (not against) complexity.

3.3 Subject, outcome and presentation of ethnomethodological pursuits

Maynard and Clayman (1991) describe just how varied approaches to ethnomethodology can be, as ethnomethodology moves into the mainstream and out of the 'suburbs' (Pollner 1991). The choice of technique is driven by what is the 'proper topic of investigation', whether it is 'perception, cognition, talk or embodied behaviour' (Maynard & Clayman 1991). The point here is that ethnomethodology rejects the assumption that in sociology there are specialised methods and techniques that can reveal aspects of the world in a theoretical way to, in ethnomethodological terms, 'ordinary members' who might otherwise have overlooked those aspects. Instead, the methods are derived commonsensically, just like those of ordinary members (how people approach their everyday lives). It follows that, if the interest lies in 'trust', our studies will orient to the ordinary ways people exhibit trust or not.

Similarly, there would be no privileged topics for an ethnomethodological enquiry (Maynard & Clayman 1991). Any form of cultural production, including verbal and non-verbal communication, can be the subject of an ethnomethodological study (Cabane 2008). Ethnomethodology values highly the 'mundane' and the 'everyday' as sources of insight about how people reason (Garfinkel 1967). Conversations, diagrams, stories, gossip, jokes, memos, graffiti, signage and the sequential order of how a task can be undertaken are all sources of insight. The body and physical movement or expression such as posture can also

be a form of evidence (Schütz 1972, p. 173). All these forms of evidence can reflect how people organise and prioritise their thoughts and activities. Artefacts can be studied from several different perspectives. One perspective entails the notion of the 'ecological', and focuses on how collections of objects are organised in space or place. Another perspective looks at how different objects are mediators for thought and activities (Randall et al. 2007, p. 222). 'Information lifecycles' (for instance, how information is stored, shared and disposed of) are used by researchers as a means to focus research on the importance placed on different forms of social activity (Randall 2007, pp. 229-230).

Analysis is the specialised aspect of ethnomethodology. Collecting data does not require any special skills (Hartswood et al. 2002). However, the researcher should be informed of prior studies, concepts, practices and lessons in order to gain a sense of 'what to look for and how to look at it' (Randall et al. 2007, p. 18). Hartswood et al. (2002) recommend that themes explored by earlier researchers can give insight into what has already been debated, and the outcomes and priorities developed in the field. Comparing problems and research to previous work can also provide further studies and allow comparison of the concepts that were used to investigate. Shortly, in section 3.3, I describe breaching experiments, a tool used to gather data used for ethnomethodological analysis. In 3.4, I explain how the information-gathering tool of the cultural probe is informed by ethnomethodological research and is a form of breaching experiment.

Before launching into a description of the different methods of gathering data that can be described as ethnomethodological, the relevance of this approach needs to be noted. As mentioned in section 1.3, computer technology, in particular that which is described as 'convergent', is moving into new areas of human behaviour and communication. Technology is now used for a multitude of purposes including entertainment and geographic tracking information. New applications and domains are explored continually. New ways of studying and understanding are therefore required to gain insights into these previously unknown intersections of technology and context. Practices are needed that can

'bring forth' data which are usually considered 'everyday' and are thus 'taken for granted'. Ethnomethodology can offer these practices.

All research areas seek to collect data and draw interpretations. Ethnomethodology uses what Garfinkel describes as 'natural, normal' troubles to provoke knowledge. The aim is to develop 'vulgar competence', an ethnomethodological term that describes a rough understanding of a situation by the researcher. An account should have sufficient 'descriptive adequacy' or 'faithfulness to the phenomena' and data should be collected in a way that captures the complexity of a situation. Both the particular and the general detail should be included. This section reviews natural and normal troubles and how they are documented. Trouble and an interruption to normality is necessary to gain insight into what is normally taken for granted. The aim is to access a 'perspective in action' rather than a 'perspective on action', which would occur if a participant was simply asked to explain what they were doing in a situation (Randall et al. 2007, p. 113), for instance via an interview. The workings of a person's response in a situation can best be studied within an experience or context, rather than outside of or after it.

A classic tool of ethnomethodology is the 'breaching experiment' – an intervention which is a particular type of 'trouble making'. It is differentiated from natural and normal troubles by the severity of interruption caused. Garfinkel (1967, pp. 37-38) writes that the process is 'to start with familiar scenes and ask what can be done to make trouble' and to 'produce and sustain bewilderment, consternation, and confusion…anxiety, shame, guilt, and indignation'. The result 'should tell us something about how the structures of everyday activities are ordinarily and routinely produced and maintained'.

The aim is to provoke exposure into the underlying rules organising a shared reality, revealing insights into the workings of a person's reasoning processes, including their (commonsense) aims and motivations (Randall et al. 2007, p. 34). The underlying understandings that have shaped a particular situation are made visible. Ethnomethodology holds that trust is the underpinning of an interaction, and a breaching experiment can be seen as a study of the construction and breach of trust. It is important to remember that the

'experiments' were not intended to have any special methodological status but rather to be viewed as 'aids to a sluggish imagination'.

Garfinkel undertook the first breaching experiments with his students at Harvard in the 1960s. Activities were undertaken in which social norms were transgressed and the results recorded. In one study, students were instructed when undertaking conversations with acquaintances to ask for clarification about everyday remarks (Garfinkel 1967, pp. 38-44). Observations were made of the annoyance caused to others in the situation when the normal expectations of day-to-day life were interrupted. Often the interrupters were asked to explain their behaviour. For instance, a subject said, 'I had a flat tyre'. The student researcher then asked, 'What do you mean, you had a flat tyre?' The subject then responded with annoyance because the expectations of a conversation had been breached: 'What do you mean? A flat tyre is a flat tyre. That is what I meant. Nothing special. What a crazy question!' In another instance, a student researcher responded to the question of 'How are you?' with 'How am I in regard to what? My health, my finances, my schoolwork, my peace of mind?' The question-asker responded with, 'Look I was just trying to be polite. Frankly, I don't give a damn how you are'.

Some writers believe it is possible to conduct a breaching experiment without trouble, anxiety and other negative feelings. According to Crabtree (2002), 'making trouble' is sufficient but not necessary. Rather than making trouble perhaps it is more useful to think of breaching experiments as a 'provoking' practice. An example of an art practitioner using breaching experiments as a form of cultural probe is Steve Mann (in Crabtree 2002). He provokes his audience to question the frameworks of surveillance present in everyday technology, creating situations of 'uncertainty, bewilderment, anxiety and confusion'. I build on this precedent to develop projects that, as cultural probes, produce insights into how participants understand a particular context.

3.4. Cultural Probes as a Means to Study Trust

I now turn to examine in detail a technique called the cultural probe and review the relationship of this technique to the research area of ethnomethodology,

including debates about the value of probes. Cultural probes are a form of data collection that encourage the participant to reflect on their behaviour and interaction in the ordinary world; it is a technique which allows the participant to self-collect material via a lateral or 'playful' format (to be explained in more detail shortly). In particular, the production of detail about how the participant understands the particular context of the probe is valuable as this provides a rich picture of how sense is created in a situation. The detail could be in the form of written notes, sketches or verbal comments by a participant. An aim in the design of a cultural probe is to attempt to reveal the rules used by a participant to make sense.

Cultural probes have become a common research tool for interactive designers, as technology moves into new areas and designers seek means to understand these domains. The potential value of cultural probes to trust-enablement is outlined. One of the most persuasive reasons to explore cultural probes for trust-enablement is the blurring of boundaries between participant and designer that the cultural probe engenders. New types of probes are introduced into the research community at an increasing rate and I propose an application of this research device. Recommendations for the design of cultural probes are outlined. I explain why the domain of art can provide inspiration for the design of cultural probes. This section closes with a review of the problems involved in communicating the findings of cultural probes with other disciplines. In part 2, I apply this knowledge of cultural probes to the design of data-collecting projects.

3.4.a What is a cultural probe?

Cultural probes are a means by which participants self-collect data via a form of intervention, and are used to understand how people feel and think as well as do (Arnold 2004). A cultural probe could be a project, event, process or experience. In contrast to other practices that inform information technology research which are based on observation (such as anthropology) (Lotan 2007), the cultural probe is necessarily an intervention. Examples of probes include diaries, in the form of hand-written pages or electronic blogs (Stalker-Firth 2007), postcards, for instance that a participant might post back to the researcher, and maps. A common claim of

all sorts of probes is the acknowledgement that people are experts in what they do, are the ones who decide how context is negotiated in a particular situation, and are the providers of essential insights into the design of their spaces. A product like a cultural probe raises issues for participants in a manner that is more believable than imaginary, and engages with the participant at a tangible level rather than an abstract one (Dunne & Raby 2005).

Probes collect and reflect 'multi-layered narratives about people, accepting the partial truths, wishful thinking and outright lies that are part of life' (Light 2004). Probes are a means of capturing the interests, obsessions and aspirations and are about what people feel as well as think (Dix 2004). As Sanders (2001, p.3) writes, 'discovering what people know helps us to communicate with them. Understanding what they feel gives us the ability to empathise with them'. No page numbers in reference list for this item.

3.4.b The ethnomethodological nature of cultural probes

This research deployment of a cultural probe is a means to bring forth and micro-analyse how things are done and understood in the everyday via an interruption that has characteristics of an ethnomethodological breaching experiment (Tolmie & Crabtree 2008), as discussed in section 3.3. Benford et al. (2006) report on a mobile game called 'Can you See Me Now?', which they claim to be a type of probe. Within this game, runners with mobile devices are chased around a city. Insights were gained from how the players co-opted the technology to reach their goal, including how they used the quirks in the technology to hide from the chase. Probes can sometimes function as a prototype introduced into a setting as a test. The insights learnt from this type of probe are fed back into the development of the prototype. Different types of methodological applications are developed as the practice grows more popular (see for instance, Chavan et al. 2009; Lucero et al. 2009).

Detail is also important to the spirit of ethnomethodology. Cultural probes provide the opportunity to gather detail, as participants are encouraged to apply as much attention as possible. Cultural probes can be designed in such a way that the participant can provide a lot of notation. As cultural probes can be done within the

time frame of the participant, it is likely that more thought will be put into a response than a scheduled survey or experiment.

3.4.c Cultural probes are problematic

Before delving into more detail about cultural probes and how applicable they are for the study of trust, it needs to be acknowledged that the use of probes is controversial in the research community. Although some describe cultural probes as ethnomethodologically based (for instance, Lim et al. 2007), it has been argued that the way cultural probes have sometimes been taken up by the interactive design community cheapens research practices and is problematic (Crabtree et al. 2009). Cultural probe initiators assert that the many probes have now become a way for collecting data that could be more rigorously collected by other means (Boehner et al. 2007) and that probes have been used because they require relatively low resources to implement. I argue that the appropriateness of a probe depends on how it is designed, implemented, and interpreted.

The originator, Gaver, claims that the probe should be strictly about design inspiration, and that the legitimacy of the choice of probe is questionable when the probe is used beyond inspiration and more concrete assumptions are drawn from the interpretation (Gaver et al. 2004). However, probes have been utilised by researchers at a variety of points in a project. Some have used it at the beginning of the project, informing the choice and use of other tools. Others have adapted the tool as a way to develop designs. For instance, technology probes are a form used when a prototype is introduced 'in the wild', as a type of work in progress. Adaptations are made to the design in response to how it is taken up by its user group (Hutchinson et al. 2003). However, it is hard to distinguish between information-gathering and inspiration and it is to be expected that different practitioners will interpret the means in their own fashion, and incorporate the probe into their practice in different ways. Graham et al. (2007) suggest that probes should open possibilities rather than narrowing perspectives of understanding.

3.5 Justification: why are cultural probes useful to study trust in digital environments?

We have seen that trust is a concept that is contested and dynamic. Trust is neither entirely rational nor irrational, and every individual holds his or her personal definition in a particular circumstance.

I argue that the use of cultural probes suits the nature of the trust. As mentioned in section 3.4.a, cultural probes allow access to 'how things are done and understood'. When attempting to gain access to the workings of trust, researchers need tools that allow access to open-ended exploration, exploration that is as little constrained by pre-conceptions as possible. As we cannot predict trust, a tool that limits responses or supplies pre-determined answers is inappropriate (for instance, surveys). Two fundamental reasons why cultural probes are useful for the study and design of trust-enablement are analysed in more detail in this section. Firstly, because cultural probes allow access to what people do and feel as well as think. Secondly, as cultural probes blur the boundaries between participant and researcher. As trust cannot be predicted and can only be defined by those in a situation, in order to enable trust for users of a digital environment, we need to provide users with tools that enable them to research what trust means to them in their particular situation.

Conventional tools have limited use in exploring the design of areas difficult to access or grasp such as trust. More traditional methods such as thick description are not possible. Some example situations in which traditional methods are not appropriate or possible include intimacy between couples separated by distance (Vetere et al. 2005), and in a hospital ward (Melles 2003). In these more private areas of people's lives, it is difficult to access what people are feeling and thinking. To explore areas that might be private, a tool needs to allow the participant to give ambiguous answers and this means participants can control or moderate the information being disclosed. Less sensitive tools may not gather any responses (Boehner et al. 2007). Physical access is also a problem. For instance, observation methods have less potential when it is in someone's private space, for instance, a researcher could not sit in a person's living room and take notes for a lengthy amount of time (Dix 2004).

The new types of digital environments require new research tools as the limitations of conventional approaches to ethnography become more apparent. As the focus of technology development has moved towards more creative applications and into broader areas of life, and away from the more conventional uses of technology, so the problem of 'thick description' becomes more difficult to resolve by simply 'hanging around'. Concurrently, design needs to go further than the aim of being usable, and pursue wider agendas which could be described as more private areas such as desire and trust (Sanders, in Judice & Judice 2007). In this type of design environment, where the notion of context and user needs are contested and shifting, the use of cultural probes is appropriate because the practice attempts not to pre-determine how participants define concepts and make meaning. There is therefore the potential to gain insight into the unexpected.

3.5.a The potential for empathy

When considering the design of trust-enablement, tools are required by designers that explore how people feel as well as think and do. Cultural probes are intentionally open and ambiguous, and thus participants are able to draw their own interpretations. This facilitates results that may be surprising. The possible data returned from a cultural probe is more open and thus there is more opportunity for surprise and disruption than with other forms of research. Preconceptions of the area under study are challenged (Boehner et al. 2007). Conventional interactive design techniques have aimed to create a picture of the average user to shape their designs. Cultural probes move in different directions, focusing on the 'peculiarities of individuals' and valuing the idiosyncratic.

As the aim of cultural probes is to create an illuminating space in which the design or situation can be considered (Randall et al. 2007, p. 295), this type of practice facilitates engagement with a context rather than allowing the designer to stand back 'dispassionately' (Graham et al. 2007). In order to access issues that are sensitive or personal, traditional marketing tools of quantitative user research reports are not appropriate; empathy is required according to Mattelmäki and Battarbee (2002). For this reason, I argue that cultural probes are more than just a method but also an approach. Moreover, designers are encouraged to recognise

their standpoint within a project via the use of cultural probes. Rather than being 'faceless', the researcher is forced to see the situation through the 'moral/political lens' of those they are designing for, which forces the designer to recognise the different points of view on the project (Randall et al. 2005, p. 40). For instance, a designer might be working on an urban renewal project. The design work may be to present the work of the developers in a favourable way. A cultural probe might make clear what biases are present in a design.

The work of Bowen (in Rust 2007) provides an example of how the notion of the cultural probe can be adapted to provide design insights. Bowen presents 'crazy ideas' in the form of critical prototypes. His aim is to provoke an immediate 'visceral' reaction rather than a more measured and calculated response. For instance, he presented a shelving system to a group of participants. Material is placed on these shelves, such as books or paperwork, and as it gains less attention over time, it moves down the shelves. Finally, material finds its way into a shredder at the bottom of the shelves. Thus the development of probes is a way towards providing insights into the more personal areas of technology because the practice allows for imaginative and lateral means of collecting, regarding and synthesising data (Randall et al. 2007, p. 294).

3.5.b Blurring the boundaries between participant and designer

One of the most useful dimensions of the cultural probe is the relationship it fosters between different people on the project. The role of participant and designer can become blurred, which also allows questioning of what the actual purpose of and the roles on the project might be. The free form of the cultural probe encourages people to bring their knowledge to the design, which improves the quality of the exchange (Krogh 2001). Dunne and Raby (2005) point out that the presentation of prototypes to facilitate discussion between public and experts is not new. Shell Petroleum used scenarios in the 1970s as a technique to forecast the future (albeit within a closed group of decision makers rather than to canvas the opinions of other stakeholders).

Importantly, probes can foster a dialogue between those involved in a specific context or probe project. This is because probes use a receptive mode of

engagement by which attention is diffuse rather than focused on a specific outcome (Deikman 1973; Loi 2007). Receptive modes can be contrasted to more active modes that emphasise exchange, sequence, analysis and conventional logic. This argument echoes the notion of being with, or 'Mitbefindlichkeit', as recently outlined by Boehner et al. (2008), who, as mentioned in section 2.5.d, believe that digital environments will soon be exploring how participants can simply 'be with each other' rather than the facilitation of more deliberate and demarcated exchanges that is the current convention of interactive environments.

There are synergies between the philosophies and arguments for both user-led and research-orientated probes and the notion of a shared context. The intention of probes is to allow the construction of a negotiated context between those involved. Their aim is to facilitate the potential engagement between people and to support multiple perspectives. This is because a probe starts people from an 'equally obscure and ambiguous place, outside the "rubber stamps of conventional clichés"' (Schachtel 1959, p. 288; Loi et al. 2002). Subtleties that are not captured by more conventional communication and data-gathering means are brought to the fore. An important part of a probe is the reminder that knowledge has its limits. Gaver et al. (2004) embrace the notion that information is shifting, fragmentary, ambiguous and incomplete. A user is aware that all that can be gleaned is a subjective interpretation that is based on what might be idiosyncratic values that might change.

In this thesis, I take this argument further and claim that cultural probes are a reflective tool for an individual, who is not necessarily a researcher, to analyse the world around them. Loi (2007) maintains that the cultural probe can be 'developed and utilised by its final user'. Examples are given of how probes have been developed in the management arena in order for managers to understand a problem. However, this application can work in more 'everyday' and informal situations. Convergent digital technology has created a situation in which a wide range of data, as well as tools to arrange and store this data, are easily accessible to all people. Thus, the current environment allows a type of 'do it yourself' (DIY) data analysis to understand how meaning works in a specific context. Participants apply their own analytic techniques. The technology and exploration

around these possibilities is likely to expand in the near future. What makes these types of user-led probes different from other data-gathering tools is an emphasis on understanding the intricacies of a specific context, a valuing of the everyday as a rich source of information, and an open and explorative understanding to knowledge.

3.6 Recommendations for the design of cultural probes

The research community has established recommendations for the design of cultural probes. For instance, Hutchinson et al. (2003) propose that the design of cultural probes should be flexible to allow for changes in response and for the fact that a project may progress unpredictably across time. Perhaps participants might be told that they will receive three different kits over the course of the research, allowing the researcher to design later kits in response to the reception of the earlier research. Or perhaps there could be a facility to change the language used in the instructions if the participants have difficulties understanding it.

An overarching aim is the creation of an environment in which a participant feels comfortable in disclosing information (Satchell et al. 2009). This could be facilitated through prompts such as questions or tasks, crafted in a non-intrusive fashion. Attention should be given to detail such as the amount of space or time given to provide a response. For instance, a large space in which to respond to a question may be discouraging for a participant because it may give the message that a long and complex response is expected. On the other hand, if it is too small a space, this might result in a limited one or two-word response. One strategy is to provide props or triggers for participants to tell stories. The prop could be an everyday object, or it might be something absurd or mismatched, which would provoke data about the participant's expectations of an environment.

Attention should be given to how to keep the user motivated to participate in the probe (Hulkko et al. 2004). It is possible that people are curious about new inventions and are keen to be involved in the design of these developments, and are therefore more willing to undertake a cultural probe that uses new technology. Motivation could also be facilitated by the design of probes that are flexible and customisable. This allows participants to respond in their own voices, and to

include/exclude what they think is relevant. This might mean giving the participant choice in the medium used to communicate, i.e. text might be preferred by those uncomfortable with speaking. The probe should not be unnecessarily difficult or inconvenient for the participant. Designing the probe to be pleasurable for participants may be appropriate. For instance, a probe may involve the collection or telling of stories. It may be appropriate for the probe to be designed as a game with either clues or surprises. A balance between challenge and ease may also encourage the participant to engage with the probes (Hulkko et al. 2004).

Ambiguity of interpretation is an essential part of a cultural probe. No matter how 'simple' a probe is, participants are sometimes unsure of what to do with a probe. This feature should be embraced in the design of the probe. Data can be gathered from how participants interpret and make sense of (or do not make sense of) the probe (Graham et al. 2007). Open-ended questions may be a way to encourage participants to provide both quality (in-depth and detailed) and quantity (a large amount) in their responses (Stalker-Firth 2007).

There are several examples of practitioners adapting the notion of the cultural probe and exploring new possibilities. Krogh and Grønbæk (2001) have explored how technology and architecture intersect. They have created the iRoom (http://www.daimi.au.dk/ispace), which incorporates a series of experiments in which users help define what an 'interactive wall' and a 'designer's workbench' might consist of by directly interacting with objects in the space. Dunne and Raby provide an example of how to collect data about a personal topic in their project 'Evidence Dolls' (2005), which taps into thinking about biotechnology. The project consists of dolls designed to provoke discussion amongst a group of young women about the impact of genetic technology on their lifestyle. Visitors to the project can write requests on a doll indicating how they would like that body part to appear. Analysis was drawn from the visitors' comments. For instance, one visitor said, 'Isn't it selfish to pick what is best and not be happy with what nature gives you? I would like to clone this lover as a dog.' Dunne and Raby gathered this as evidence that while people are resistant to thinking they can change other humans, it is acceptable to alter pets. Likewise, the introduction of mobility to computing has opened up a whole new area that needs to be examined (Hulkko et

al. 2004). Those working in the design and implementation of technology need to be able to weigh up context, actions, feelings, attitudes and expectations in a dynamic environment. Technology probes are a means to user test a project and develop it incrementally in the field (Hutchinson et al. 2003).

There are artists whose work can be inspirational to the design of cultural probes; for instance, Miranda July, the American performance artist. One of her latest projects is a spin-off from her book and film, *You, me, and everyone we know*. At the website (July & Fletcher 2009*)*, visitors undertake small assignments that are often ambiguous and provocative in nature. For instance, 'take a photo from under your bed' or 'ask a neighbour to sing a song and record it'. Participants are encouraged to upload their completed assignments and also review the assignments of others. Knowledge and insight can be gained from examining how people choose to represent themselves and who in their neighbourhoods they choose to work with. Another example is the work by Felix Gonzalez-Torres, which often depends on visitor participation for completion of the work. Untitled (Placebo) (Gonzalez-Torres 1993) is a gallery floor covered with gold-wrapped toffees. Visitors are able to take from the work, and can choose how many to take. Visitors need to draw conclusions about how many toffees are acceptable to take and also what to do with them. Some might choose to keep the sweets as a piece of artwork. As visitors take from the work, and spaces are made in the supply of toffees in the floor, there is evidence of visitor behaviour left behind for future visitors to read.

Cultural probes that engage with technology can be considered as a type of 'device art', a newly developing area of the hybrid practice combining design, technology, aesthetics, art and mass culture. The resulting products 'blur the boundaries' between artwork, commercial object and research tool (Nova 2007a). An example is 'Bitman–Rings' by Denki and Kuwakubo (2003); these are rings with a set of led displays featuring the image of a man. This figure responds to the movement of the wearer. This type of jewellery can be re-purposed to collect the responses of the wearer in different locations, in a similar fashion to Christian Nold's project mentioned in section 2.6.

3.7 Presenting results to other disciplines

As Gaver claims, 'What comes back (from a cultural probe) doesn't have to be correct or accountable in traditional scientific terms but is evaluated in terms of the design it inspires' (cited in Light 2004). Since cultural probes produce a subjective understanding of a situation, then what is a relevant way to present the result of a cultural probe study so it can be accessed by other disciplines, particularly quantitative driven research areas? These communication problems have no easy answer, are deep-seated and have more to do with the differences between disciplines and the problems of cross-disciplinary research than the acceptance of cultural probes. Some disciplines are more comfortable with the notion of 'incomplete information' than others (Randall et al. 2007, p. 141). The crisis regarding how to present results is partly because cultural probes are data-led (Randall et al. 2007, p. 124), as distinct from being hypothesis-led. Being data-led means that the data is not imbued with scientific criteria and has not adhered to measurement standards. Computer science, focusing on the 'construction of a solution rather than the identification of the problem' (Randall et al. 2007, p. 128), communicates results via a specific set of standards.

A goal of a cultural probe is to provide models of use (Stalker-Firth 2007). These models can include behaviours or preferences that participants tended towards, and this mode of inquiry can discover unmet needs rather than wants. Perhaps these models can be visualised in the form of a graphic design to allow access to those outside the project. Mattelmäki and Battarbee (2002) disagree and argue that a less digested treatment is appropriate: 'Designers need both information and inspiration to be innovative, in that sense all the user data should not be cut up into small dry facts'. Ultimately the most effective way to present the results is determined by the nature of the project, the team working on it, and the role of the researcher on the project. It will also be shaped by whether research into the socio-technical conditions of the project is undertaken at the outset of the project or at another point (for instance, end project user-testing). The relationship of research to design on a particular project is also relevant. Does a specific project regard research and design as intertwined or as separate endeavours (Randall et al. 2007, p. 45)? These factors will shape what insights are

important and by what criteria they are measured, as well as the relationship of the research to other forms of investigation being undertaken within the team (Randall et al. 2007, p. 9).

3.8 Conclusion to chapter 3

This chapter reviews ethnomethodology: how it intersects with design, and its potential and relevance when understanding trust and context in digital environments. Different means of accessing an ethnomethodological sensibility were explored, including the device of the cultural probe. Ethnomethodology is a form of analysis that holds that raw experience has no organisation until it is apprehended and interpreted through a constitutive frame of reference. The meaning of a context is created by its participants (Dourish 2004). Ethnomethodology side-steps notions of 'truth' and instead focuses on intra- and inter-subjectivity. According to ethnomethodology, trust is central, underpinning the expectations involved in social interactions. As the means to function in the world are so embedded in our everyday existence, there need to be special practices to 'bring forth' the operating rules, assumptions and priorities that are used by those in a situation. The breaching experiment, one approach within ethnomethodology, is an interruption into the expectations of those within an experiment in order to gain insight into what the participants' expectations are in that context.

There are interesting frictions between the disciplines of ethnomethodology and interactive design, including different criteria for success and the means to apply theory to practice (generalisability). These frictions encourage critique and a questioning of the role different participants play within a project. A possible exciting area of new collaboration is the equal combination between the disciplines, where different practitioners need to adopt the skills and perspectives of the other discipline. This fundamental re-shaping of expectations on a project may be a fruitful response in a rapidly changing world. 'Incomplete design', which questions the relevance of a complete and final design that cannot be updated in response to new developments, is one type of practice that taps into

how society is now shaped by networks of associations rather than clear boundaries.

This chapter has also explored the potential of the technique of the cultural probe, a tool developed and utilised by the interactive design community to understand and design for users, that can be understood as a type of breaching experiment in the ethnomethodological tradition. A cultural probe is an intervention implemented in a situation by a designer and data is self-collected by participants. Cultural probes also have the potential to engender empathy rather than a dispassionate separation between subject and object of a study. The process of using a cultural probe is a means to gain insight into the intricacies of the subjective aspects of people's lives, including trust. As IT moves into more and more areas of everyday life, cultural probes are a tool suited to gathering knowledge of the more personal aspects of human existence. Researchers use cultural probes in a variety of ways and with varying degrees of rigour. There is a problem communicating the results to those in more scientifically-orientated fields that have well-established standards of acceptance for findings. An exciting aspect of the cultural probe is its blurring of the boundaries between participant and designer. It is possible that a type of 'do it yourself' (DIY) cultural probe can be developed by which participants can gather and share data relevant to their own pursuits. Trust underlies all social interactions, and participants working through the process of exploring what trust means to them in a certain context may enable interactions that would result in trust-enablement.

3.9 Conclusion to part 1

The aim of this thesis is to explore how trust-enablement is achieved in a digital environment using interactive design. Part 1 lays the theoretical foundations for this argument. Trust-enablement is when users can conduct trust relationships on their own terms, exchanging evidence relevant to their interaction and understanding. This is an advance on previous research that argues for the façade or the enforcement and coercion of trust. It is a position that is agnostic about the value of the relationship: both trust and distrust are equally valid options. I argue that trust-enablement is a two-way negotiation – those who seek trust may also be

subject to trust considerations. In this first part, I establish the key terms of reference and justify why trust-enablement is a suitable approach to trust in a digital environment. I outline ethnomethodology and critical interaction design, two inter-connected fields on which this research builds. In part 2, I explore how the design of trust works in a series of practical projects. Applying my insights from part 2, I argue in part 3 that the development of a digital environment that is a shared context, where trustors can exchange evidence on their own terms, is the key to trust-enablement.

Part 1 opened with a description of the contested nature of trust. Researchers from a wide range of areas have defined trust and emphasised different elements of trust in a myriad of ways. I agree with Cofta (2007, p. 11) that trust is a relationship within which the trustor, in a position of vulnerability, is confident that another party (the trustee) will respond in the trustor's interest. However, definitions of trust do not contribute much to how trust works as a practical accomplishment as trust seems to be so context-specific. In this thesis, I argue that focusing on the processes and structures around trust, and thereby side-stepping any static definition of trust, allows a designer to consider the elements of a digital environment that can enable trust.

The form, establishment and maintenance of trust relationships in digital environments are in part shaped by the underlying technology used to create digital systems. What are the qualities of the medium that we have to work with as digital designers? Current digital environments are characterised by users undertaking a high amount of information disclosure. A flood of data is being created that users of the internet can archive, search, and possibly take out of the context it was intended for. The full ramifications of these types of environments are yet to be understood. Donath (2007) argues that in the pursuit of efficiency, some digital environments have also short-cut many aspects of human behaviour, and some of these short cuts are inappropriate, meaning that users tend not to want to participate. It is possible that trust is one of those aspects of human behaviour that needs complex treatment in the digital environment.

This thesis uses ethnomethodology and critical interactive design as perspectives to explore the design of trust-enablement within provisional digital

environments. Generally speaking, ethnomethodology is a recent branch of sociology, which argues that meaning is constructed by those involved in a situation. From this perspective, trust is a practical accomplishment between trustors and trustees. Ethnomethodology has influenced interactive design. Interactive design, in broad terms, is the consideration and design of the user's experience of a digital environment. Originally, the aims of this discipline were grounded in the values of automation and efficiency. However, as time has passed and technology has moved into more areas of human lives there has been an increasing amount of critique of mainstream interactive design theory. Different strands within interactive design exist. One of these, 'critical design', is particularly relevant to trust-enablement because it encourages consideration of how users might be able to reflect critically upon their own identities and roles within digital environments, as well as consideration of alternate ways users can relate to each other (beyond the pursuit of commercial interactions). The research perspectives allow a problematising of trust, context, the role of the participant and designer in a digital system, and the intersections between these concepts. Problematising also opens up exploration of the connection between theory, practice and what design should be doing in the rapidly changing area of digital environments.

Now that the grounding of this research is established, this thesis turns to explore the intricacies of trust via a series of five practical projects that are data-gathering exercises forming the basis of part 2. Trust is studied across a series of several domains. These projects explore the tensions between trust in theory, which have been discussed in this part, and trust in the context of a practical implementation. The thesis gains insights into how participants construct trust, what trustors value in a trust interaction, and how they resolve ambiguity. I convert these insights in part 3 to propose a design approach that may enable trust. As mentioned above, I argue that one solution to trust-enablement is the development of a shared context between users.

PART 2: UNDERSTANDING TRUST THROUGH FOUR CONTEXTS VIA PRACTICAL PROJECT CREATION

Introduction to the creative projects: the mode of praxis

In the following chapters I explore and problematise the notion of set categories of trust evidence. I describe the undertaking of practical projects that attempt to apply trust theory to practice. I find it impossible to meaningfully disengage an understanding of trust from its context. This means that I believe that it is not appropriate to pre-empt trust as trust is a concept that can only be understood in situ by those participating in the interaction. There are certain implications from insights gathered from the practical projects here for the design of trust-enabling digital environments. Rather than presenting the user with pre-determined, de-limited trust evidence to work with, a preferred strategy is to hand the interpretation of the construction of trust to the user. This design concept is pursued in part 3.

Part 2 describes five data-gathering projects that explore how trust works across different contexts. The series of projects reflect the iterative nature of the development of this research. The findings of one project informed the design of the next project. The research investigation was continually re-framed to explore the elusive relationship between context and trust, and I found that the two are inseparable. The purpose of this exploration is to identify the degree to which 'trust' has different features across these different scenarios. The first project, described in Chapter 4, is an initial exploration into how trust is perceived in the workplace. The methodology used was interviews and I found that the interviewees' comments, as they reflected back on their experience, neatly reinforced notions about trust that are common in the literature. In contrast, the subsequent projects seek to explore what happens when theory about trust is applied to a practical design situation. The second project, described in Chapter 5, is a game project that explores what happens when trust information provided to a participant is stripped back to a minimum. This gives us the opportunity to see how participants orient to issues of 'trust' and familiarity in situations where information is at a minimum. Chapter 6 documents a third project that also

investigates familiarity. It explores the type of information categories participants seek to create context and trust. A fourth project, featured in Chapter 7, re-visits the workplace and explores how a group of professionals construct trust as part of their daily work. Finally in Chapter 8, a project that explores trust in a highly emotive context is described and discussed. The context here is the creation of a documentary about road accident trauma. Five projects were chosen to gain a sense of how trust works across a range of situations in order to explore the similarities and differences that arise.

All of the above mentioned projects are linked by a common approach to interaction design driven by praxis. Praxis is a term in the literature commonly used to describe the intersection of theory and practice. Originating with Aristotle but most commonly associated with Karl Marx, the term has undergone a number of transformations. For Aristotle, it was to be contrasted with 'theoria' and 'poeisis' that referred respectively to the pursuit of truth and to knowledge associated with production. 'Praxis' was reserved for practical action that could include ethical and political matters (Knight 2007). For Marx, famously, it became the means to contrast the theoretical knowledge of philosophers with the need for engagement. Hence, in one of his most famous statements, 'philosophers have only interpreted the world in various ways; the point is to change it' (Marx 1845). For Freire (1970, p. 36), this became 'reflection and action upon the world in order to transform it' and it is this meaning which associates most closely with the modest proposals of this thesis, where 'changing the world' simply means intervention and engagement through the design of technical applications.

More recently, others have explored the term, including Deming (1986), who explains how theory and practice interlink: 'Experience will answer a question, and a question comes from theory'. Martin and Booth (2006) argue, in a defence of such commitments, that experience and/or 'reflexive' practice-based work is appropriate in a context where the distinction between the supposedly 'objective' and the apparent subjectivities of 'experience' is becoming increasingly blurred. This is particularly relevant to the area of design, which is a form of intervention by definition. Design can be loosely thought of as an activity offering a solution that may change the conditions of others in the future

(Zimmerman 2009). Thus design is not an isolated act. As mentioned above, interactive design is centrally concerned with the application of theory to practice and vice versa; thus this mode of research is particularly appropriate.

By theorising a practical activity such as design, a practitioner is able to move from understanding aspects of isolated case studies or incidents, towards 'broad explanatory principles' and the prediction of problems and solutions (Friedman 2003). Friedman points out that the area of socio-technical design has problematised the distinctions between process and outcome, participant and designer, and service and product, and therefore requires new hybrid forms of understanding. Some of the aims of praxis should be, according to Zuber-Skerritt (2001), to communicate concepts in a fashion that everyone can understand, transform theory into practical accomplishments, and understand a problem from a holistic perspective that can embody historical and societal dimensions.

Central to the programme of praxis is the relationship between researcher and participant, writer and reader, or designer and user. In whose interests is a researcher working? And how much does a researcher care about the interests and enablement of those they are working with? How much negotiation of approaches and ideas is possible (Surma 2005)? These are issues central to the design of trust-enablement and other design projects that problematise traditional power relationships between producers and users. Here, creative work is used as a vehicle to explore how ideas in theory might work as implementation in a practical setting. This process allows lateral exploration of what an idea might mean, perhaps providing different insights to those gathered from a written pursuit of an argument. Different points of emphasis of how an idea works in a practical project might arise. Problems that occur in the execution of an idea have a chance to be identified. By developing an idea, even as far as a sketch, it is possible to discover whether the concept might work or not.

As this is a design-related thesis, the way these contexts were examined is based on certain kinds of intervention rather than any attempt at 'fly on the wall' observation. The perspective of design attempts to understand how interventions can provoke certain types of communication or response from participants, so exploration via intervention is a logical starting point. Some forms of intervention

also allow for a closer examination of the processes that participants use to create trust than the act of observation might facilitate. It is the process of trust that I am most concerned with in this study. As mentioned in chapter 3, cultural probes are an established form of data-gathering intervention that allow the participant to create his/her own sense of meaning and also allow the designer to gain insights into how a context works from the perspective of the participant. The projects discussed in this part are modelled on the form of the cultural probe.

The aim of undertaking creative projects is to explore how trust-enablement is achieved in a practical setting, when theory is applied to practice. The exercise is an exploration into how theory works in practice and also the pragmatics involved when a design concept is converted into a project with which others interact. The process of planning, executing, and collating these projects and reflecting on the practices of those engaged in them also allowed an examination of the micro-detail of trust: that is, the details and nuances that occur around it.

Outline of Part Two

Each chapter in part two describes a project exploring trust, including the context that the project explores, the means to gather data, the task the project participant is asked to undertake, and the type of information the participant was given. Insights gained into trust as a practical accomplishment conclude each chapter. I then provide a summary of the knowledge gained from undertaking the practical design projects, and explore the similarities and differences of how trust and context were created by participants. Part 2 closes with indications into how this knowledge will be used in part 3, when the insights are applied to create design affordances.

Chapter 4: An initial exploration into the concept of trust evidence

4.1 Preamble

As a starting point, I begin my data-gathering exercises into trust by exploring the notion of trust evidence: what is valued by a trustor in a trust (or distrust) interaction? In this chapter, I explore how the area of trust and technology research conceptualises the micro-detail of trust and ask interviewees to reflect on how they understand the evidence to trust. The work forms material used in a report I wrote for British Telecom (Dwyer 2008). I find that interviewees report from their own experience and offer insights based on their conceptualisation of what trust is. In the next series of chapters, I continue the exploration and examine what happens when the research area's theories on trust evidence are applied to a practical project in the form of a cultural probe. I then find that when a discussion moves away from an abstract notion of trust, the data collected and the collection process is more complex but it is also richer. When participants enter into the scenario created by the probe and are no longer drawing entirely on their own experience, context and how to make sense of it becomes a key issue for participants. These projects therefore confirm my claim that trust cannot be extracted from the context in which it exists.

Cofta (2006) provides a distillation of the trust and digital research area and argues that trust evidence falls into three dimensions: continuity, competence and motivation. Continuity evidence is connected with time and is a reflection of how long someone has been a member of communities relevant to the trust interaction. Competence evidence indicates whether someone has the skills to deliver on a trust interaction. Motivation evidence is an insight into whether those in a trust interaction have encapsulated interest. Arguably, continuity is the most important dimension, and the different dimensions interrelate and affect each other. I now report on the interviews, which formed the basis of a paper I wrote for British Telecom (B.T.) (2006) about trust evidence. Seven people, all employees of B.T., were interviewed and asked to tell a story about a trust interaction. These are the seven types of people that were interviewed:

1. Establishment of a virtual collegial friendship (*Virtual Collegial Friend*)

2. Development of a life-coach relationship from the perspective of a person coached by a life-coach (*Coached by Life-Coach*)

3. Development of a life-coach relationship from the perspective of a life-coach (*Life-Coach*)

4. Workplace relations, from the perspective of a gay woman who needs to let co-workers know of her sexuality (*Gay Rights Awareness*)

5. Workplace relations, from the perspective of someone who has created trust with a client (*Client Trust*)

6. Workplace relations, from the perspective of a high-level manager (*The Manager*)

7. Workplace relations, from someone who delivers high-level projects (*Project Deliverer*)

The findings from the interview are organised under the themes of continuity, competence and motivation.

4.2 Continuity

The dimension of continuity is shared interest beyond the current encounter; what is the shape of the 'shadow of the future' (Axelrod 1984)? A judgment using continuity uses the length of time the trustee has existed in a certain community (Cofta 2007, pers. comm., 3 July). 'Social embeddedness' is important grounds for trust and refers to the reputation of the parties within a trust interaction and the amount of associated 'social capital'. Social capital refers to the ways in which one's social relationships provide access to needed information, resources and supports. Someone who is rich in social capital can be described as being respected within a certain community or 'well-connected' to respected people. As mentioned in the introduction, the notion of social capital is sometimes researched from a perspective that tends to avoid critiquing the complexity of the concept (Navarro 2002). Putnam's seminal work on social capital, 'Bowling alone' (1995), argues that the amount of social capital directly affects the productivity of individuals and groups. Putnam explains social capital and the development of

resources as a cycle. Civic engagement creates ties between individuals, which in turn creates trust. This allows resources to be exchanged expediently between people, a process that in turn facilitates further civic engagement. These networks are frequently informal rather than formal, and they often serve to exclude and restrict access as much as they assist others, as Field (2003) points out using the example of the networks within the British Civil Service.

The dimension of social capital is supported by a comment from *The Manager.* This is how he judges whether to trust a person to deliver a project:

> Social proof and respect is a key factor. People demonstrate this in different ways. It's about history, and seeing that they have done things that are relevant. I got excited because the researcher was talking to key-people – and had found spontaneously links into the organisation. He was on the right track.

The manner in which people express their social capital is also judged and is a tenuous process. According to *The Manager,* sometimes people can breed distrust in the way they present their social capital.

> A classic one is that people introduce themselves in terms of whom they report to. This must be in order to tell people that they must listen to them. Once I used to take note of this. But now think of people who do this as idiots.

Social embeddedness allows for the exchange of information about a trustee's performance. Trustees, knowing that trustors could exchange information about their behaviour, have an incentive to fulfil an arrangement, even if they do not expect future interaction with a given trustor (Riegelsberger et al. 2005). Second-hand trust, reliance on the reputation and advice information from other parties, plays an important role within this category of trust information (Lacohée et al. 2006, p. 19). This advice is informed by the previous experience (both positive and negative) of the contact.

A further comment from *The Manager* demonstrates how acculturated trust is within a social setting by underlying group membership and familiarity as requirements for trust.

> Yes, however you cannot teach trust skills because it is about judgment and experience. You learn on the job that some things are not important and other things are important. The judgments are context dependent and people react differently. If you are involved in the team where you see people making the judgments, although you are not receiving the signals directly, you will be able to learn what those signals mean. You can take on that wisdom and develop your systems of interpretation. I think it is a cultural thing.

In summary, continuity is embodied in the reputation the trustee holds within a specific work community.

4.3 Competence

The dimension of competence refers to whether the trustee has the ability and skill to fulfil the requirements of the interaction (Cofta 2007, p. 111). Competence includes the ability to competently negotiate a relationship. This involves the trustee as providing indications of understanding the trustor's perspective. The competence dimension emphasises that trust is a two-way relationship: each participant provides an offering that is built on by the other. This process is fragile. The French theorist, Bourdieu, describes competence as 'cultural capital' and explores how this form of capital is heavily mediated by culture (1986). He points out that the amount of cultural capital a person may hold is a function of what class they are from as it is an acquisition that can be passed through family and associates (which links this concept with the notion of community and social capital). For instance, access to education can determine the type of qualifications and knowledge one holds. However, this example also demonstrates how complicated and problematic the link between competence and social capital is. On one hand it may determine, an individual's ability to access resources, but in actuality, may more factors shape an individual place in society.

The interviewees in this research referred to specific characteristics of what constitutes competence evidence. Within the scope of this research, the interviewees interpreted competency as the ability to communicate: does the trustee have the cultural literacy required to negotiate a relationship successfully? In my research, pursuit of clear guidelines surrounding communication can indicate competence and was cited as a reason to trust. *Coached by Life-Coach* trusted her life coach because:

> He told me everything would be confidential…between me and him…everything that comes out of the coaching experience is just between him and me. That reassured me that I could tell him anything I liked to share. He put it in writing too; this is what a life-coach does. He keeps a logbook. This also helps in his coaching career. He needs to lock down hours. He gave me the rules…I know what he can and can't do…I have been asked to keep a notebook to write down anything that has been discussed, any actions that need to be taken. And to reflect on that for next time I saw him.

According to *Gay Rights Awareness*, it is important to have the opportunity to ask questions and for both parties to listen to and understand the position of the other. In her interview, she said:

> Trust is a two-way street. It comes from two-way communication. It is a journey of hopscotch steps, you get to know details of each other. You are not going to get trust if they don't understand.

This resonates with Andrew Kydd's argument in 'Overcoming mistrust' (2000) that trust is a 'confidence game' (Bourdieu would argue that it is a form of love). The game is a delicate and complicated balance. Early in the proceedings, actors should not send trust communications that are either too valuable or too cheap because evidence can be misconstrued or damage trust. Throughout an interaction, each participant should wait for the other to offer a move before reciprocating (Rothstein 2005, p. 158). The process can be damaged if too many assumptions are made too quickly. For instance, if one trustor quickly escalated the tone of an email exchange to ask questions perceived as too personal by the other party, then

there could be damage. However, if the level of personal intensity of an email exchange slowly increased, then trustors are more likely to find personal questions appropriate. As mentioned in chapter 1, Rothstein (2005, p. 210) adds that willingness to genuinely consider others' perspectives is predicated on believing that the others will reciprocate.

In addition to those in a trust interaction understanding each others' perspectives, the level and type of judgment made on the perspectives affects trust. Openness and non-judgmental communication is communication that avoids making assumptions about a person's position or identity. *Gay Rights Awareness* searches for indications of non-judgmental communication as evidence to trust.

> You can tell if someone is open-minded by their response to the general environment. You are not going to get trust if they don't understand.

This interviewee argued that non-judgmental communication is important because it means that people do not think that the information is going to be used against them. She gave the example of Amazon and other recommender systems (automated methods based on users' past behaviour that predict then present choices and services). Amazon provides recommendations to people depending on their prior purchases, which makes it evident that information is stored and linked about a purchaser. It is easy to imagine that this information may fall into the wrong hands. For instance, somebody living in China who was listed as seeking books on the contentious Chinese occupation of Nepal may be at risk. This user sentiment is echoed in Serino et al. (2005), who studied the effect of personalisation on recommender systems. They found in each of their four trials that personalisation encourages distrust because users perceive personalisation as a violation of their privacy.

Assuming and respecting the expertise of others in an interaction also promotes trust, according to the interviewees in this research. *Client Trust*'s work-place behaviour has facilitated clients to trust him in high-risk situations. His approach is to put to his clients: 'You are the expert – please tell me about it. How are things? Or how should things be?' Perhaps the reason this approach breeds

trust is because the participant communicates a willingness to comprehend the perspective of others.

4.4 Motivation

The dimension of motivation has to do with shared interest (Cofta 2007, p. 111): Does the trustee have an interest in working towards the welfare of the trustor? Castelfranchi and Falcone (2010, p. 123) refer to when the assessment of the trustee's intentions results in the trustor feeling positive about the trustee's intention as the 'belief of unharmfulness'. Motivation between two parties is explored by the sharing of a connection based on what they have in common and what is important to them. The process allows the trustor to ask if the trustee shares a world-view, feels a bond or connection and thus is motivated to work in their interests. As mentioned in section 1.2.d, 'Trust as a multi-faceted concept', the familiarity process can beget trust. According to Luhmann (1979), when people start to cooperate, they get the chance to adopt each other's perspectives. *Virtual Collegial Friend* described how his relationship with an email friend began with the two parties establishing that they had hobbies and interests in common. The relationship was then maintained by the discussion of the similarities and differences between lives in different cultures (U.K. and U.S.). Furthermore, *Virtual Collegial Friend* described how detail in an email would be a springboard for the two parties to explore their connection.

4.5. What evidence is most important: continuity, competence or motivation?

It is important to know which dimension is the most persuasive in any given context as this insight provides a more complete picture of how trust works. A designer can, if she or he is able to identify the 'powerful' contextual elements, emphasise the most sought after dimension over others when attempting to design for trust-enablement. In ethnomethodological terms, the most important dimension is referred to as the motivational relevance: the dimension that is the most persuasive in a particular context. Interviewees in the B.T. report indicated that continuity was the dimension of trust that they found most persuasive. This is

counter-intuitive in the domain of the workplace where one might assume competence is valued.

As argued in chapter 1, it is impossible to pre-empt how different trust evidence is valued. It depends on the context, the individual and the interpretation relevant to the participants in the situation at the time. *The Manager* commented:

> Continuity is the aspect I would value most; the sense of people doing things and that you are aware of what they have been doing. Motivation signals are important. But the reading of motivation signals is something that you need to distrust in yourself. Your constructions of what motivates people are often very misleading or wrong.

Coached by Life-Coach concurred. To him, lack of competence can be compensated for by continuity:

> If someone has limited skills it is possible to get over this weakness by showing motivation and sticking around.

Coached by Life-Coach added that the existence of competence without the other dimensions causes suspicion and reason not to trust.

> In fact, people who are competent but lacking in continuity and motivation breed distrust. You begin to question whether they have time to do the project properly – whether they have too many fish to fry.

Manager also judged competence on its own as a signal that may lack quality:

> Competence means that you might trust someone until they let you down. And then your trust falls away very quickly.

Project Deliverer pointed out that the dimensions are interrelated, particularly continuity and motivation.

> Motivation is very important. You need to have the motivation to keep the project going. It is a big problem when a core team member leaves. So motivation is definitely linked with continuity.

4.6 Conclusion to chapter 4

To understand the dimensions of trust in more detail, I interviewed seven people about how they perceive trust evidence. I gathered detail from the interviewees about how the dimensions of trust work. Reinforcing the concepts about trust in the literature, the interviewees described continuity as the length of time someone had belonged in a community. Continuity can reflect trust as those embedded in a community wish to keep their status, which leads to trustworthy behaviour. Competence, according to the interviewees, is whether someone is skilled in the area relevant to the trust interaction. Finally, the dimension of motivation encompasses whether one party benefits from working in the interest of another: the welfare of all is meshed. While it is evident that different types of evidence to trust are interconnected, it is continuity that seems to be the most persuasive type of trust evidence.

Within the scope of the interview, the participants reflect backwards on the process of trust and produce material that sits neatly with understandings of trust found in technology research. The practical projects, as I discuss in chapters 5, 6, 7 and 8, problematise the notion of being able to define trust as something that exists separately from context. In chapter 5, building on the explorations in this chapter, I attempt to script the trust evidence described in this chapter into a game. Game participants struggle to make sense of the game, as is explained in the next chapter. The aim of these projects is to explore in further detail the question of which type of trust evidence is the most persuasive within digital contexts.

Chapter 5: Trust in the context of a financial game and limited information cues

5.1 Preamble

As mentioned in the introduction, my interest in trust is how it is created between people who do not have previous knowledge of each other. I wish to understand how participants create context, draw on resources, and understand trust when it is absent at first. How is familiarity formed when the participant cannot draw on resources such as reputation (that I argue are not part of trust)? In part 3 of this thesis I apply these insights to form design strategies for trust-enablement. The project described in this chapter explores one aspect of the above perspective on trust: how do people understand trust when the information provided to base a decision is minimal and there is an absence of clues? Under these conditions, how is context created; what do participants draw on to construct context, familiarity, trust and distrust? The aim of this project was also to provide detailed knowledge about how trust-enablement works in a practical implementation.

In order to study these aspects of trust, throughout 2007 I developed and implemented a financial trading game (re-purposing existing game software). The structure of a location-based game was used to place virtual characters holding different combinations of trust evidence in different geographical locations. The aim of the game was to make as much money as possible in the game space. Participants were instructed to invest in the characters holding the correct arrangement of trust evidence (as deemed by trust research). Willingness to invest was regarded as willingness to trust.

The game provided limited cues and guidance for participants to form impressions; each character was represented by short snippets of information. The snippets were written by adapting theory about trust into a scripted line. For instance, as mentioned, theory tells us that competence is important in a trust consideration (Cofta 2007, p. 111). The limitation of information is reflective of how digital environments tend to offer limited, fragmentary or seemingly irrelevant information (as discussed in section 1.3). Examples include social

networking sites (such as Twitter and Facebook), which encourage participants to reveal small snippets of information, often without context (Elder-Jubelin 2009). Thus learning how trustors create trust in such environments where meaning is stripped back can help inform the design of digital environments.

This project was undertaken at an early stage in my research, and was originally designed to test out whether the evidence to trust as documented in the research literature is reflective of the trust evidence participants do actually seek and value in practice. That is, the project sought to answer the question, 'What type of trust evidence is the most persuasive?' During the test run of the project, it became apparent that participants were confused by the exercise given to them and that the underlying model of the project required investigation. The aim of the project then became whether it is possible at all to approach definitive concepts of trust. Rather than proving or disproving which type of trust evidence was the most persuasive, the project became an exploration into the complex nature of trust. Thus questions of the success or otherwise of this project as an experiment are essentially redundant.

The inability of participants to comprehend the trust evidence snippets highlighted for me the position that I subsequently adopted: that trust can only make sense in context and that participants were unable to judge the trust evidence they were presented with without access to what was happening around the evidence. The evidence was meaningless without context. This was a useful study because it helped me clarify my position on trust, leading to the realisation that there is no such entity as pure or essential trust, existing independent of a social context.

The aim of the overall project therefore shifted to an examination of how participants make sense of an environment when cues and guidance are limited. I found that participants strive to create context, meaning insights into how trust works as a practical construction can be gleaned from the processes participants draw on. Participants managed to draw a lot of inferences from very little information and to seek out information that was beyond the game context (as designated by the designer) in order to draw a conclusion. It became apparent that if there is no information available in a situation where a participant expects

information, it is regarded as suspicious by participants. Attention is drawn to the lack of information. Participants wonder why there is no information and wonder what the problem is. A game scenario is approached by participants with a level of self-reflexivity: participants anticipate what is expected and balance what they would like to do against what they think others might do. The project also raised for me the issue of whether trust should be in the foreground or the background of an interface. Should the dynamics of a trust interaction be explicit for a participant or handled in a more seamless and automated fashion?

Insights into trust from this project came from three sources. The first source was from design and technical challenges encountered during the construction of the project. These are discussed below. Another source was the characters chosen by participants as investment possibilities. The third source was the comments made by participants when they were returning the game device. Participants willingly offered comment at this point. I transcribed the comments as the participants spoke, and compiled the notes on all participants to compare the comments.

5.2 Participants and participant instructions

The game was undertaken by ten participants. All were employees of the Australian Centre for the Moving Image (a public cultural institution in Melbourne), aged between 27 and 37. These participants were chosen because they were my work colleagues and thus a group I could easily recruit. As the project was based in an area near our work, it was convenient and not time-consuming for participants to undertake. Participants were instructed that the aim of the game was to make money by investing in characters from the past. It was explained that as they experienced the game they would receive text statements from different characters and based on these statements they would need to make a decision about whom to invest money with. Thus participants were aware that they needed to make a decision based on limited information. Participants took approximately half an hour to complete the game. All returned the game equipment (the equipment is described in section 5.3.b) straight after finishing and spontaneously provided me with feedback when handing back the equipment. I

wrote down their comments and this material is reported in the section, 'Insights'. I tallied the results for the participants' choices manually and sent participants their results via email.

5.3 Tool of enquiry: a game as a cultural probe

This project involved a game in the form of a cultural probe. As discussed in section 3.3, a cultural probe is a data-gathering tool used by participants without the presence of the researcher and in their own time.

5.3.a Why a game?

The format of a game was used as an underpinning for this cultural probe because games are a conventional and familiar structure that participants understand and thus can be leveraged off to create an accessible design. Participants have a sense that they needed to work through a series of activities to reach a goal. This allows participants to focus on the activity of constructing trust and context. Furthermore, the game structure provided a motivation for the participants to complete the task.

Games are an accepted research mode to study trust and a range of other research areas. The phrase 'games as research lens' was coined by Chang and Goodman (2004), who used this term to describe their project, 'Fiasco', that was initiated partially as a method by which to understand the user's construction of self in a virtual environment. The group, 'Blast Theory', developed a mobile game called 'Can you See Me Now?', which Benford et al. (2006) claim to be a type of probe. Within this project, runners with mobile devices are chased around a city. Insights were gained from how the players co-opted the technology to reach their goal, including how they used the quirks in the technology to hide from the chase.

Although the way some games have been used as tools to explore trust have some problems isolating the subject of study, the combination of a game and the form of the cultural probe can provide breakthroughs in how trust and context can be understood. It is possible that participants reveal genuine responses rather than contrived answers, because games require players to provide quick responses rather than allowing time for players to consider and manage how they might be appearing to others. However, there are disadvantages to using games as a

research tool. Sometimes a learning curve is required before the game can begin. Participants might be required to donate a longer amount of time than is needed for more conventional methods.

5.3.b Overview of the game used in this research

This section provides detail into the construction and the user experience of the game. Insights taken from the experience of constructing and executing the game follow this section. The project was a location-based game for use on a GPS-enabled personal computing device using software developed by British Telecom. After logging into the game (figure 1), the participant viewed a map of the area, which was also the main interface for the game (figure 2). Throughout the game, the map always reflected the position of the participant's current position in space (as indicated by the 'man' symbol in figure 2).

Participants walked around Federation Square in Melbourne, and at certain intervals, the GPS location of the participant would trigger either a piece of moving image or a trust event to appear in the interface. Within a game scenario, participants were asked to view some limited excerpts of trust information and make a decision based on this information. The aim of the game was for the participants to make money by investing in trustworthy characters. Across one play of the game, it was expected that a participant could encounter the eight trust decision components and perhaps four snippets of moving image material. Before providing a more detailed description of the trust events and the moving image components, I will briefly describe how the game was scored.

5.3.c Game content

As mentioned above, there were two types of content represented in the game: the moving image component and the trust events. Two types of content were used to provide an engaging and absorbing experience for the participant and thus encourage the participant to complete the game. There was no conceptual connection between the film footage and the decision component; participants could not seek information in the film footage to help with the trust decision. Confusion resulted from this disconnection, an issue that will be discussed below

in the ‘Insights’ section. The moving image component is discussed first because it is the simplest to describe.

Figure 1. Game log-in screen

Figure 2. Game interface

5.3.c.i Game content: moving image component

As the participant moved around the area, she or he received archive footage that showed what the specific place looked like at another point in time. The inclusion of this material was intended to provide a level of entertainment for the participant. The moving image appeared as an overlay across the map. Each footage snippet was between 10 and 15 seconds. The material was sourced from the archive collection of the Australian Centre for the Moving Image who own the copyright to films made by the State Government of Victoria. The material is rarely seen and was unfamiliar to the participants of the game.

Included were small excerpts from an observational film made in the 1940s about the people who gathered on the banks of the river (besides what is now Federation Square) on a Sunday. The location was a renowned gathering location, especially for those wanting to take part in the soapbox discussions that were popular at the time. The material features people relaxing in the sunshine on a day off. The second film was also an observational film; it was shot in the 1960s and featured candid shots of Melbournians going about their everyday lives, for instance, playing sport or attending a public demonstration (figure 3). Shoppers walk the streets (figure 4).

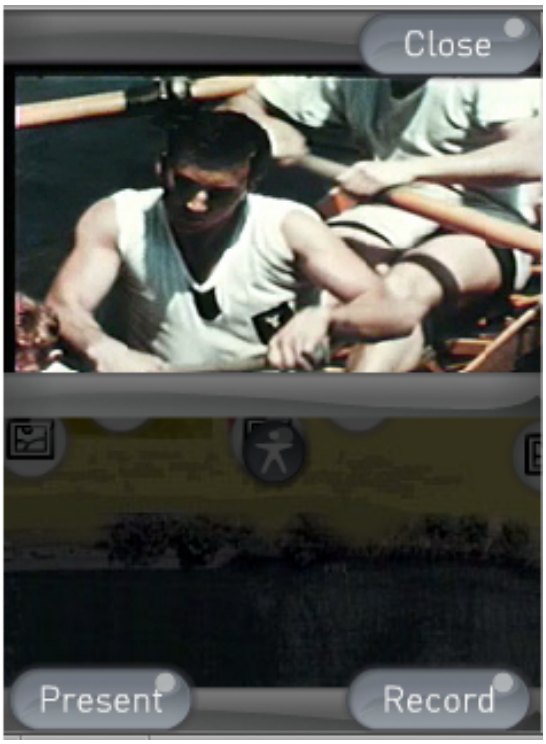

Figure 3. Film footage within the interface

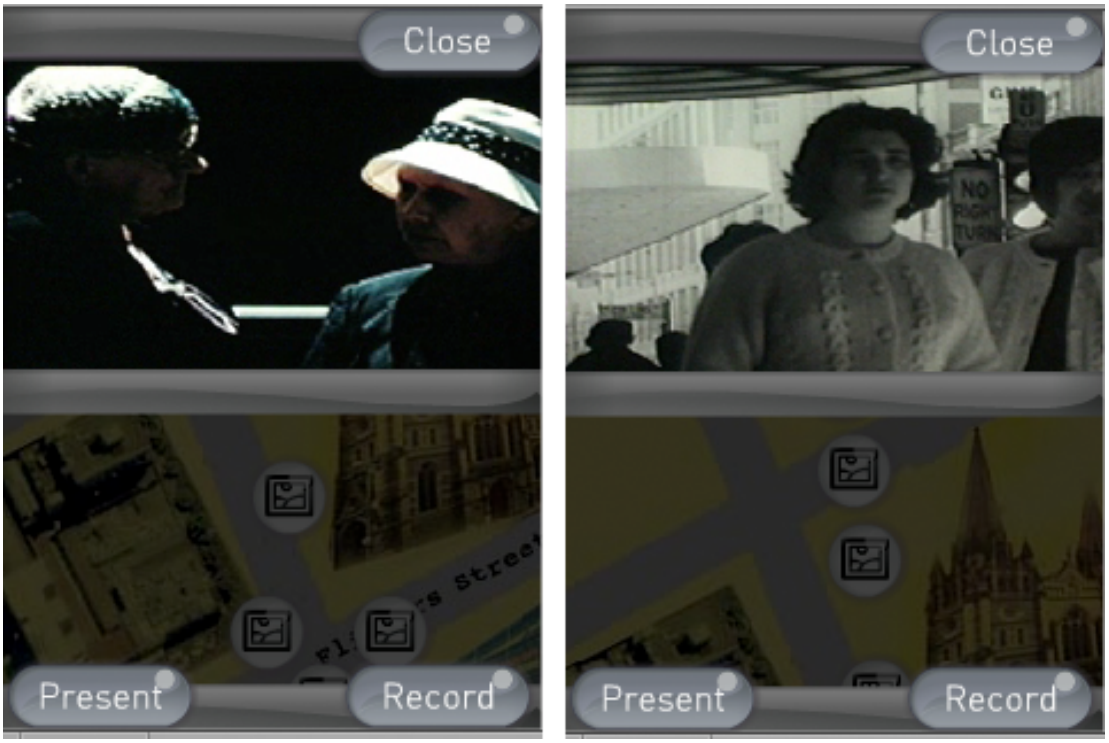

Figure 4. Film footage within the interface

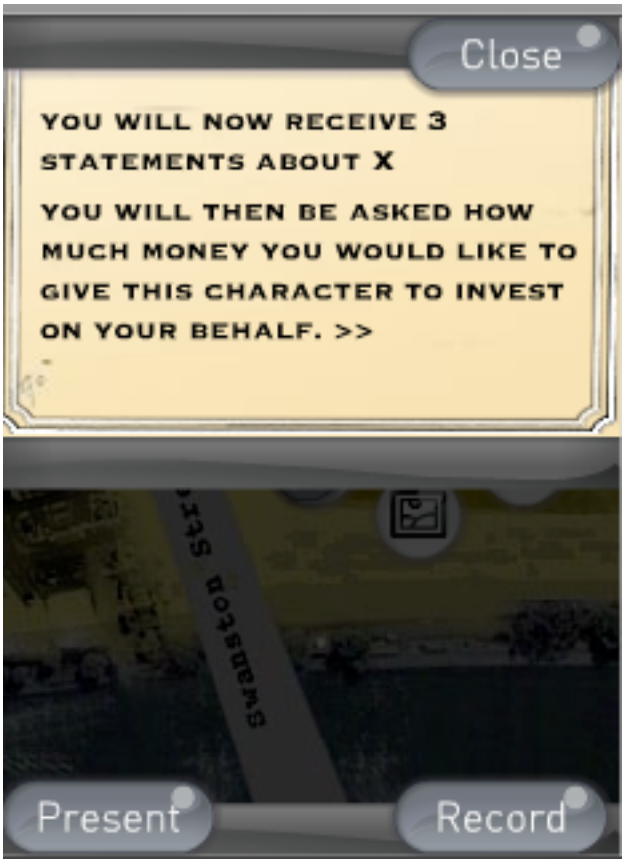

Figure 5. Statement presentation within the interface

Figure 6. Statement presentation within the interface

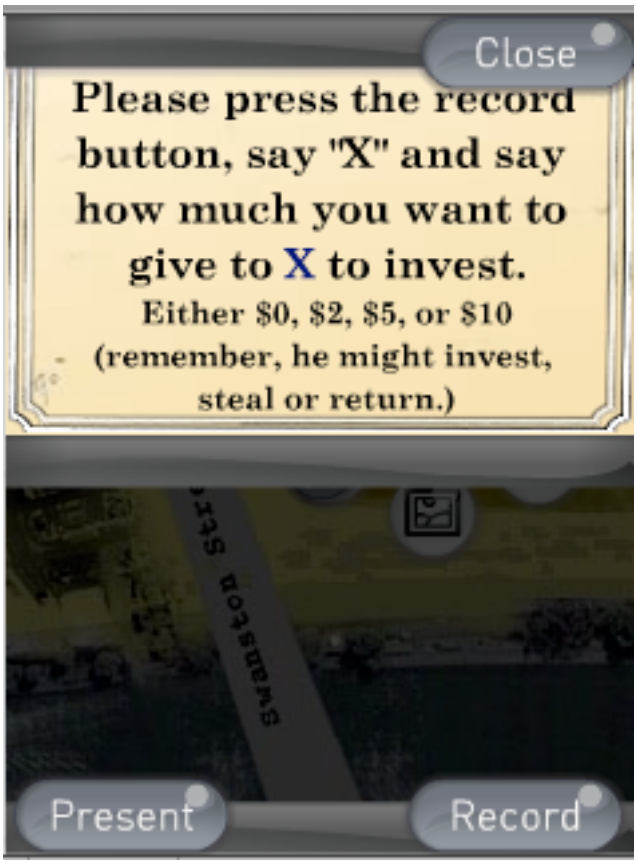

Figure 7. Allocation of decision within the interface

5.3.c.ii Game content: trust decision component

When the participant walked into certain geographic areas, an overlay appeared that asked the participant to review a small amount of information about a particular character and make a trust decision (figures 5, 6, and 7). There was no image or sound representation of the character to ensure that the decision was not biased by the character's appearance. The gender of the character was kept constant to try to control bias.

The user was then given a set of three fragments of statements representing the character (figure 6). After viewing the statements, the user was asked how much money s/he would like to invest in that character. There were eight characters in the game, each represented by three statements. Each character held a different combination of the three trust evidence dimensions as claimed by the literature.

As mentioned in chapter 4, trust evidence can be understood to fall into three dimensions: continuity, competence and motivation. These dimensions were established by Cofta (2006), who distilled the work of many researchers working in the area of trust. He analysed the categories that the evidence to trust is divided into. The dimension of continuity is evidence that indicates that a trustor has been involved in a community of interest for a considerable amount of time and that this status will continue. The dimension of competence is whether a trustee has the ability and skill to fulfil the requirements required by the particular interaction. Finally, the dimension of motivation refers to shared interest: does the trustee have an interest in working towards the welfare of the trustor? Castelfranchi and Falcone (2010, p. 123) describe this type of trust as the 'belief of unharmfulness'.

Figure 8 lists all the statements used in the game and how the statements and dimensions of evidence were allocated across eight characters. The eight characters were allocated three items of trust evidence. This arrangement allowed an allocation of every possible combination of trust dimensions. One character held every dimension of trust. One held no evidence. Instead of a fragment of a statement, the user received: 'No information available – not the fault of z' in place of a trust statement. For the character that did not hold any evidence, this

information was presented three times. Figure 8 (column four) also lists how the scoring allocation was applied to the different arrangements of statements.

5.3.d Scoring of the game

After receiving three statements from a character, a participant was asked to allocate money to a character for investment purposes. Participants were given the instruction that the characters could provide a return, break even or lose the money. The assumption was made that the participants would make the choice based on their interpretation of the scripted sentences. The investment amounts participants could allocate were $2, $5, or $10. Participants were asked to select the record button on the interface and speak their amount into the device, as illustrated in figure 7. There was no limit to the amount of money participants could invest. Participants received their results by email.

Results were scored by the allocation of a certain amount of points to a participant when she or he nominated a certain amount to a character. Higher scores were allocated when a participant made a choice that followed the logic of the research literature. For instance, if a participant chose a character that held sentence fragments reflecting a high amount of trust evidence (such as text reflecting continuity, competence and motivation) then she or he received high points. If a participant did not follow the logic of the research literature, and invested a high level of trust in a character that did not hold sentences that reflected trust, then she or he received a deduction of points. However, I found very quickly that the meaningful data from this project was not the scores of the participants, but the process of creating the project and how it worked as a cultural probe for participants, allowing them to gather their own data about their responses to trust evidence. In table 9, I have included a breakdown of the investment amounts in order to provide background information to the reader.

	Continuity	Competence	Motivation	Scoring
Character r	He has lived here all my life - from boy to man.	He has been headhunted by an employer.	He understands the value of a happy customer.	3 x amount allocated by participants
Character s	He has provided goods for many people like you in the past.	No information available – not the fault of z	The standard agreement is 20% of your profits.	2 x amount allocated by participants
Character t	No information available – not the fault of z	He won an award when he was an apprentice.	Word of mouth is important to him.	2 x amount allocated by participants
Character u	He belongs to a different branch of the same club as you.	By midday there is a long line of people wanting to buy his fish.	No information available – not the fault of z	2 x amount allocated by participants
Character w	No information available – not the fault of z	No information available – not the fault of z	You will be the silent partner and he will be the active partner.	1 x amount allocated by participants
Character x	No information available – not the fault of z	The younger boys ask him for help.	No information available – not the fault of z	1 x amount allocated by participants
Character y	He has been in the community for a long time.	No information available – not the fault of z	No information available – not the fault of z	1 x amount allocated by participants
Character z	No information available – not the fault of z	No information available – not the fault of z	No information available – not the fault of z	0 x amount allocated by participants

Figure 8. List of all statements used within the game

	Total amount invested by participants
Character r	105
Character s	205
Character t	125
Character u	145
Character w	200
Character x	80
Character y	120
Character z	0

Figure 9. Amount invested to each character by participants

5.4 Reflection on the process of scripting the trust evidence and creating the game

It soon became apparent in the process of writing these theory-based script lines that the exercise was not producing the anticipated results, for several reasons. Firstly, the sentences lacked a plausible sense without some sort of 'meaning in action' happening around them. For instance, one scripted statement was 'The younger boys ask him for help' which relayed very little about possible underlying motivation, and hence gave no clue about the context this event was happening in, who the actors were and the relations between them. When planning the project, I thought that a character that represented all three dimensions of the trust values would be rated the most highly. I also believed that trustors would perceive this character as having the most 'well-rounded' trust. This was not the case, as is discussed in this section. What the trust dimensions of continuity, competence and motivation mean in practice is dependent on an individual's unique interpretation, shaped by context.

I wrote statements reflecting the trust evidence I gleaned from the literature as the most persuasive for trust. I stripped back the detail of the sentence as much as possible to include only trust evidence. The task seemed artificial, difficult to achieve, and worked on the assumption that there is something that exists as 'pure trust'. The process of preparing the game demonstrated to me how theoretically loaded the concept of trust is and how diverse the different and mutually exclusive

interpretations within the research area on trust are. Some research, as a result of undertaking empirical studies into trust, according to Åm (2011), pursues an essentialist core of a decision that can be isolated as trust. Other research, for instance Luhmann (1979) and Möllering (2001) attempt to understand trust as a socially defined concept.

Any detail that was scripted into a sentence to provide evidence gave the reader an opportunity to apply bias from past experience. Although past experience and prejudice are recognised components of how people create trust impressions in the social psychological literature, my interests were distinct from this. I was more interested in 'trust enablement', so such issues were not especially relevant. A lesson from this is the ethnomethodological one: participants actively produce the environment they are in, and they therefore actively produce what the relevant features of 'trust' are in this, and the other, contexts.

In conclusion, ten participants completed the game. Data for this research was lifted from the design and technical problems that arose during the creation of the project, characters chosen by the participants to be the most trustworthy, and most importantly, the comments made by participants when they returned the game equipment to the researcher. I now review the insights into trust gathered from this project.

5.5 Analysis

This section reviews insights produced from the experience of creating and executing this project. The insights are relevant to the design of trust-enablement. I am particularly interested in how the participants construct trust as a practical accomplishment.

5.5.a The pre-preparation of trust evidence is a meaningless exercise.

As mentioned in section 5.1, the experience of writing the sentences based on theory provided some insights into the design of trust-enabling technology. It was very difficult to create a statement that did not introduce the possibility of bias. It seemed that the inclusion of any element of detail could distract the reader

because it encourages the reader to make a judgment based on bias or previous preferences. Participants found the trust statements within the game 'puzzling' and 'uninformative' without a clear guiding context and then sought to create a context in order to complete the task. Participants created context in a situation of ambiguity. For instance, during the pilot study, one participant commented on the use of grammar in a sentence, and how much he draws on this element as grounds to trust someone. One statement in the test version of the project was 'He has drunk at the Green Man Hotel'. One participant in the test stage of the project commented that he would be swayed by such a quirky title. External influences on a project are known as framing effects, and as discussed in section 4.1, trust researchers have often strived to eliminate these effects from their studies. By undertaking studies in the laboratory, researchers hope to limit framing effects. However, the relevance of the study outside the laboratory then comes into question.

It also became apparent during the process of writing the statements that the dimensions of trust were difficult to separate into distinct categories. In many instances, analytic decisions in relation to specific sentences seemed arbitrary. A statement could be seen as a reflection of continuity, competence or motivation; for instance, 'He understands the value of a happy customer'. This could reflect that the trader has been in a community for a long time, or that he is good at his trade, or finally that he is interested in working in the interest of a customer. Participants also found it difficult to distinguish between the content of statements across the different character representations and this caused a mental load for participants. This insight has implications for the layout and placement of information in digital environments but as it is concerned with memory performance, the issue falls within the realm of cognitive science and design and is beyond the scope of my research.

5.5.b Trust is idiosyncratic.

As a result of the finding that no one game character was more popular than the others, I noticed that participants were drawing highly individual conclusions. Meaning was created from very little. In this ambiguous situation, participants had

idiosyncratic responses to the trust situation, and looked for a means to reduce ambiguity. Participants drew on their personal experiences and background in order to make sense and make a trust choice. Participants looked for clues in the game scenario that referred to their life experience. One participant (who happened to be a mother) said: 'The statements were so simple that they reminded me of a bunch of little boys. It was like a bunch of kids asking me for money'. In contrast, another participant said:

> All you told us was that the game was set in the past. It made me think of Victorian England stories and the 'street urchin'. I thought I was going to be 'ripped off' the entire time.

So one might say that trust is a highly personal view, shaped by pre-existing knowledge brought from outside the trust context. In chapter 4, I reviewed some of the research areas that examine the backgrounds informing trust perceptions. Trust is formed by an individual's interpretation of a situation that in turn is influenced by a person's life experience and also a collective understanding of society. Some researchers also explore personality disposition as filtering the understanding (Lumsden et al. 2006). It is difficult to predict how evidence will be perceived. Although what shapes a trust perception is beyond the scope of this research, the existence of a wide range of options and experiences informing the perception of trust helps support a claim of my dissertation. An individual's working definition of trust becomes meaningful when it is applied in a context, and an individual can explore what s/he would 'really do'. My research, however, focuses on the construction of trust in a context, rather than what has led to the trust perception. Context can only be constructed and understood by those participating in it. Thus trust-enabling design can be achieved by focusing on the processes by which participants create trust in contrast to seeking pre-determined solutions. This concept will be pursued further in part 3.

5.5.c Trustors will seek out information and perhaps look further than the context as demarcated or assumed by the designer of the environment.

I found it problematic to have two separate layers within the game probe: one layer gathering data and the other layer providing engagement. Two participants said that they looked to the film footage snippets to provide clues or support when deciding how much to invest. They found it disorientating and frustrating not to be able to draw connections between different aspects in the interface. The two layers of the project should have been united in some way. This leads to the question of whether it is possible to design a project that is entertaining and engaging for participants but can also be a successful data-gathering tool.

5.5.d Trustors are suspicious if no information is available.

Even though trustors are highly individual in their interpretations, they wish to have some amount of information to work. One game character was consistently chosen as 'unpopular'. This was the character with no trust information available who carried the text 'not the fault of z'. He was consistently allocated no money, even though in the interface it was stated this was not his fault. One participant commented: 'I don't care if it is his fault or not. There is still no information.' Another participant said, 'I know it wasn't his fault. But there is still a reason why there is no information, and this can't be good news.' However, it should be remembered that this was in a situation when other information cues provided positive grounds to trust (rather than distrust). Is the case of 'no information' considered differently when other information cues are negative?

5.5.e Trustors approach a game with a level of self-reflexivity and reflection on what playing a game means.

Trustors automatically understand what a 'game' entails. There are certain rules and some sort of strategy needs to be chosen. Also, others will be undertaking the game, even if not at the same time or in direct competition. The participants in this project reflected a level of self-reflexivity, anticipating what they thought might be expected by the game framework and comparing this with what they would

like to do. A game is a 'strip of activity', as described in section 4.1: participants understand that there are rules and restrictions that apply in the game space.

One participant said, 'I kept wondering if I was supposed to be trusting the characters or trusting the interface'. Another participant indicated how she kept comparing her response with what she thought another might do: 'I kept wondering if I was too trusting or not trusting enough'. Yet another participant wondered about the underlying logic of the game and what the participant was expected to do:

> I wondered if you were testing responses comparing my emotional side or my rational side. I kept wondering which one I was valuing; business information or personal information. I guess trust is a matter of balancing both. That is what the real world is about.

Participants were interested to see how they went in the game and how they compared to other participants. As the technology of the game was limited, the results needed to be calculated manually. Participants were then given feedback in the form of a wider explanation about what the game was about and how it was an exploration of trust meaning different things to different people.

5.5.f Trust in the foreground rather than the background?

This project requested participants to make a trust-based decision in the guise of a question about how much money someone would give a character. This process raised the question for me of how explicit trust-enablement should be for the user. Should trust-enablement be in the background or the foreground of a user's experience? As discussed in section 2.3, there is pressure for the design of digital environments to be predicated on automation and efficiency. As examined in section 1.2.a, many researchers (for instance, Quercia 2009 and Bødker 2007) seek to place trust in the background of an interaction. Others such as Marsh (2010) and Jensen (2010) explore approaches that combine both human thinking and computer processing.

If users are to make the best trust decision in their interests (a decision that only they can make), then it would follow that there needs to be an element of

self-reflection and deliberation in the process. Part 3 will pursue this concept because it is central to trust-enablement design. A related design question is how to distinguish between different trust options. Although no participants raised the issue, as I was constructing the project I was concerned about whether participants would be able to distinguish between the offerings of the different characters (and also whether participants would be able to remember the options clearly). A common graphic design strategy to help comprehension between options is to emphasise difference. However, how does this serve trust? Perhaps this strategy distracts users away from the commonalities between options. This issue is also discussed in more detail in part 3. The issue is also linked to the question of what 'state of mind' designers want participants to be in when conducting a trust-based relationship. Alert? Relaxed? Reminded of danger? Inspired to take a risk? This question cannot be solved within the scope of this thesis, but needs to be slated as a challenge within design for trust-enablement. This issue is raised again in part 3.

5.6 Conclusion to chapter 5

This project explored how trust works in a minimalist context when information and guidance is limited. Undertaken at an early point in my candidature, the project was originally designed to investigate what type of trust evidence was the most convincing. After a test run of the project, it became apparent that this question is not appropriate for the nature of trust. Instead the project became a tool to investigate the complex nature of trust and how context dependent it is, rather than an experiment gauging the efficacy of a particular mode of trust.

Under discussion was a locatioån-based game that asked participants to view short fragments of information about a character and to make a trust judgment about the character. The project prompted five insights. Firstly, trust is a highly individualistic perception formed in part by pre-existing knowledge brought from outside the trust context. Secondly, because trust is so idiosyncratic in environments within which information is limited, it is difficult to predict how trust evidence will be perceived. Thus attempting to pre-empt exactly what trust evidence may be relevant in a future context is not a useful strategy. Thirdly, trustors actively seek out information and perhaps look further than the context as

demarcated or assumed by the designer of the environment. Fourthly, trustors want, at a minimum, enough information to feel that their decisions have a basis in concrete evidence; consequently, they are suspicious if no relevant information is available. Fifthly, trustors approach a game with a level of self-reflexivity and with a reading of what the situation entails, continually comparing their thoughts and behaviour to what others might do. Thus, trust can only be understood by those within the context. A digital environment within which participants can share context has potential for trust-enablement. Part 3 applies insights learnt from the practical projects to provide insights into the design of trust-enablement. In particular, Part 3 pursues the first two insights listed above.

In response to this project, I designed the project that is the subject of the following chapter. In this next project, I attempt to de-limit the type of information participants can gather. Rather than the open-ended responses which are featured in the game explored in this chapter, I investigate what choices participants make when offered categories to choose from. We will now turn to what information themes users wish to seek when making a trust based decision in an organisational context. This question is explored in the domain of virtual teams and teammates.

Chapter 6: Trust in the context of virtual teams and teammates

6.1 Description of project

The 'Trust in the context of virtual teams and teammates' project explores what type of trust information an individual would want to know about another in order to judge whether to collaborate in a workplace setting, in particular a virtual team. That is, the issue involves the kinds of familiarity that are relevant in working environments. This project looks at how an individual decides with whom to work, before collective decision-making starts. The virtual team context is characterised by interconnected people undertaking a task via a digital environment.

As a brief description, in this project, participants were given the scenario that they needed to choose someone as a work partner. Scenarios, within which participants are asked to put themselves in the mindset of a 'real-life' problem or task, are an accepted industry practice to gain insights (Shami et al. 2009). Participants were asked to visit a website (Dwyer 2010) and choose categories to reveal information about a potential collaborator. Insights about trust were taken from the categories chosen by participants. A profile contained listings describing a user, for instance, personal preference and belief information. The website was loosely modelled on the style of social networking sites which contain 'profiles' of the different users involved in the site. I considered this model to be the most appropriate for data collection in the context of work colleagues and digital communication. As most people are familiar with the structure of social network profiles, the means of making a choice was not challenging for participants. However, the task and scenario were open and required the participant to create a context, drawing on the information provided in the site. As the project was placed on a website, a large number of participants could be recruited via email and could then complete the task at their convenience. The experience provided me with an overview of what a large number of users might do when needing to construct a context in the circumstances I have described.

This project, undertaken in the second half of 2008, was a development on the location-based game project described in chapter 5 and continues themes

raised in that chapter. In the location-based game project, we saw that participants' responses were based on micro-detail that they were forced to create in the absence of relevant cues. The project now under consideration focuses on the wider categories of trust evidence people seek, rather than the micro-detail of trust. It is less open-ended than the last project. Even though different people have different assumptions about the type of information that might be found within a category, insights into trust can be gained by the wider categories of information that are sought by trustors. Participants were forced to seek categories of information in order to complete the task. As participants completed the task in private and anonymously, participants could choose what categories they wanted to see without concern about impression management with one another.

6.2 Background: the wider research area under discussion

This section explores the domain of virtual teams and technology within the research area of Knowledge Management (KM). KM looks at how organisations deal with the processes around knowledge acquisition, and how they create, experience, share and store information. It is a research area of interest to several disciplines, including human resources and information systems. Specific points of interest include 'communities of practice' (Wenger et al. 2002; Lave & Wenger 1991). This area explores how individuals with a shared interest (either due to professional or personal interests) form groups and how different information-sharing processes develop from these relationships. Another focus of KM is 'social networks' (not to be confused with social networking systems using technology); social networks refers to how individuals in an organisation are connected by different sorts of interdependencies which in turn affect the types of outcomes people produce in the workplace (for example, the work by Granovetter 1983, and Hill & Dunbar 2003, who were influenced by Georg Simmel, an early 20th-century writer). In turn this work is influenced by social capital literature.

Web 2.0 and the impact of how new forms of technology affect KM, in particular the capacity of individuals to collaborate with others, is a current focus (for instance, Davenport & Baron 2007; Lakhani & Panetta 2007). There is substantial research into the use of virtual worlds such as 'Second Life' for

activities such as virtual team building (for instance, Bessiere et al. 2009; Kellogg et al. 2007). The impact of email and instant messaging is also relevant to how people work in teams (Panteli & Tucker 2009). There has been a flood of material on the dynamics of social networking sites relating to community building and personal development. Research on the intricacies of social networking is emerging, sometimes with a view to providing design guidelines for future social network site development. For instance, research has focused on how to convince users to be committed to a certain social networking site (Vasalou et al. 2010) and how social networking can be harnessed to provide recommendations (Geyer et al. 2008).

Currently, research is building in the area of social networking in digital environments and work (DiMicco et al. 2008). Increasingly, social networking is being used as a tool by which colleagues in both formal and informal associations build relationships. Berlanga et al. (2008) suggest that those who are designing work-orientated digital environments need to learn from these social applications in order to understand how people exchange information, as these types of spaces will become the workplaces of the future.

However, the influence of social networking systems on collaboration and trust in the workplace is just beginning to be explored. Blogging at work (for instance, the work by Kim et al. 2008) and the use of wikis at work (Hasan & Pfaff 2006) are popular focuses of research. Steinfield et al. (2009) explore how an intranet style social networking site can affect the social capital of workers within an organisation. They focus on what users of the site feel they gain from the experience. In addition, Zhao and Rosson (2009) have undertaken what they describe as a preliminary study into how and why people micro-blog at work. They found that one of the impacts of this technology is that users perceive each other as more 'human, than just a professional carbon unit'. The tensions that arise from the dissolution of boundaries that has occurred from the use of social networking in the workplace is another issue gaining importance (Skeels & Grudin 2009). None of this research, however, examines the intricacies of what influences users' thinking and behaviour, particularly in relation to trust or how people understand others and context in these spaces.

The research closest to the focus of this thesis is the recent work by Shami et al. (2009). From a signalling theory perspective, their work explores the inferences drawn by colleagues about how others present themselves on a website, in particular what signals are important to work colleagues when choosing someone to be an advisor. Their aim was to find which signals were the most popular in order to inform design recommendations (they found that evidence that a person may respond to advice enquiries was the most persuasive). My research differs from Shami et al. (2009) in two ways. Firstly, the issue of trust and how it is constructed was not at the forefront of their investigations. Shami et al. (2009), on the other hand, were interested in whether direct, indirect or more conventional signals were the most valued when a trustor is seeking someone for advice. They also explore how a trustee can send a socially accepted signal for a quality. Instead, I am specifically interested in what broad categories of information trustors seek when forming a trust relationship.

6.3 Methodological Issues

This project loosely fits the characteristics of a cultural probe. It is intended to be a trigger for insights for the researcher and provide an impression of users' preferences. Although the responses that a participant makes are closed options and are not open-ended (often characteristics of a cultural probe), the participant needs to consider how the task makes sense in his or her own everyday life in order to be completed. The project has other qualities in common with cultural probes. It provides an opportunity for self-reflection and also can generate surprise for the researcher. The task is also undertaken at the convenience of the participant.

Usually cultural probes explore qualitative knowledge. However, in this project, I collect quantitative data describing which choices are the most popular. This project was a response to the open-ended nature of the game project described in chapter 5. Within the project now under consideration, I delimited the choices to see if I would receive different data. However, I found that my insights were very similar across both projects. My aim of providing categories for users to choose from was also to explore how cultural probes can gather numerical data.

I believe there is no reason why cultural probes cannot combine qualitative and quantitative data as a means to gain insight into how participants understand a situation. Different forms of knowledge can provide different dimensions of understanding. For instance, numbers can provide patterns, which may provoke an insight for the researcher.

6.3.a Participants and participant instructions

Respondents were asked via email to visit a website address and complete a response formed from a quick impression. The length of time required to complete the task was five minutes. There were 90 respondents consisting of people from two different groups. One group, consisting of 45 people aged between 25 and 35, were all employees of a public cultural institution. The other group, also consisting of 45 people, was made up of students aged 18 to 25, enrolled at Victoria University. These two groups were chosen because they were people the researcher had access to. No cross-comparison was done between the two types of group members. A successful ethics application was lodged for this project.

6.3.b Step by step experience of the project

After registering at the website, participants were asked to choose someone with whom to work (figure 10). No information was provided about the type of work that was to be undertaken. The intention was that participants would draw correlations with their own experience.

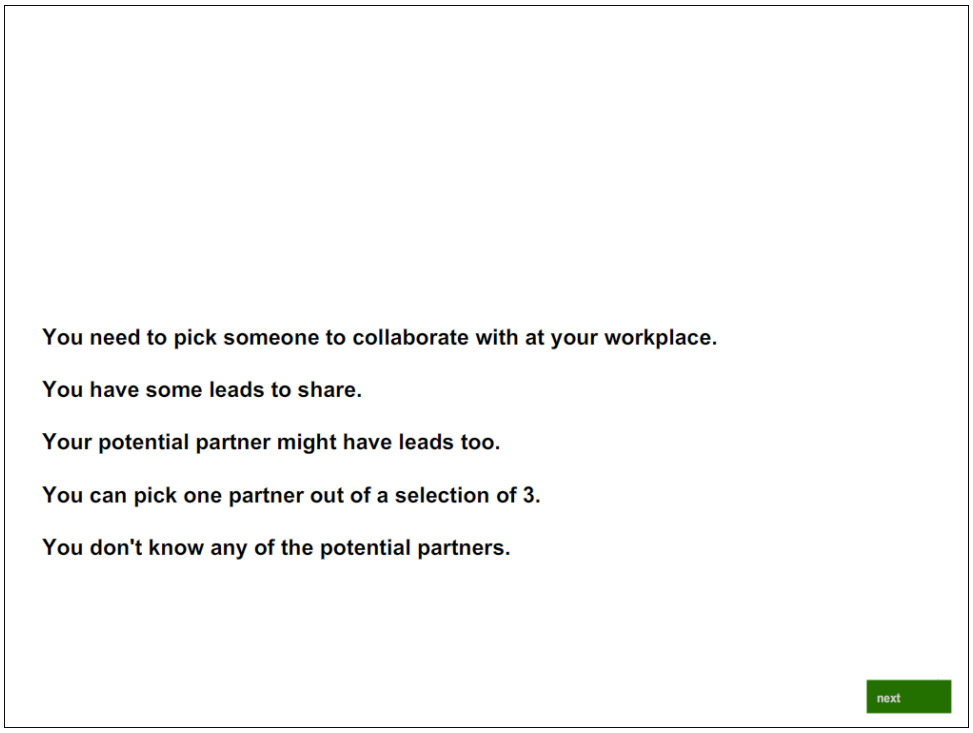

Figure 10. Introductory screen

In order to find out about a potential work partner, the respondent was then presented with categories of information to choose from (figure 11). The aim of this research was to explore which categories were the most popular. The respondent was asked to choose three of the ten categories (more information and rationale about the categories is provided below). The requested information about potential partner choices was then revealed to the participant. Data was gathered from the categories sought by participants. Participants were only allowed to make three choices. These choices were collected via a database that registered the selections and entries made by participants.

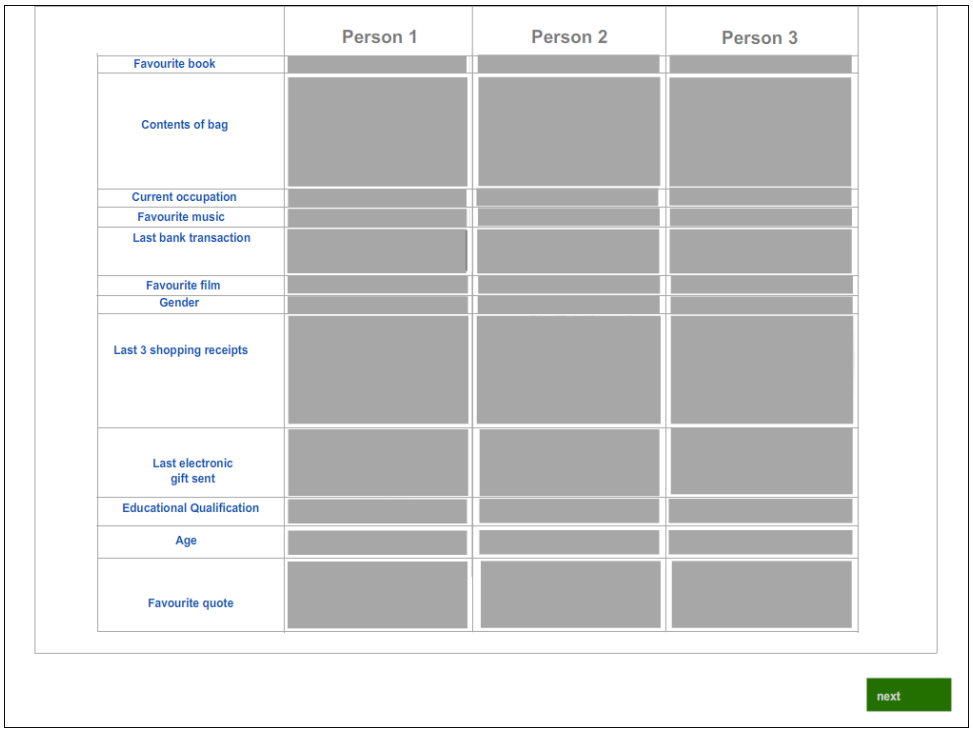

Figure 11. Selection screen

Information about the fictitious potential workmates was then revealed (figure 12). The participant was given a choice of person ‘one’, ‘two’ or ‘three’ to work with. A ‘thank you for participating’ message was then presented (figure 13). The choice of which fictitious character was popular was not of use to the research. It was included in the experience of the data-gathering to complete the experience for the participant.

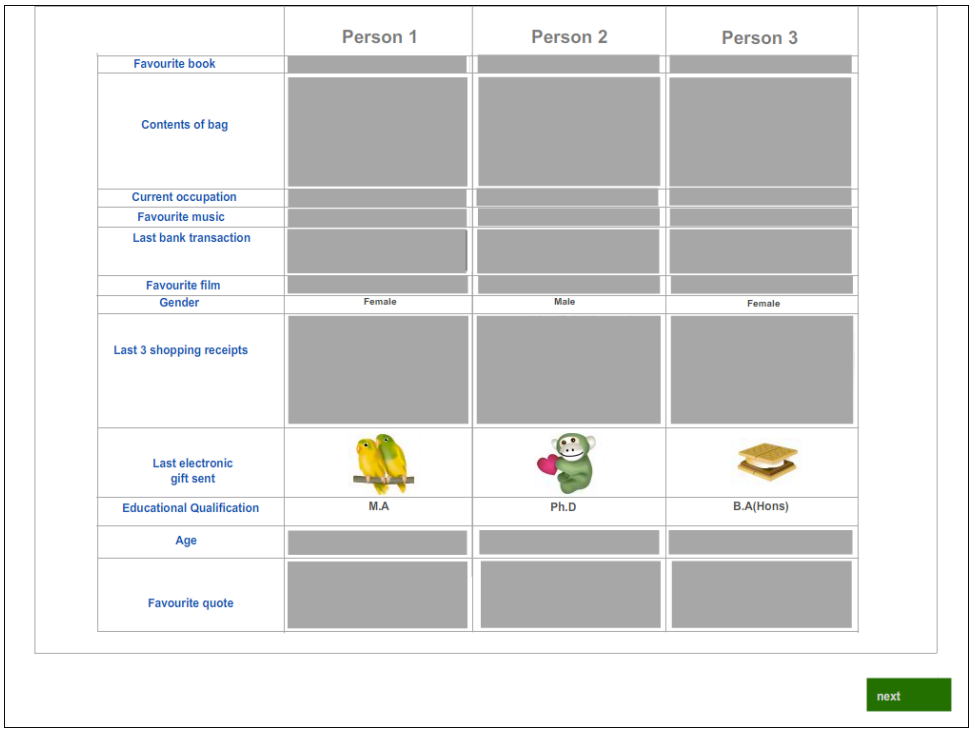

Figure 12. Result screen

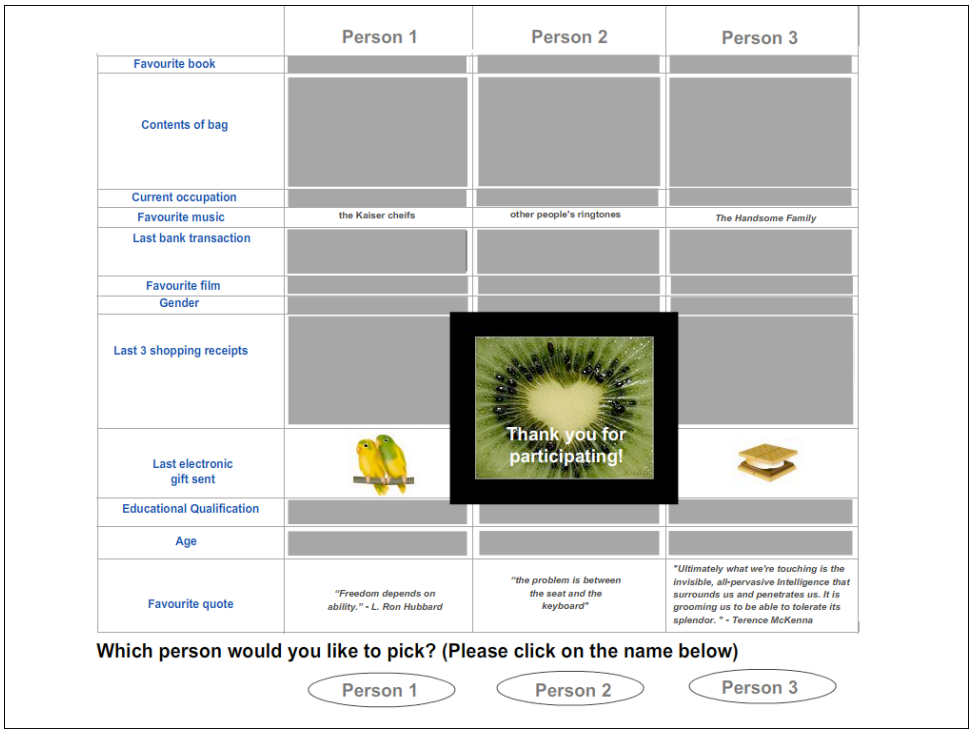

Figure 13. Thank you screen

6.3.c The categories of information included

The respondents were asked to choose three of these twelve categories: age, gender, educational qualification, current occupation, favourite quote, favourite music, favourite book, last electronic gift sent, favourite film, last bank transaction, contents of bag, and last three shopping receipts. The order of the presentation of these listings at the website was randomised across visits to reduce order effects. These categories, chosen as representatives of a wide range of areas of a person's life, are differentiated by how private the information is. The categories fall under three themes. The three themes were not made explicit to respondents. One theme is peripheral information that includes information that is easily accessible such as age, gender and current occupation. Often this type of information is referred to as demographic because it is used to broadly describe populations and is sometimes easy to obtain about a person. The next theme uses preferential information, which is information that individuals tend to keep more private. The preferential information categories used in this project are favourite book, favourite film, and favourite quote. The final theme includes what is usually considered by most people as highly private information: beliefs, values and habits (Nowak et al. 1990). In this project, I represent this information via documents that individuals generate as part of everyday life that is rarely available to others, for instance, last bank statement, last shopping receipt and last electronic gift sent.

6.4 Results

I was interested in which categories were most popular with the participants as an indication of the type of information trustors seek in a trust interaction. To judge this occurrence, I totalled a tally for how often and in what priority a category was selected. The score was totalled according to the following process. A category was allocated three points if it was chosen first by a participant. A category was allocated two points if it was chosen second by a participant, and one point if it was the third (and last) choice. The following is a breakdown of the tallies of the popularity of each category available for participants to select.

Favourite Quote	90
Age	72
Favourite Film	72
Current Occupation	71
Last Bank Transaction	53
Favourite Book	52
Contents of Bag	51
Educational Qualifications	51
Favourite Music	48
Last Electronic Gift Sent	20
Gender	19
Last 3 Shopping Receipts	9

Figure 14. Category selections by participants

Although there are not enough differences in the final totals to draw conclusions about the dominance of one particular information category, the research does show that the information sought by participants is often of a personal nature. Information about someone's personal preference, such as favourite quote and favourite film, seems to be very influential. I found this a surprising outcome and counter-intuitive. Those in the employment and human relations industries usually advise that demographic information, in particular occupation and education, is more closely linked to employment choices and would be sought by participants making a decision in the context of work (see for instance, Puah & Ananthram 2006; Scott et al. 2009).

6.5 Discussion

As mentioned above, participants were recruited via email and were sent the instructions for the task. Most participants who were successfully recruited sent a reply email to notify that they had completed the task. Unlike the project described in chapter 5, where participants found it difficult to comprehend what was required, participants in this project did not have to ask any questions of the researcher and clearly understood the task. After completion of the task, some participants asked for more information about the wider context of the project and

I sent them a summary of my research.

There are several explanations in the literature as to why personal information might be sought by participants making a trust decision in the context of work. Although it is beyond the scope of this research to fully investigate this question, as I am exploring what type of information indicates trust and what processes users adopt to develop trust, the reasons these choices were made will be quickly reviewed. One reason is that personal preference information is more revealing than other kinds of information and thus constitutes genuine evidence (as according to Riegelsberger et al.'s 2005 taxonomy). Another reason is that people tend to trust people like themselves or at least those with whom a sense of familiarity is felt (as indicated by the research of Fukuyama 1995).

Whatever the reasoning underpinning this data, this project indicates that trust-enablement needs to cater for users' desire for a wide range of information to be available. In particular, the availability of personal preference information seems to resonate with users. A challenge for interactive designers working in this area is to balance trustors' need for preferential information with trustees' need for privacy. As mentioned in chapter 1, often the positions of trustor and trustee are not clearly delineated and a user may move between positions. Thus the mainstream design approach of user-centred design is not appropriate to meet the needs of this design situation.

6.5.a Why might personal information be sought? The search for genuine evidence

According to some researchers, trustors may seek preferential information about others even in a context such as work because it may be perceived that this type of information gives an indication of what a person is 'really' like, that it is genuine information that has not been filtered (Bacharach & Gambetta 2000). As mentioned in chapter 1, Riegelsberger et al. (2005) divide the signals to trust into two categories, direct and indirect. There is the direct evidence that a trustor will prove worthy of trust, for instance, a public health professional holding a medical degree. But then there are the indirect signs; these are the signs that are generated alongside the direct evidence.

The reader of the signs understands that indirect evidence is revealing because it takes energy, motivation and creativity to be able to generate these types of signs and thus there is a higher probability that it is genuine. It is unlikely that a trustee would want to make such an investment of resources. People also understand that these signs are a 'moving target'. After a certain context has existed over a period of time, a growing number of people work out how to demonstrate what the 'right' indirect signals in a situation are , and at that point that signal is no longer valuable. Möllering (2008, p. 12) writes that human resources workers receive training to spot when job candidates are presenting fake signals. Candidates, through word of mouth, have heard about these strategies, and are thus prepared to mask any signals of note. Thus a signalling game evolves, whereby candidates generate the appropriate signals in the context and the employment conditions are complicit in this game (Shulman 2007; Möllering 2008, p. 12). The 'shifting target' nature of these signals is one reason they may not have been explored extensively by the research. Researchers might feel that their findings may become out of date quickly. However, it is possible that there are some underlying principles to the process of how the authenticity of trust signals is communicated between trustee and trustor. This issue, however, is beyond the scope of this research. At this point I am exploring at a general level the processes users adopt to explore trust. The nuanced area of authenticity is a dimension within the larger concept of trust.

6.5.b Why might personal information be sought? The search for similarity

Are participants seeking information for the trust decision that can help determine similarity between themselves and a potential work colleague? Fukuyama (1995) argues that we have more trust in those who share our values. Rather than our trust-based decisions being motivated by pure self-interest, our decisions are shaped by the belief that people with similar values to our own will be interested in a positive outcome for the group with whom they identify (Uslaner 2004, p. 30). There seems to be a trend evolving on social networking sites for people to seek out those who share common interests. If this trend continues, participants in these types of environments will only be exposed to a limited range of influences.

However, according to Nooteboom (2004, p. 5), only an understanding of 'what makes others tick', without necessarily 'ticking in the same way' is necessary for trust interactions (perhaps because trust between people is so heavily grounded in understanding the intention of others). Experimental research has demonstrated that participants are more likely to be cooperative towards a human than a computer opponent, and a friend more than a stranger. Even the identification of whom the participant is interacting with can positively influence cooperation (see Charness et al. 2007 for an overview). Cues that reduce social distance tend to increase cooperation and trust.

Therefore it is proposed by some writers in the area of virtual teams that if trust is to be prioritised, then people who are similar to each other should be selected for collaboration (Orvis & Zaccaro 2008). This is a problem for collaboration and innovation, as these pursuits need diversity. There is a lot of research to indicate that the inclusion of diversity, such as ideas and participants from a range of perspectives, improves the quality of idea generation and project value. The diversity could be across a number of dimensions, including age, gender, education and cultural background. The potential for diversity will only increase as the world becomes more globalised, and the technology to facilitate collaboration becomes more commonplace. Individuals who have many connections in networks that are open, rather than having a closed membership, are more likely to have access to new ideas and opportunities (Kosonen & Kianto 2008).

A research area yet to be fully explored is how diversity and trust are facilitated in the context of work. There is a failure by firms to manage the 'knowledge flows across different employee cohorts' (Kang et al. 2007). Grudin (1988) calls for researchers to be more reflective about the processes and intuitions used to pursue research. As a step forward, he suggests studying how different kinds of people operate.

In summary, it was found that participants in the experiment, when seeking information to make a trust decision, placed importance on information that is of a preferential nature. This was a surprising result, given that demographic information such as 'current occupation', 'education', and even 'age' and 'gender' is usually considered by researchers (for instance, Puah & Ananthram 2006; Scott et al. 2009) to dominate work-related decisions. There are several things that might explain this result. Trust research tells us that people tend to trust people that they feel are similar to themselves, or at least have an affinity with. Also, the search for trust evidence is about the search for information that is not contrived and is authentic. Further, it may be perceived that information that is of a personal nature may have the potential to be more revealing about what a person is 'really like'. Regardless of which explanation may carry the most weight, such insights have significance for interactive design.

6.6 Analysis

This section outlines the insights gained from the experience of this project into trust 'in action' that can be applied to the design of trust enablement.

6.6.a Unless a scenario is 'real', participants are not likely to reveal what they might 'really' do.

It is questionable whether participants were actually doing what they would 'really do' in a work-based situation. If this is the case then this is not just a failing of this project, but of all data-gathering exercises which explore an issue out of its 'real world' context. Unless participants have truly motivating needs, risks and pressures (such as time and accountability), then the ability of a project to access what might 'really' happen is questionable. Thus gaining access to the mechanics of trust is fraught with difficulty, because researchers cannot easily

interrupt ‘real world’ events for the sake of adding detail to trust theory. As discussed in section 1.2, exploring trust requires a high level of methodological creativity as well as access to causal mechanisms; this is difficult to achieve for many reasons including ethical ones.

This tells us that when considering the design of trust-enablement, we can only gather approximate information that guides us towards general features of the context. There is a link between ‘gross’ or broad ways, and ‘contextual’ ways a participant interprets a situation, and a researcher needs to identify the relationship between these two modes. We can only comprehend in a general fashion how individuals understand and approach trust because trust evolves in relatively structured ways. However, an individual’s response cannot be fully predicted. A designer of trust-enablement can cater for this function. A trust-enabling environment is one in which there is support for the general processes users adopt to explore trust. Users can then configure the environment to convey and collect the specific trust evidence important to them.

6.6.b In a digital environment with little guidance, personal information about a trustee appears to be important for a trust decision.

As mentioned, our participants sought preferential information as a resource to inform a trust decision, even in the context of work where demographic information such as education and previous work experience are usually held to be the most important determiners of a person. In a similar environment to the ‘stripped back’ conditions in project 1, the environment within which the participants needed to make their decision provided little guidance about what was expected (beyond a quick task instruction). We see again that in this type of environment, trustors become personal about their trust decisions. It seems that when there is little to measure up against, or little to make sense with, trustors turn to the personal to make decisions and create familiarity.

What does this tell us about trust? Trust is neither completely rational nor irrational, as discussed in section 1.2.d, but highly contingent, as asserted by Möllering (2001). It is also a highly personal and idiosyncratic dynamic between individuals that can only be understood in context. So what does this insight

imply for trust-enabling design? If digital environments could allow participants to share the trust evidence important to those involved, then trust-enablement could be facilitated. Perhaps participants could manage the trust evidence they are producing by explaining or offering more information to provide a background for their disclosure. This strategy has the potential to enable trust as users might be able to negotiate on their own terms. This insight will be explored in more detail in chapter 10.

6.6.c The visual design of trust-enablement requires a consideration of what the project is trying to evoke. Thus what state of mind does a designer want a visitor to a trust-enabling site to be in?

An insight gleaned from constructing this project is that the visual design of a trust-enabling environment is fraught. Visual designers usually work with a brief that describes what the imagery, layout and other design elements should evoke. The field of 'branding' has researched how visual images can generate different messages, which can be controlled to manipulate and motivate the viewer. I did not want the website to appeal to one worldview over another. I also did not want the website to appear 'corporate', with clean stock imagery and controlled use of fonts (indicating a level of prioritisation of the information). The end-result therefore was a 'prototype', 'in-development' appearance, as if the project was constructed in a hurry with little planning or concern. Interestingly, I got the impression that some of the participants wondered about my design skill. Why did it look so rough if design is my trade? I also felt during project construction that the stripped back appearance of the project made it less likely to qualify as a cultural probe because the project does not appear 'playful' or 'innovative' and tends to evoke the style of a survey. A level of embellishment may have given it a more 'arty' appearance. I also believe that the design style of the project prevented it from being a 'creative/practical' project that could be submitted as part of the practical works undertaken in this research.

The problem for trust-enablement is that there is no such thing as neutral design. All visual design evokes some sort of image and association for the viewer (Thaler & Sunstein 2008). What sort of presence is appropriate for trust-enablement? As I discuss in section 9.2, trust researchers working in the area of

technology design have developed heuristics to promote the appearance of trust (for instance, Egger 2003). Hence, people are more likely to trust 'professional' appearing websites, especially in the area of finance and trading. However, the aim of trust-enablement is not to merely give the façade of trust, because this might not be a valid position for the user. In fact, there are reasons to doubt such 'facades' in any case. Recently, there has been publicity regarding highly professional looking websites that are illegitimate and have convinced users to part with their money (Ivanitskaya et al. 2010). Perhaps as users become aware of such cases, 'professional' looking websites will not automatically be deemed trustworthy. The appearance of trust is a 'moving target', changing as those who want to appear trustworthy adopt and present certain evidence, and are then revealed to be untrustworthy (Möllering 2008).

Trust-enablement does not aim to present the façade of trust but to enable a user to make up their own mind. What type of visual design style facilitates this mission? It could be argued that a design that 'strips back' visual elements as much as possible might be the solution because it allows the user to make an uncluttered decision. However, this is an aesthetic style in itself and is culturally coded on many levels. For instance, designs with minimum detail may be understood as 'corporate' or 'cold' by a participant, and perhaps even encourage a participant to make a decision with these types of values in mind. Different nationalities have different design styles and values. Something deemed as 'accessible' from one culture maybe appear incomprehensible and alienating to someone from another culture (Bourges-Waldegg and Scrivener 1988).

There is no straightforward solution or formula to this question. If users are to create a shared context together, then one of the elements that needs to be created from scratch is the visual appearance of the digital environment that the users are operating within. As well as the visual design, the interface design also needs to be resolved including how information unfolds and how the project is navigated. A digital environment that can achieve these aims also needs to be flexible and adapt as a work in progress; the preferred type of environment shared between individuals may take some time to evolve, as participants unfold and

negotiate their preferences. The challenges and complexities around shared context and design are discussed further in chapter 10.

The determination of design style is linked to the question of what state of mind we want users to be in when making a trust decision. Working from the position that trust cannot be thought of in isolation as it is always context dependent, what role do we play as designers of a digital environment? Even if an environment is designed that users can configure to their own needs, a designer shapes an environment to a certain extent. What input do we want to make as designers? Do we want users to be reminded of alienation, corruption and exploitation? Would this force a position of distrust? Perhaps relaxing users is the aim? Cofta (2007, p. 106) argues that users need to be kept vigilant to try to balance the paths of trust and distrust for as long as possible. In this case, an aim for design is to help a user maintain complexity. The relationship between the user's state of mind and trust-enablement is, however, beyond the scope of this current research. The issue leads into fields of enquiry at philosophical odds with the platform of ethnomethodology that this research accesses. Ethnomethodology focuses on the outward demonstrations of human behaviour to create interpretations than drawing inferences about individual's internal worlds.

6.7 Conclusion to chapter 6

This project explored how trust works in the context of virtual teams; in particular, it examined the evidence those in a virtual team seek when considering colleagues, trust and collaboration. By understanding what categories of information are prioritised in this scenario, a designer can gain insight into how participants in the context of work form trust and familiarity. Participants were given a scenario where they needed to pick someone to work with in a virtual team. The exact situation was kept uncertain, and little guidance was provided to participants in order to find out about how they create context and trust when cues and guidance are minimal. The participant was told that to find out about the possible selections, they were able to choose from different categories of information about the fictional colleagues. Insights were gathered by calculating which categories were the most popular with the participants. No single category

was significantly more popular than others. However, information about the personal preferences of candidates rated highly. It was striking that demographic information usually associated with the workplace and the selection of workers, information about education, previous employment and current occupation, was not more popular. When a context is uncertain, and users need to create their own context and sense of trust, idiosyncratic understandings of trust arise. It seems that although trust is idiosyncratic, it evolves in relatively structured ways.

The project produced three insights. Firstly, trust is personal, idiosyncratic, and somewhat inexplicable. Similar to the insight gained from Chapter 4, when the focus was the provision of minimal information to make a decision, our participants sought personal information as a resource in order to trust. This is surprising, as the domain of work is usually associated with demographic information rather than information of a more personal nature. The project is a working example of how trust is neither completely rational nor irrational. The highly personal and idiosyncratic dimensions of trust are also highlighted. Certain implications for trust-enabling design follow. As has been established in this thesis, trust can only be understood in context and not fully pre-empted. If digital environments can allow participants to share and also manage trust evidence important to those involved, then trust-enablement can be facilitated. A more detailed discussion of these issues follows in Chapter 10.

However, secondly, the ability of any data-gathering project to access what is really going on is under question. Unless motivated by a 'real' set of concerns, it is questionable whether participants produce the same data as they would in 'real life'. Therefore, we can only understand generally how individuals understand and approach trust and look for the relatively structured ways trust evolves. Thus trust-enablement is achieved by creating environments within which there are general ways of working that can be configured by users to convey and collect salient trust evidence.

Thirdly, the visual style of trust-enabling design is fraught. All design convinces the viewer of some sort of message (to varying extents), but the agenda of trust-enablement is to facilitate people to be able to make up their own mind, with as little interference as possible. Design and trust-enablement are therefore at

cross-purposes. The way forward is to create environments that are infinitely configurable by participants. Thus design is a tool for participants to work through and reflect on trust evidence. The challenges involved with this strategy are discussed further in chapter 10.

Now that trust has been explored from the perspective of virtual teams and the selection of colleagues, we will turn to another work-orientated area: trust and professional judgment in the area of film curatorship. In this next project, rather than asking participants to select from pre-determined categories, I ask participants to show me (via the device of the cultural probe) what type of information they focus on in a trust consideration. I find that participants seem to select similar areas of a document but apply varying interpretation.

Chapter 7: Trust in the context of professional judgment, in the area of film curatorship

This project explores how trust works in the domain of professional judgment, in particular in the area of film exhibition and curating. To undertake this exploration, in October 2009, I studied how a group of film professionals navigate the data the film industry produces (such as synopses, reviews and festival guides). Film professionals were asked to choose a document and highlight information they felt to be reliable or trustworthy. The trust at stake in this context seems to be how seriously to take the opinion of others: the credibility and the authenticity of the information. Participants were sensitive to the interplay between what could be described as 'factual material' and its representation by different writers.

Each participant had different heuristics developed as part of their professional practice to weigh the information and look for different indications to trust. For our group of participants, trust developed in relatively structured ways, but participants had personalised techniques informed by what qualities were the most important to them. Participants also seemed to enjoy the process of drawing trust conclusions. This application of their skill appeared to be something they enjoyed as part of their everyday work, and their observations of material are discussion points to share with other film professionals. It could be argued that the development and exchange of these trust insights is a form of professional self-expression.

7.1 Background research

The domain under consideration is also part of the wider research area of Knowledge Management (KM), the area discussed in chapter 6, as well as the research area of 'recommender systems', which explores how a digital environment can provide automated yet personalised suggestions to a user based on his/her previous behaviour, selections or purchases. An example is the system Amazon (the ecommerce website) uses. When a user purchases a book, she or he is given a recommendation in the form of a message, 'Other people who chose this book also bought the titles featured below'. The research area is very

interested in how films can be recommended to users. This application provides an opportunity to explore the nuances of an individual's taste when there is a very large selection. Insights into film recommender research can be applied to other more de-limited domains.

Recommender system research was traditionally orientated around improving the accuracy of systems but now a broader set of aims is being explored, such as satisfaction, acceptance, transparency and serendipity (Amatrain et al. 2009a). In addition, there is more scrutiny into why a system should have certain aims. Is a system supposed to be persuasive (convince the user of a certain position), effective (present credible information), or reflect another goal wished for by the system developer? Tintarev and Masthoff (2007) also demonstrate that a system that provides critical recommendations allows the user to understand the reasoning behind the recommendation, and thus receives trust from users in the form of acceptance. Research by Urban (2005) argues that users appreciate a service or a provider working in their interests and respond with loyalty.

'Explanation systems' is a developing research area within recommender systems that works on the notion that the provision of explanations around a recommendation can boost the transparency, effectiveness and trust of a system. The strategy is to tell users why a recommendation of a system has been made. An example of a simple explanation is 'If you liked this film, you will also like this offering'. As recommender systems develop, the delivery of explanations will become more fine-tuned. An example of a more developed explanation is 'If you agree that the strongest part of the film was the soundtrack, then it is possible that you will appreciate the following offerings'. According to Pu and Chen (2006), more work needs to be undertaken into how explanations create trust and the impact on long relationships and return visits from users.

Research that investigates from a participant's perspective how trust is enabled can contribute to a wider investigation into how an explanation system might best be implemented. Recommender systems are also becoming more embedded in social contexts. Sinha and Swearingen (2001) explore how users trust the recommendations of friends and peers more than strangers. 'Collaborative filtering' assesses how the tastes of one user may be applied to

another and thus how much the choices made by one user can be successfully suggested to another. Users can also observe the choices and reviews of others in these types of systems (Avesani et al. 2005).

7.2 Methodological Issues

7.2.a Participants

Six participants were recruited via email request. I was able to access this group because they were work colleagues. All participants are film professionals – curators at a public film exhibition institution. The notion of a professional or an expert needs to be approached with caution. Turner (2001) points out that it is difficult to draw distinctions between experts and non-experts. However, there can still be value in studying how certain groups of people bring competencies to a situation. Amatrain et al. (2009a), for instance, have studied film experts in order to improve an algorithm. They define an expert as 'an individual that we can trust to have produced thoughtful, consistent and reliable evaluations (ratings) of items in a given domain'. The professionals in my study had well-developed processes with which to judge the trustworthiness of material.

7.2.b Participant task and experience

This project is a cultural probe. Participants were given an open-ended task: 'Please select a document or resource used in your everyday work. Where in these pages are the indications to trust, as you define trust? Please mark-up the instances on the page and explain them to me at your convenience'. During a pre-arranged ten-minute session, participants then explained the notes to the researcher. I transcribed their comments as they spoke. The notes written by the participants on the documents worked as a springboard for further discussion. The activity had some structure but allowed the participants to apply their expertise. The nature of the approach also meant that participants could bring their own working definition of trust to create a context.

Participants were not asked to articulate their definitions of trust. During piloting of this probe it was found that defining trust is a demanding task and takes a participant's focus away from exploring how trust is manifested. Exploring trust is difficult because it is an embedded and everyday process that is

'taken for granted'. This is why this study was undertaken via a cultural probe in the form of marking up a film document. The participants chose the following documents to use: '*The Melbourne Film Festival Guide 2009*', '*Cannes Festival Guide 2009*', '*Sydney Festival Guide 2009*', '*British Film Institute Newsletter*' and a website, '*www.aintitcool.com*'. These are documents and resources this group already uses to research new developments within the film industry. The text in these documents usually includes 'facts' about a film (for instance, director, producer and distributor) and a synopsis describing the film. The insights, which attempt to bridge theory, application and the issues concerned with the practical implications of trust-enablement, are documented below.

7.3 Analysis

This section outlines insights produced from the experience of this project into trust as a practical accomplishment that are useful when considering how to design the enablement of trust.

7.3.a Professionals have a set of techniques to analyse trust that are part of a personal professional development.

Like anyone undergoing a familiar activity, the participants had processes to apply to the reading of a film guide. However, each participant had an individual style and different emphasis on what trust information is valued. For instance, one of the film professionals valued authentic information; in particular, whether the writer was from a marketing company and the text was generated for an advertisement or whether the text was someone's genuine opinion. Another participant was sensitive to the claims being made by a text and whether the claims were exaggerations. On the other hand, the manager of the unit viewed the information in terms of how the general public might perceive the information.

> It is about, 'What is the grabber?' And this is the key image first and then the title of the film. The key image is to work as a tonal reference for the film. It needs to be a true indicator for the film and this is true for the Cannes catalogue.

How publicity material for a film is understood by members of the general public is of concern for this participant. He wonders what first catches their attention (the 'grabber').

7.3.b There is interplay about the 'facts' presented in a document and how those facts are presented.

Participants seemed to shift focus between the two modes of analysing facts and then reviewing how the facts were presented and who was presenting them. Even the inclusion of facts by the writer of a resource is regarded as significant. One participant commented on the provision of factual or background information in a guide:

> It is collegial to do this. Their message is that they are providing this for you and you don't need to do this work for yourself when you might want to use this film at a later point. It also gives a sense of the layers behind a film by bringing up the focus on the director and other people involved.

This participant appreciates it when she is offered research material by the writer of a festival guide and interprets the offering as a sign of trust.

The participants use processes and prior knowledge to filter 'facts' about a certain film and to form interpretations. The reputation and credibility of certain players in the industry play a role. For instance, when reviewing a festival guide for the first time, one participant said that she draws heavily on the 'facts' about the film. The facts being weighed include, 'Who is in it, who made it, who distributed it?' The participant gave an example of a particular distribution company and said, 'usually I see everything they own'. The particular festivals at which the film has been shown also seem to matter. Some festivals are weighted heavily. Others are seen as less important.

When the focus moves to how facts are presented, attention is given to how the words are used to convince or inform. Often the synopsis of the film comes under attention because this is where the use of text is the richest. There are

many ways to write a synopsis, from stripping the text back to the bare essentials that describe the plot to writing the synopsis in an evocative and perhaps convincing fashion. The reflections of the participants demonstrate the complexity behind the design of text, context and trust. The renowned Cannes festival was provided as an example of a festival that provides a stripped down synopsis:

> This is because this festival does not need to convince, they can bank on their reputation and assume prior knowledge on the part of the reader. Their synopses are 'unclouded', there is no sell and the audience is left to make up their own mind.

The participant believes that the reputation of the festival has affected the style of communication used in its festival guide. There is little attempt to try to sell a film to the reader, and the text does not contain persuasive content. However, another participant thought that this approach might let a festival down.

> Sometimes as a reader you are wavering and you need to be tipped over, one way or another. It's not about which film is better but what mood do I want to be in. You may also be looking for a particular mood or tone for a particular audience. You need to know what gravitas the film is.

This participant points out that in some situations the reader wants to be persuaded and influenced. Another participant gave an example of an evocative synopsis that worked well for her. She reflected,

> It makes the reader excited. In a nutshell you know what it is about. I know it will be a bit sad, a bit funny. You also get a sense of the director and you can read about what else they've done. You are convinced that you should see it. When a convincing synopsis like this is not presented for a good film then it's cruel because people miss out on seeing the film.

A convincing synopsis should tell the reader about what a film is about, and provide a sense of the director and his/her previous work, according to this participant. She believes that it is the duty of a writer to advocate for a good film.

Other readers might look at the claims made by writers and distrust statements that are too ambitious, are not possible, or are trying too hard to persuade. One reader gave specific examples. On her document she highlighted words that are used to convince a reader, which in this example were mostly adverbs and adjectives. She explained:

> This is not directly about making me trust or not trust, but the points where a claim has been laid, and I need to be able to see or judge for myself. A qualifier has been made that I don't need.

This participant points out that when a claim and qualifier are made by a writer, she would prefer to be able to make up her own mind. The adjectives highlighted by this participant included 'a thrilling plot', 'mind-blowing film-making', and 'amazing soundtrack'. Verbs and adverbs that denoted a sense of quality were also problematic such as 'honouring', 'best-loved' and 'acclaimed'. The participant commented,

> Perhaps these claims could be over-statements, for instance in the case of the use of the word 'reflect'. Perhaps the film does not do this, and this claim is an exaggeration. Maybe the film only presents rather than reflects.

Sometimes claims by writers might be exaggerations, points out one participant. She drew attention to the words 'enjoy so much more' in the introduction of the text. 'How do they know that I will or won't?' the participant commented. She also highlighted the text lines 'Be among the first' and 'spaces are limited' and commented, 'These lines make you wonder what they are trying to convince you of'. Claims by writers raise suspicions concerning what they are trying to convince the reader of. The writings of Goodwin might illuminate what is happening here. In his work, 'Professional vision', Goodwin (1994) argues that the demonstration of professional expertise is not necessarily a property of seeing

or thinking. Expertise instead is closely connected to discursive practice, which is how professionals in a certain domain shape different occurrences or 'objects of interest' to fit professional scrutiny. This includes the scrutiny of other professionals. Different opinions can exist within this system, understood as varying perceptual frameworks.

7.3.c Original as well as authentic information is valued.

One principle noted by a participant was the necessity for original text content in a film festival guide. She argued that it is easy to spot when text has been lifted from a press release by a film's maker or copied from another source. 'It comes across as lazy and you wonder why the festival could not be bothered to write their own content', she added. Another participant explained that a combination of professional knowledge and personal background information can explain the motivation of the writer and provide insight for the reader. The participant believed this style of text content can assist in propagating trust. He comments that:

> It tells a story and where the writer is coming from because you also get a sense of the writer's passion for the material. It's also a way to tell if the information is authentic and not planted by a marketing company. It takes care to write this text.

For this participant, access to the writer's motivation can provide proof of authenticity. The posting of bogus messages on sites by some distribution companies is a common practice. The provision of background explanation is a means to be able to filter for authenticity in order to guard against this.

7.3.d The design of trust-enablement involves common-sense. But other aspects are more complex and require nuanced solutions that do not lend themselves to automation.

There are some straightforward and 'common sense' recommendations for trust-enablement design, which is evident in the 'vision' of these professionals. For instance, the provision of background information is considered collegial. Authentic information, written with personal opinion rather than disguised

marketing, is also valued in the consideration of trust. Readers prefer to be informed than to be subjected to advertising. However, beyond these 'common-sense' recommendations, the means to enable trust becomes complicated with no clear path forward that will work for every user, and is highly dependent on the conditions of those participating in the interaction. As described in 7.3.b, some film professionals prefer a document to only include factual information, and distrust when a writer attempts to make a claim. However, other film professionals see a need for evocative and convincing text and believe it can contribute to trust. It is apparent that trust-enablement is not compatible with easy solutions that can suit all users.

This complexity creates a problem when considering how research can be conveyed to examine domains that prefer a single holistic solution, for instance, business and computer science. Recently at British Telecom, I was asked to summarise my insights into trust-enablement. On one hand, I was claiming that some film professionals preferred text with the adjectives and adverbs stripped out. On the other hand, I was of the view that some professionals see the need for a synopsis that convinces, utilising adjectives and adverbs. I was asked to provide a recommendation that could apply to communication with a broad audience. I could only suggest a strategy of the writer providing explanations of his/her writing, so that the motivations behind the text were accessible to the reader. The reader is then in a position to make up his/her own mind. However, this strategy does not lend itself easily to sustainability or scalability. It takes time to both write and read this type of text (this strategy is discussed further in 7.3c).

As discussed in section 1.3, efficiency and time saving are one of the aims of digital environments, which is why business and computer science seeks automated solutions that can be applied in all situations. There is a tension between designing and catering for the complex, personal and idiosyncratic nature of trust and designing for the automation that digital environments have traditionally been driven by. There are, however, solutions to this dilemma. For instance, perhaps the process of reading and writing recommendations can be designed to be an entertaining process in itself so that it can be considered exempt from the requirement of efficiency usually deemed necessary for the design of

digital environments. Participants found pleasure, the opportunity for expression of self and also professional proficiency, in the act of deciphering trust. A potential fruitful research path is an examination of the pleasure of recommendations. How can the process of recommendation, either providing or receiving advice, be regarded as a significant social activity and how can the motivations and pleasures around this act be brought into the design of digital environments? This issue is pursued further in chapter 10.

7.3.e Trust evolves in relatively structured ways. How can a design cater for this?

While trust is complicated and highly idiosyncratic, this project demonstrates that it can evolve in relatively structured ways, with the final analysis left to the discretion and idiosyncrasies of the trustee. The participants approached the activity of finding trust with similar processes; they just had different interpretations, perspectives and preferences that determined their trust perception. All participants differentiated between facts and the presentation of facts. They read 'in between the lines' of what the presentation was saying about the authenticity of the material and also the motivation of the material's writer.

However, while using certain processes, participants placed emphasis and importance on different values. For instance, the manager of the film unit quoted above operated from the perspective of how general public audiences might perceive the material, and what the 'grabber' might be for a potential viewer. He is imagining the way in which a potential audience might understand how a film is represented, what one might expect of the material offered in a film, and whether these expectations will be fulfilled. On the other hand, one participant, a film curator in this case, was also looking at the effect of the words, but with a different view. Her perspective was based on whether a film was properly represented. She described it as 'cruel' when people missed out on seeing a good film because the synopsis was not appropriate, perhaps because it is not convincing enough. However, another participant also examined the interplay between, on the one hand facts, and on the other, evocative and convincing writing. But in this case, the participant was suspicious of claims and did not want

to be convinced. She said, ‘I need to be able to see or judge for myself. A qualifier has been made that I don’t need’.

This project demonstrates that trust evolves in relatively structured ways. All participants attended to the interplay between facts and how they are presented. The participants had different preferences and priorities about how they arrived at trust or distrust. How can we leverage off this function of trust to build on how trust evolves in relatively structured ways? A solution is to create digital environments within which individuals can apply their idiosyncratic perceptions to a set of processes. Thus the design of the digital environment can assist trust-enablement by facilitating the processes used by participants to arrive at trust (or distrust). This issue is pursued further in chapter 10.

7.4 Conclusion to chapter 7

How trust works in the domain of professional judgment in the area of film exhibition and curating was the subject of this project. A group of film professionals were asked to undertake a cultural probe. The participants chose a document that they used in their everyday work and marked on it the points in the text where questions of trust and distrust was an issue for them. Trust, as broadly defined by the participants, is how to weigh the value of information as represented in written documents by other film professionals. Credibility and authenticity play an important role. In the next chapter, I build on the insights from the design of this project to explore trust in a highly emotional context in order to investigate what types of negotiations participants regard as important.

The project in this chapter suggests that there are some commonsense strategies that can inform the design of trust-enabling environments. For instance, the provision of factual information in a film guide, which is time-consuming to source, expresses collegiality towards other film professionals. Once explorations move past these more obvious aspects of trust, trust becomes complex and idiosyncratic. Professionals have a set of techniques to comprehend trust that are part of personal professional development. For instance, the manager of the film unit analyses the interplay between text and image and how this will attract audiences. There is interplay between the facts in a document and their

representation that is filtered by a professional to reach a judgment. Attention is given to how the words are used to convince or inform. Often the synopsis of a film comes under most scrutiny because this is where the use of text is the most complex. Some readers are dissuaded if the writer of a document is trying too hard to persuade or makes overly ambitious claims. One participant outlined a style of information presentation that he finds trustworthy, stating that the combination of personal and professional argument in a text can help explain the writer's perspective to the reader. For these reasons, it seems that trust evolves in relatively structured ways. However, professionals differ in how they prioritise different values and interpret the intricacies of trust. While different participants had a range of perspectives and priorities when considering trust, they used fairly similar processes to arrive at trust judgments. These processes can be designed into digital environments to help enable trust, and can be a feature of the agenda of shared context raised in this chapter and pursued further in chapter 10.

Chapter 8: Trust in a highly emotional context: the road trauma documentary project

8.1 Introduction

Trust in a highly emotional context, when those involved are interconnected in the same community, is the subject of this chapter. What happens to trust in traumatic and emotionally difficult circumstances? Learning about trust when feelings are amplified can provide insights into how trust works in more ordinary situations. This chapter explores what trust means in a local context where everyone knows each other and there is the option for technology-mediated communication. Trust in local communities has always involved a level of negotiation but technology has increased the possibilities for and also the speed of the distribution of information. The practical project used to explore these perspectives on trust is the making of a documentary that examines the reasons behind the high number of young men dying in car accidents in a remote part of North West Tasmania. Most of the material for the documentary was created in 2009 and 2010. Viewers can share the experiences and worldview of those featured in the documentary. Members of the community, referred to in this chapter as participants, were involved in the making of the documentary as well as providing stories and testimonies. As a designer who wishes to create digital environments that are trust-enabling shared contexts, I believe I have an obligation to learn how the participants believe trust should be constructed.

Participants presented several suggestions about what is important for trust-enabling design. Understanding where others are coming from in order to achieve a convincing shared context was central for the participants. Authenticity (c.f. Portigal & Jones 2009), whether a testimony reflects ‘what really happened’ or ‘how things really are’, is an important ingredient of the shared context. However, the drive for authenticity needs to be balanced against the need for sensitive information disclosure, as how to best handle the feelings and insights of others was a central theme accompanied by a concomitant need to do ‘what is right’. Anticipation and consideration of how others might perceive the documentary was a critical aspect of several stories. The potential for betrayal through mishandling information was at the forefront of the interactions discussed by participants. You

might say that ‘mistrust’ rather than ‘trust’ was the theme of the project. Various dimensions of trust were interwoven for the participants, demonstrating how trust works on several levels simultaneously. The project research also highlighted how trust is not always transactional but can instead emphasise ongoing relationships.

This chapter lifts and interprets comments out of a voiceover recorded for the documentary’s website to use as participants’ insights into trust. Working from this voiceover was a rich means to study trust in this domain because it gives insight into the processes by which those involved make sense of their predicament. Any form of data collection that was more interventionist would not have been appropriate in the circumstances for the people involved. At the time the voiceovers were recorded, the documentary was finished and had recently been screened. The event of the recent screening had given participants the opportunity to reflect and understand the project as a whole. As our participants know each other and are part of the same wider community, a theme of this chapter is also the nature of trust when participants are known to each other and are members of the same community.

8.2 Relevance of this project to understanding trust in less fraught circumstances

The highly emotional domain of this project amplifies the complex underlying processes that participants use to make sense of what they should do in a context. Although everyday situations are usually not as fraught or emotional as the context under consideration here, it is likely that everyday communication between people who are co-located does embody similar interpretations of trust that include sensitivity to others and authenticity of information (Giddens 1990).

The research of Troshynski et al. (2008) establishes a precedent for studying extreme situations in order to inform how we understand more everyday and average use of technology. Troshynski et al. (2008) study the use of surveillance bracelets on criminals in the U.S. and the wearers’ perceptions of the technology to develop findings about how mobile locative technology can make users accountable and feel constrained by their devices. This research was used to argue that the feelings these ‘extreme’ users had of the technology are shared to a

certain extent by other users with mobile devices not forced on them by law, and that the extreme circumstances he studied only amplified the dimension of control mobile technology brings with it.

8.3 Background information on the documentary

This research is based on a documentary that explores the reasons behind the high number of young men dying in car accidents in a remote part of North West Tasmania. The project was funded by government bodies including the Australia Council, Attorney General's Office, and Screen Tasmania. It forms a television show to be screened on Australian national television in 2011. The geographical terrain of this area is harsh, hilly, and difficult to access. It is also an aesthetically beautiful area. In some testimonies we hear that the ambulance attending the accident took two to three hours to arrive at the site. There are few places for young people to go out and the places where people live are dispersed. People in the community may not know each other well, but have heard of each other. The director and producer set out to make a film that was an engaging testament to and narrative about the community, but was also an effective persuasive tool to convince young male drivers to be careful.

The documentary we discuss here includes, as its most significant material, interviews with different people across the community who have been affected by the trauma of road accidents in the area. That is, the makers of the documentary interviewed people who had been affected by local road trauma (as survivors, as friends and family of survivors, and as friends and family of casualties). In generating voiceover content for the documentary, its makers effectively interviewed themselves as well. This paper explores moments when those interviews reveal the participants' views on trust in the community, both how they found it and how they feel the project influenced it. In so doing, we show ways in which trust is not necessarily transactional, but can instead emphasise the value of ongoing relationships. Participants created content, including editing and filming, as well as being subjects of the documentary. Eight participants created a ten to fifteen minute voiceover segment each. The voiceover offers guidance to visitors of a website (that contains clips from the documentary).

The principle of selection was to identify quotes that reflect on trust relations within the community, within the documentary project team, or between the community and the project team.

8.4 Methodological issues

The participants on this project were brought together by the creation of the documentary, following big hART's well-established procedures for recruiting participants (Big hART 1996). A committee, consisting of people from different walks of life, such as social workers, teachers, police and youth volunteers, was established in each town that hosted the project. I was able to access the project through my previous involvement with the big hArt group and my involvement was heavily mediated by the project's two directors.

I asked eight participants, who were core members of the project delivery team, to reflect on how they knew people in the project and their feelings about the project. Their conversations were recorded. I transcribed the material for the purposes of this research. The material will be used to link the different video material available at the website. The aim is to present material as unified parts rather than a disparate selection of clips that can found at many website portals. An important part of the project is the connections between the different people involved and the lines of grief that exist in the communities. The original plan for this project was to provide participants with a cultural probe containing paper, pen and numbered index cards for every film clip and a request that they draw maps and include the number of the clip. This was quickly found to be an inappropriate form of study, as many of the participants have a low literacy level or feel uncomfortable writing.

In parallel with the film professionals' project described in Chapter 7, participants were not asked to reflect on trust. Asking participants to define trust requires too much conceptual work on the part of the participant because it is too abstract and can make the participant feel unnecessarily pressured. A lateral approach instead frees up participants to raise the issues that are of concern and provides a working definition of what trust means. In this highly emotional context, trust spontaneously emerged as a topic.

8.5 Analysis

This section reviews the data and provides an interpretation of how trust is constructed by the speakers as a practical accomplishment. I analyse how the participants understand the processes of trust and the role of trust within the project and in the life of the community.

8.5.a. Supply users with the tools to reach trust-enablement on their own terms.

One of the directors of the project, drawing on his experience of working on the project, believed that young men do not respond well to being told or forced to receive a message. This insight can be applied to how other types of users function. Instead, he suggested that people should be given 'tools' to arrive at conclusions themselves. This insight has a synergy with the agenda of trust-enablement: the examination of how users can reach relationships or decisions on their own terms. He reflected:

> I think that until you can accept how things are, to see things without them needing to be in a certain way, you cannot have change. A huge issue with the film; it represents something as it is. I hope that thing is the thing between 15 and 20 where you are larger than life. How are you going to get through to that? You need to give them the tools to get through it themselves. The only way change can happen is when people feel like they are getting to it themselves and are not coerced. When you tell a young man to do something, he is geared to think, 'I am an individual, I make up my rules. Whatever you give me I will break to express my independence to show you how powerful I am in my early manhood.' (Joe – director of the project)

The director of the project suggested that to communicate, especially with 15 to 20-year-old men, one needs to hand them tools to make up their own minds. Forcing a particular view of the world does not work. Thus Joe has identified that if a project is to successfully communicate, the designer of the project needs to provide the tools for users to reach their own conclusions. The question from the

perspective of trust-enabling interactive design is: what are the tools that help users reach their own conclusions? And what are the biases embedded in these tools? Are they designed to convince a user of a certain position? These questions are explored in part 3. Another project participant describes how a message can be received and an impact made once a connection has been made (Project Participant 1):

> Luke's story is so in 'your face' and confronting. In rural Australia everyone can link it to someone they know. There's nobody who is impervious to those goings on. It's just so common. It's very real. I sat next to some dudes at a screening, and I know there are some dudes that drink and drive and stuff. But you see that they have the fear of god in them when they watch that interview. You see sense run through their bodies, even if it is just for 30 seconds. It puts a thought in their heads like, 'I drove on that road last night' or 'I drove home pissed the other night'. Hopefully it instils a message in people that everyone is susceptible. You certainly see it in them that first time people watch it. I've watched people's reactions. I've probably watched that clip four times with different people every time and watch their reactions. It's always been dramatic. It surprised the hell out of me.

The participant points out that one particular story is very confronting because those living in rural Australia can connect the story with someone they know. He adds that he has observed an impact on those who watch the story.

8.5.b Trust-enablement requires provision of an overarching framework.

Another participant pointed out that the sense of a context can only be gained with an overview, and an understanding of how all the parts of an issue fit together. Trust-enablement is fostered because the participant is in a position of understanding. The participant explains his view (Project Participant 2):

> Throughout the film and just doing little bits and pieces, to be honest, it didn't affect me much at all. But then sitting there last night and that, seeing it all…having the whole thing hit you last night it's like, it had a big impact I suppose. Just like, it sunk in.

> Does that make sense? Just how basically how [sic] stupid it is, like getting pissed or whatever, being a dickhead in your car. Definitely Paul's story stood out for me. I wasn't best mates with him or nothing like that. Just Jane there (Paul's mother), when she is just laying it all out the impact, how it has affected her.

This project participant reflects on how the provision of a wider context allowed him to comprehend the material in the documentary. This suggests that a digital shared context should aim to provide participants with a macro view of an environment as well as the possibility of accessing interactions at the micro level.

8.5.c Understanding others' perspectives as a foundation for trust.

Another participant focused on the role of conviction and persuasion in the creation of a shared context. Giving a user insight into how another approaches a situation, and the processes used to deal with a situation, can allow a user to understand another perspective. Providing the opportunity to experience another perspective can work well to get a message across. Trust research literature has often raised the link between understanding and trust, which equates to familiarity as a key ingredient of trust. Nooteboom (2006) maintains that trustors and trustees exchange information in order to establish insights into each other and the grounds for familiarity. Luhmann (1979) argues that the familiarity process in itself begets trust. Möllering (2001, p. 417) believes that a core question in relation to understanding trust is: what are the processes people use to establish familiarity? The participant's testimony below provides detail into how someone the participant interviewed was able to convey a sense of how the interviewee functions (Project Participant 3):

> When I recorded him he was really in depth in what he was trying to explain. He gives a soft side with what he has been through. He is well and truly a great bloke in a zone where he can understand. As you can tell as he is talking about his son, if you listen to his full story, and how he went past every little bit of road and how he explained it that day, it put an edge on it for me, I could understand him. When you go past a roadside memorial, you can taste, feel and

> smell all the screaming and all the anguish and pain. I didn't think it would click on to me. So I'm driving down the highway, and I pull over, and I don't even know the bloke it was. And I saw this cross there. And I was thinking the exact same thing he was and I was thinking that I get what he means. You can just imagine what happened to them. Your imagination just starts going crazy. If you were an ambulance driver you would be crying in your car. He 'middles' himself.

Thus Project Participant 3 describes the process by which he could understand and emphasise the perspective of another. He explains how he was motivated to experience the viewpoint of an emergency services officer. This same participant also provided an example in which he found it initially difficult to understand the perspective of the person he was interviewing. He believed it was because her situation was so extraordinary. The participant's observation indicates that people or contexts that are more extreme or more outside what is considered to be average or everyday have a more difficult time in establishing a shared context and perhaps trust.

8.5.d Information disclosure: how are others affected?

Sensitivity to information disclosure and how to best handle the feelings and insights of others was a central theme including the responsibility participants felt. Anticipation about how others might react, including think or feel, is a core component of the trust process. It is the valuing of intention over outcome that makes the ways in which people think different to how computers regard trust. Computers can only measure outcomes and do not process the subtleties of intention (Nooteboom 2006). Within an interaction, our participants considered the different perspectives and the impact of information disclosure. For example:

> She was a very good interviewee. When we interviewed her it was kind of hard in one way [to] put yourself in her shoes. For her, what happened was pretty extraordinary. The first interview that we did was inside her house. She was in tears. It was really quite sad. It was hard to get her story out of my head. Some of these interviews get to you. If you sit down and listen to people for a long time, you just go

> 'why?' If he had a chance he would have pulled over but he was just worried to get to work. I'd pull over. Just better to lose your job than your life. (Project participant 4)

Empathy and sympathy are demonstrated by this participant. He discusses how he understood the perspective of a mother whose son died and how her testimony affected him.

The participant's response indicates a desire to do 'what is right' by others. Sensitivity needs balance against the need for authentic testimony. Anticipation and consideration of how others might perceive the documentary both now and in the future, and also the impact of information disclosure on others, was raised by many of the participants. The potential for betrayal through mishandling information was at the forefront of the interactions discussed by participants. Not abusing the trust of those who had provided stories was also paramount. One participant reflected on how he was present at one accident scene but immediately considered the impact of his disclosure (Project Participant 5):

> Is there a webisode on that guy who died out at Woodley? I was one of the last people to talk to him. I'd never met him before. No one knows that. We were on the side of the accident. Our work bus turned up and he was sitting there looking pretty dozy. We were just yacking to him, trying to keep him awake.…Everyone sounded really surprised when they read the paper and found that he'd died. But I wasn't. He looked like he was ready to go. 'I'll be right', he was trying to saying a few words to keep himself awake. I don't know if you want to put that on a webisode. Pretty gruesome for his mum to hear.

This participant describes how he was the last to know someone who died. The participant was concerned about whether the mother of the victim would be affected by this revelation.

The project director also reflected on the negotiation process (Joe – director of the project):

> You feel on the edge of wrongness because of the position this project puts you in. It puts you in the middle of death and all the confusion people are in. Whenever I am with someone, I feel I could say something wrong. It's such a fine line. I feel like I have a big cloud on my shoulders that has never rained. It gets heavier, heavier and heavier. I don't want to be under this anymore. I don't have the answers and I don't want to tell everyone what to think. I want people to think for themselves. The expectation of everyone was a driver education film but I don't want to be making that.

The director describes the uncomfortable nature of his role, which involves balancing the expectations of stakeholders.

The conversation of two project participants discussing one particularly fraught scenario reflects how complex the negotiations are in the domain of highly emotional material. Those in a position of trust or power need to anticipate how others will understand a situation and judge a correct path to balance different needs. This conversation between two participants reflects the nuances:

> The thing is it just comes down to do you suffer it or do you not. They have signed all releases and things. We have put half a million dollars into this film. I'm trying to reason with them as much as possible. And hopefully it will be good. But if not all I can say is, 'You guys are not seeing clearly. You come across really well. Jack's story comes across really well.' (Joe – director of the project)
>
> They need more people to come up and say that to them, 'Eh?' (Project Participant 6)
>
> It's not personal. And we have a really good relationship. But I don't want the film to go to air with them wanting to pull their son's story. It would just seem not right. I believe in what I'm doing and I believe in the message the film has. (Joe – director of the project)

In this excerpt, the participants weigh the expectations of others and what might be at stake in a negotiation.

Demonstration of a lack of sensitivity towards others can quickly result in mistrust. As part of the publicity surrounding the project, representatives from the local news and also a national television program had visited the location and had interviewed people on the project. Several interviewees had expressed dissatisfaction with their experience of participating in the news reports and did not believe their welfare was considered by the interviewers. Questions were raised about asking the participants to re-visit occasions and trauma and it appeared to the interviewees that questions were crafted to draw an emotional response. Due to the publication of a newspaper article, there had been negative repercussions for a man who had killed his best friend while drink driving. The director of the project changed how the final version of the film was presented to the community in anticipation of what the newspaper would produce on the release of the film. She also stated that she needed to re-build trust after the event as project participants were exhausted by the experience of negotiating the media. A colleague of the director, who is currently running a similar project in another state of Australia, is looking into techniques to train his participants to deflect questions from the media if they do not want to answer them.

8.5.e Authenticity and the reflection of a context to describe things as they 'really are' is a point of concern.

Several participants raised the need for the film to represent what they understood as 'the truth', and highlighted the importance of an authentic testimony making an impact. The link between trust and authenticity is central to several researchers including Bacharach and Gambetta (2000), and Riegelsberger et al. (2005). Trustors automatically sort and synthesise evidence, deciphering whether it is genuine or not. Authenticity is an embedded dimension of trust, associated with the credibility of information, which is also affected by judgments about the expertise, believability, and depth of a message. It is difficult to pin-point what is at risk or lost when one is duped, as the event moves beyond rational explanations (Möllering 2008).

In the domain of co-located people who have shared an event, authenticity is judged as the match between testimony and 'what really happened'. To introduce

the final version of the film, one of the directors of the project took the film to the houses of those who had testimonies included. Some of the comments provided by other participants reflect the importance of authenticity:

> All the stories (in the documentary) have a connection in the way it goes around here. The guys think that are on the fly. They think they can get away with it. But you can't (Project Participant 7).

> Sam has come off in a very positive light. Considering…He's always been a really nice guy. But he always had an edge to him. So for someone who was such a risk taker that could have come off a lot worse. You could write a thesis on Sam's history of stupidity. The film was really gentle (Project Participant 6).

> I went to school from grade 2 onwards. We hang out a lot. He was the only kid around Smithton with a pushbike with a sidecar. He used to take [me] from my place to school on it. The funny thing about Lincoln, we used to tell big fibs about the things we did from a young age about driving cars. He had the most outrageous stories and then when people bothered to go to his 21st birthday party they found out the stories were true (Project Participant 6, reflecting on Lincoln, who was accused of lying during the project construction).

These three participants reflect on how the documentary has depicted the reality of those existing in the community.

8.6. Conclusion to chapter 8

Trust in a highly emotional domain – in this case, the making of a documentary about road trauma – has been the focus of this chapter. To accompany a documentary, a commentary was recorded within which ten project participants reflected on their experiences. For the purposes of this research, insights into the processes of trust were inferred from these recordings. The highly emotional domain amplified the processes of trust and also reflected how complicated, interconnected and layered trust is. Cook and Cooper (2003, p. 235) argue that more micro-detail is needed in the theory of trust to provide robust understandings

of trust. This research attempts to provide some insights into how the processes of trust work in situ.

The documentary itself is an example of shared context; those involved are trying to make a film that convinces people, in particular young men, not to drink drive or speed. This project was an opportunity to study what makes an effective shared context. What helps to convince others of an idea and becomes a trusted testimony? Also under consideration were the underlying tensions when creating a project in a highly emotional domain. In this context, it is clear that high levels of emotional 'charge' indicate a serious possibility of mistrust. Those involved are very aware of the effect of their actions or information disclosures on others; the link between trust and information disclosure was paramount. Participants maintain that trust is a negotiation process and those who are in a position of trust need to understand the repercussions of information disclosure if they are to act ethically. Anticipating how others will perceive the distribution of information, either to protect or convince them, was a key process. The authenticity of information, the accuracy of a testimony to reflect what 'really happened', was also an important element for both the creation of shared context and also the engendering of trust.

I gained several insights into how design can enable trust. Those creating or establishing a shared context need to know how to communicate with target audiences by considering the needs and motivations of that group. Participants need to be given tools to work towards their own conclusions. The subject of what those tools might constitute is pursued in part 3. A shared context works as a whole, not disparate parts, and participants should be given both macro and micro views of the overall environment if understanding is to be facilitated. Understanding the perspectives of others, perhaps even experiencing it to a certain extent, is part of the familiarity process, and should be built into the design of a shared context. Utilising a shared connection, or drawing attention to what those involved might have in common, is a tool to convince and motivate.

8.7 Conclusion to Part 2

Part 2 uses the creation of practical projects to reflect on trust across different contexts and how trust-enablement works as a practical implementation. Each project builds on the preceding project. As I learnt about trust and context, I shaped the next project and re-framed my enquiry. This conclusion explores what the projects discussed in part 2 had in common, that is, what issues linked to the design of trust seemed to re-appear across domains. The differences in how trust worked and the insights gained from the projects are also relevant. Some of the insights seem incidental, others more overarching in the understanding of how trust-enablement works. Insights are explored and applied further in part 3.

One contribution of my thesis is to present from an interactive design perspective how trust can only be understood in context, and that the understanding of trust evidence is only meaningful once filtered by those involved in the situation. As my research has developed, it has become apparent that trust evidence is so contingent on how participants understand context that it is more useful from an interactive design perspective to focus on how participants create context. As each participant might draw different interpretations, I argue that digital environments need to look for different ways to support trust that do not focus on the surface value of trust signals. This concept is pursued in part 3. By understanding how trust works across different contexts, we can design digital environments that enable trust by supporting participants' trust processes and preferences. This was the aim of the projects outlined in Part 2.

The data produced by the second and third projects was different to the final two projects. The second and third projects delimited the range of responses a participant could provide. In these projects, participants could only choose from a restricted selection of responses. The final two projects, on the other hand, allowed participants to produce specific references to a situation or arguments to back up observations about trust. Limited information cues were chosen as design elements and exploration points for two of the projects (the financial trading game and the 'virtual teams' project) to learn about trust in certain conditions. The type of trust situations of particular interest here are when reputation and knowledge mediated by the experience of others cannot be accessed or relied upon. This approach reflects the conditions of current digital environments, within which

users can encounter an infinite number of strangers and participate in limitless unknown interactions.

One aspect that all the project insights had in common was the idiosyncratic nature of the judgment of trust. All participants had different ways of making sense of a situation and then applied their personal opinion of what trust should be. Chapter 5 found that participants may look beyond the decision frame as demarcated by the designer to form a perception. Chapter 7 demonstrated that participants approached the activity of finding trust with similar processes; they just had different interpretations, perspectives and preferences that determined their trust perception. All participants differentiated between facts and the presentation of facts. They read 'in between the lines' of what the presentation was saying about the authenticity of the material and also the motivation of the material's writer. In Chapter 8, the director of the highly emotional documentary pointed out that in order to form trust, we need to let participants form their own ways of reaching understandings. In order to enable trust, digital environments need to be created by the users themselves so that users can share and manage the type of trust evidence and relationships that are relevant to them. As technology and design is now at a point where spaces can be established that can be infinitely configurable by users, this agenda may be achieved in the near future.

One observation that stands out for me across all the practical projects I undertook is how interested participants are in the concept of trust. It was a subject they wished to talk about and reflect on. Möllering (2006a) describes trust as a 'mystical' process that, if it were explicable, would not be trust. Perhaps users are drawn to this magical quality of the interaction, are intrigued by the possibilities trust offers and find it a topic worthy of philosophical reflection. The claim that users are interested in trust cuts against the grain of the literature that either assumes that users do not want to have anything to do with trust (for instance, the work of Bødker 2007; Quercia 2009), or that users need to be involved because they hold essential information required for the trust interaction. At the beginning of this thesis, in section 1.1, I examined how trust research is split between those who wish to attempt to automate trust for the user and those who believe that trust interactions should combine the power of computing

technology and human thinking. The research literature encouraged me to share the assumption that users were either not interested in trust or only interested because they had to be, and I found that this view is not necessarily correct. There is little research dealing with the issue or whether users might find the concept of trust intrinsically interesting. The research closest to the claim that users are interested in trust is research that investigates the link between control and trust for users.

Researchers (for instance, Kaminski et al. 2005; Chang & Schroeter 2010) argue that users wish to be in control of their trust interactions including the level of privacy used in their digital lives. Users wish to self-manage how they present themselves to others, worry when information is taken out of context, and value when others are discreet with their information (Preneel 2010). Squicciarini (2008) argues that a solution that allows users to control their data is a negotiation system whereby users trade private information incrementally. Users are more likely to share information if they perceive they have control over it (Chatfield et al. 2005). However, the claim that users want to deal with trust because they wish to control their interactions still implies that users are only interested in trust as a means to an end rather than trust as a core interest in itself.

In order to verify the claim that users have an interest in some areas of trust, I contacted a number of researchers in the field of trust research to canvas their opinion on whether they think users are interested in trust decisions and to check if there was any pre-existing research that I had missed. Wakeman (2010) believes that users do not favour trust interactions because to focus on a trust interaction takes users away from their 'primary cognitive task' at the moment. But what if trust was the cognitive task at hand? On the other hand, Ries (2010) believes that users do not like making decisions, but sometimes do want to have a level of control in the interactions that affect them. Users understand trust in terms of risk, according to Lacohée (2010), who, as an example, points to a new and developing market in information brokerage. A new organization, Mydex, helps individuals manage their personal information on their own terms. The organisation is attempting to re-dress the current power dynamics that develop between individuals and institutions. Often individuals lose control of their personal data

when it is handed over to an organisation. The information is used by the organisation in all sorts of ways that disadvantage the individual, for instance, the data is sold to third party companies that use the data to improve marketing techniques.

In reference to how and why technology is accepted, Lacohée et al. (2006) argue that users understand the inherent risks involved when using technology, and see interaction with technology as a trade-off with risk. For instance, there is an item for purchase on an internet site that is very tempting. However, it is possible that purchasing the item might lead to theft of credit card details. It depends on how tempting the item is for a user to purchase it.

I am not arguing that users are interested in all trust interactions. There are a multitude of trust decisions involved in daily life and it would be too complex to process each one separately. But I agree that there are some trust decisions that users want to be involved with and these types of decisions are those that involve interaction with others. There may be a spectrum of trust decisions, and towards one end are the types of trust interactions users are drawn to and are interested in. At the other end of the spectrum are decisions that are either considered boring or stressful, and users would prefer not to engage with them. More detail about what type of decisions lie at different ends of the spectrum is a subject for further research.

It was surprising not to find more difference in how trust works across these four domains. Different dimensions of trust may be prioritised depending on the situation. For instance, a visit to a doctor may emphasise competence, whilst an interaction with a potential date may prioritise continuity (depending on personality preference). This might point to a problem with the design of this and other data-gathering projects. Without 'real-world' motivation, participants in a project are not responding as if a context was 'real' and may adapt generic ways of thinking about trust. However, this insight in itself is useful for the design of trust-enablement. Trust is not easily predicted or pre-empted. As all trust interactions are to some extent unique, all trust-enablement can seek to achieve is to create environments within which users can share context, and share and manage the trust evidence important to those in a situation. If these environments

are flexible enough to be configured ‘on the fly’, then users can change and shift as the situation evolves.

The projects revealed that although trust is highly personal and idiosyncratic, it does evolve in relatively structured ways. In Chapter 5, participants understood that when one is playing a game, certain expectations are met that help form the decision-making space. In Chapter 7, all participants drew attention to similar parts of a document when seeking trust, but applied different priorities when weighing up the information. If we can build these processes and structures into digital environments, it may assist users to create the contexts needed to trust-enable. Part 3 applies the implications from these methodological insights to arrive at a proposition, a set of design elements that are a solution for trust-enablement within the interactive design of a digital environment. The nuances of trust found in this part are interpreted into design elements in the form of affordances and configurations.

PART 3: DESIGN PROPOSITION

Chapter 9: Problem-setting the intricacies of a trust-enabled digital environment

Part 3 applies insights from part 2 to provide a 'design proposition' including what design features can create a trust-enabling digital environment. The proposition is a solution to the problem set by this thesis: how can two strangers decide to trust in a digital environment? The proposition, outlined in the next chapters, consists of affordances (design features that a user can interact with) a designer can place in a digital environment.

However, before a design proposition is offered, a discussion of what design can and should offer is necessary. This exploration of design is the focus of this chapter. I argue that design should set problems rather than necessarily solving them, opening up a design space for questions and scrutiny by examining the judgments required to create design. In this chapter, I explain why it is not appropriate for research through design to provide specific guidelines on existing projects and techniques. Instead, research through design (as outlined in chapter 1) has the potential to offer theories and interpretations on possible future design spaces that break from accepted traditions. Research through design in an academic environment can sometimes be unfettered by alliances to commercial design, and an opportunity is created to consider a design situation from a range of perspectives. A discussion in this chapter of what design might offer, the setting of problems and the exploration of design judgments leads into chapter 10. This chapter is an introduction to the notion of a shared context, my interpretation of how a design can be set up for users to enable trust interactions rather than the provision of a fully pre-empted solution. Chapter 11 provides further detail on how this shared context might work.

9.1 Problem Setting

Often design research is expected by those working in other disciplines to provide recommendations for design. Researchers (for instance, Dourish 2006, 2007; Nova 2007b) have documented how designers presenting at conferences are often

asked to apply their research to abstract situations to solve a problem. Dourish (2006, 2007) describes this as the 'laundry list' approach – the reduction of a design study to a small series of note recommendations, sometimes in bullet points (for instance, 'Users prefer large buttons', 'Create links that are easy to read'). The 'laundry list' approach fails to capture the value of what design can bring to a situation. An aim of design is to create (and also problematise) connections between users and experiences. This type of contribution, however, cannot be easily simplified.

The prevalence of the 'laundry list' approach may be due to a misunderstanding between different disciplines over what design can achieve. Disciplines approach the notion of 'universality' differently. Speaking very generally, science is a 'grand project' that seeks to find universal truths that can be applied across a wide range of situations. Variables that may influence an outcome can be somewhat isolated, thus the effects of culture and local influences can be regarded as temporary. This approach allows science to chip away one part of a larger issue and focus on it in detail. However, design does not have this luxury, as any design situation is highly context specific, and thus any investigation needs to consider and cater for many aspects of a situation (Stolterman 2008). Stolterman gives an example. To design an mp3 player interface, one needs to consider a wide range of elements including when someone uses the player, the outside casing of the player, and the size of the users' fingers. Time and resource limitations always influence a design situation.

Instead, research through design can problem set: it can offer approaches that problematise a design situation as well as alternatives for how to navigate through a design problem (in the case of this thesis, how to achieve trust-enabling design). So the aim of design, I argue, is not to close down a decision-making space and to de-limit options but rather to open up possibilities by providing questions. Thus design is about problem setting rather than solving (Schön 1983). Rather than providing recommendations, design can uncover motivations for action, needs and deeper human rationale and explore the implications of these drivers. The approach of problem setting suits the influx and configurable nature of contemporary digital environments (as described in section 1.3). This

perspective acknowledges that the design of new spaces is never complete, is shaped by those who use them, and is always contested.

9.2 Design as judgments

The activity of design revolves around the making of judgments (Stolterman 2008; Nelson & Stolterman 2003). To set a problem around a design, a designer needs to identify the judgments required in a specific design. The underlying aim of this process is to bring forth the priorities and agenda of the design. Research through design can reveal and explicate the underlying logic of an environment to the designers of the project or other stakeholders, such as the users. In section 1.3, I describe how the roles of designer and user are sometimes blurred by the nature of current digital environments. Thus users have the potential to be the generators of judgments as much as those who are considered designers.

Judgment is a pragmatic and practical task grounded in knowledge. It is decision making which cannot be described as entirely either rational (following a certain path of logic) or intuitive. Judgment taps into the accumulated experience of the decision maker including how she or he has understood consequences from past decisions and has balanced complexity. Learning how to judge does not then involve following prescribed steps but reflection on how different experiences and relationships interact. Designers can use tools such as the cultural probe (described in Chapter 3 of this thesis) to develop and aid judgment-making facilities. Making a judgment involves setting priorities, whether it is deciding who is regarded as the most important stakeholder within a project or what outcomes are required by a project. A design product is the collection of consequences of a series of judgments (Stolterman 2008; Nelson & Stolterman 2003) and is a balance of needs and power dynamics. Already, we can elaborate on some of the questions underlying design judgments raised during this thesis. Exploring these questions allows us to see how problematic the design for trust is. Whose side is the designer on? Is the designer hired by a company to deliver an agenda? In that case, the designer may be motivated to work in the interest of the person who has hired them. This alliance might equate to the designer understanding users for the purpose of a design agenda rather than amplifying

how a local group respond (Suchman 2002). And also, what is the design intended to do? Improve efficiency? Attempt innovation?

I argue that much of the work done in the area of trust and design has the agenda of encouraging trust in the interest of business. As mentioned in Chapter 1, many researchers since Fukuyama (1995) have asserted that trust can 'grease the wheels' of business, reducing transaction costs and facilitating further transactions. For instance, the work of Egger (2003), which is widely quoted in the research area, provides guidelines on how to give the appearance of trust. In Egger's work, like many papers investigating trust, trust is assumed to be positive. Briggs (2010) provides another example, the Reina Trust Building Institute, which can be hired by organisations to promote trust. The Reina Institute uses scales as a means of measuring trust and a betrayal continuum that needs to be overcome by employees.

The scenario in which a designer is working in the interests of the user also needs to be problematised. Sometimes designers, governments and companies assume that they know what is best for a user (Roubroeks et al. 2009), a practice described by Thaler and Sunstein (2008) as 'benevolent paternalism'. An example of a benevolent paternalistic design working in the interest of a user is a cafeteria design that places the healthier food in near reach of the consumer. But who gets to decide what is best for a user is problematic. When considering the design of trust, how can a designer know what is best for the user? Perhaps the cafeteria visitor is dying and would like a tasty last meal. I argue that an approach that allows the user to make the judgment about what she or he prefers enables the user to form trust relationships on his or her own terms. This approach is the basis of trust enablement.

How is technology understood? Is it the technology before it is used or is it how the technology is incorporated into peoples' lives, as 'local adaptations', that is of interest? In the case of design and trust, as trust is a concept that revolves around how humans interact, it is how technology is used that is important and meaningful. How is the user viewed? Is it as a co-creator? As an impatient being pursuing quick results? Or as someone who is lacking decision-making capabilities and requires material to be 'simple' (Lockton 2009)? I argue that the

user is able to make decisions on their own terms, may not necessarily be seeking quick results, and instead may value an environment that gives them the message that their input is genuinely valued. Implicated in this question about the role of the user is the division between user and designer. As mentioned earlier in this thesis (section 1.3), in the current digital environment (which is characterised by features such as user-generated content), the division between user and designer is eroded and it is no longer clear where one role starts and finishes. The owner of a project can determine how user and designer are designated within the space of an environment. New technologies can allow a user to have a more fundamental role in the shape of an environment or more traditional forms of engagement may be selected.

Leading from the question of how the user is viewed is that of what is it that the designer wants users to do? Does the designer want the user to be constrained (to only pick from a limited amount of options), motivated (to buy things) or to be enabled (to be assisted)? Given the need to, as I have suggested, treat trust contingently, and just as importantly, as emergent, it follows that trust cannot be forced on an individual. Thus trust-enablement, when a user is able to make decisions on his/her own terms, is a solution that works with the idiosyncratic nature of trust.

Also of relevance to the setting of a design problem is how and why users are motivated to use a digital environment and the relevance of the environment to a users' everyday lives; why, when and how might an individual use a site and return to it? What are the underlying incentive and reward structures? Researchers exploring this issue include researchers of open source communities. According to researchers, participants in an open-source community are motivated by the feedback that they receive from others in their community (Terry et al. 2010). The opportunities to develop skills, build reputations and receive an intellectual challenge are other incentives that encourage users to develop digital projects for little or no payment (Lerner & Tirole 1999). Baldwin and Clark (2006) add that the modular architecture of open-source developments, whereby projects are developed in small parts that are collated together to form a larger whole, also

helps participants feel a sense of ownership and motivated to continue involvement.

9.3 Setting the problem of trust-enablement: a shared context between users

The problem this thesis seeks to analyse is how, from an interactive design perspective, can a digital environment be designed to enable trust or distrust between strangers? This section (and also the following chapter) form a design proposition that responds to this problem. Using the insights gathered from Part 2, a proposition for trust-enabling design is laid out. The proposition is a strategy that can be adapted to specific design projects. This section introduces the underlying design concept, the notion of a shared context. In summary, a shared context is a digital environment that participants can configure to receive, manage and negotiate trust (and distrust) on their own terms. The aim of a shared context is to allow users to explore their own judgments, identifying their priorities and agendas and to reflect on how these values might intersect with the values of others. Users can set their own problems on their own terms. Furthermore, a shared context can help a user ask questions of themselves and others. To create such an environment, the designer needs to establish certain features relevant to trust that can be configured by users. (The following chapter, chapter 10, delves into this detail). In this section, I examine the ways in which a shared context can enable trust. I also provide an overview of what is technically possible to realise this concept.

According to researchers such as Kopecka et al. (2010) and Wood et al. (2009), design is a bridge, forming a link by which disparate entities can connect. A bridge crosses a gap (Wood et al. 2009), and a solution to trust-enablement needs to allow two or more people to create a connection and develop a relationship of trust or possibly distrust. A bridge is a connection, shaping to a certain extent how relationships are first formed and allowing further interactions to develop. A bridge is also a means to manage complexity. It is a form of technology that allows something to happen that may not be able to happen otherwise. Using the example of a bridge linking two towns on either side of a river, a bridge saves people from having to negotiate the water in order to cross

from one side to the other. In this design proposition, I argue that a shared context can function as a bridge between participants, allowing participants to incrementally build trust on their own terms.

9.4 Context and design

The notion of context is central to design. Design guides how someone makes sense of a context and gains a sense of familiarity (Laroche et al. 1996). As argued in section 1.4, design can never create a neutral context. There is always some sort of encouragement towards a certain way of thinking or behaving (Thaler & Sunstein 2008). Context may include power relations, social conventions, traditions, expectations, habits and memory (Zack & McKenney 1995). A shared context is one within which participants shape how information is prioritised, organised, explained and managed. As is explained shortly in Chapter 11, sharing a context means that there is no fixed claim on the nature of the dominant ingredients in the context. A balance between a context that can guide a user and can allow new ways of thinking is recommended for trust-enablement.

The design of a context that is shared between participants, within which trust evidence is exchanged, is an area in which interactive design can support trust-enablement. Dourish (2004, p. 11) describes the use of the powerful technology available today to help individuals create, define negotiate and share context as a 'major design opportunity'. These types of services might be what Dennis and Wisely (2007) describe as 'killer applications': services that tap into a human need and gain large on-going audience visitation and involvement. A solution may be to create an environment where participants can negotiate what types of information are important, and the terms upon which it is exchanged; this will allow participants to manage the process by which familiarity is developed. Insight for participants is provoked through a negotiation process (Daniel et al. 2008).

Framing is the process by which people create an understanding of a situation (Nooteboom 2005), thus framing and context are resources for design. The concept of framing within interactive design allows a complex consideration of the subtlety and nuances a participant might bring to a trust situation within a

digital environment. Using frames to understand a decision is a challenge to the notion of traditional, rational, scientific models that attempt to claim a universal understanding of decision-making by de-emphasising context and variance across situations (Dufwenberg et al. 2006). Within a frame, a participant seeks different evidence to trust. This evidence is multifaceted. There is evidence that is deliberately contrived, then there is evidence that is understood as a symptom of trustworthy behaviour. This type of evidence is considered more valuable because it is perceived as more authentic. Evidence falls into three dimensions: continuity (the existence of the trustee in a specific community), competence (whether the trustee has the skills to deliver), and motivation (whether the trustee will work in the interests of the trustor) (Cofta 2006). These dimensions hold different interpretations depending on what context the trust interaction is taking place in and how the participant values these properties.

9.5 Why is a shared context necessary for trust enablement?

Earlier in this thesis, I argued that it is not possible to precisely define trust. Everyone has his or her definition. Thus a solution to designing a digital environment that deals with trust is to allow the participant to apply his or her own understanding shaped by the context the interaction happens in. For the bulk of thesis, I have demonstrated that trust is slippery; it is impossible to clearly define, difficult to predict and constituted in an idiosyncratic decision-making process for the trustor. Yet as trust is fundamental to our interactions, some sort of means for a user to negotiate trust relations is necessary. I maintain that the design of a 'shared context' has potential because it attempts to put the productions of trust into the hands of those relevant to the trust interaction, side-steps the problems of trying to work with a definite view of what trust should be and of providing a homogenous 'one-size fits all' solution. This research follows Clark et al.'s (2002) advice not to design as if the outcome is known but instead to design a 'playing field'.

Central to a trust interaction is, in some sense, familiarity. Chapter 7 finds that individuals acquire familiarity in different ways, emphasising different types of values, so an environment that enables trust needs to also allow participants to

acquire familiarity on their own terms. Any solution to trust-enablement needs to offer these allowances as a fundamental design feature and I argue that the design concept of a shared context holds this potential. A shared context offers participants the opportunity to use their personal working definition of trust and negotiate the familiarity processes that are relevant. Chapter 11 provides detail on how a participant can apply their priorities in the shared context I propose. As a side note, Patel (2009) provides a wider social context to this claim. He argues that society has become infiltrated by the valuation of profit and wealth accumulation rather than need, and that the global financial crisis is proof that the structures which we use to understand our interactions, both personal and public, require a re-think. He outlines in *The Value of Nothing* how the time is right for individuals to re-build social relations on alternative terms. He provides many examples from all over the world where this is happening. He also argues that the claim of the rational 'homoeconomicus', which I describe in chapter 1 as a position that holds that individuals are driven by the pursuit of self-interest, is invalid (Patel 2009, p. 166). In conversation he has said that the key to trust is in the familiarity process. The shared context I propose may allow participants to explore their value systems and provide the opportunity for them to apply what is important to them rather than adopting a value system that has been imposed externally.

A shared context is also necessary because it provides an opportunity for participants to negotiate, repair, manage and query: processes that form the grounds of trust and familiarity. This thesis has demonstrated that trust-enablement is a multi-layered experience and relationship, not a one-off transaction as often claimed by the research literature. In Chapter 9, the participants understood trust as an ongoing process, not a quick transaction. These participants were continually anticipating how others might respond as well as considering their future actions and livelihoods. Trust is not a one-way relationship – a user isolated at a computer, trying to make a one-off decision about another. Trust is a relationship and the roles of trustor and trustee are sometimes blended. Thus trust-enablement cannot be described as 'user-centred' because the needs of those in a trust situation may be at cross-purposes. What

might work for one party may expose another. A shared context can facilitate a negotiation and form a bridge between participants.

9.6 The technical possibility of a shared context

It is an exciting time for those interested in the development of technology infrastructure that can be configured by users because digital technology now has the potential for this vision of a shared context to be realised. As reviewed in section 1.3.b, digital technology was established and developed by experts. Over time, technology has been appropriated by an increasing number of non-professionals, to the point where now arguably anyone has the potential to develop a digital system by configuring technology to their own purposes (Paulos 2009). We are at an intersection, according to Paulos (2009). A part of this new design agenda is that users are becoming creators and even designers (to different extents) of their own spaces, as signalled earlier in section 1.3.b's discussion about the blurring of boundaries between designer and user. Chapter 11 discusses the type of environments a trust-enabling designer may want to set up and offer for users to configure and take in on their own terms. But before this is explained, this current section reviews research developments that can enlighten how a shared context might work.

Some researchers tend to focus on the possibilities for different types of users in the ever-increasing range of digital environments, and on what users can now do to empower themselves. For instance, Oliver and Green (2009) investigate how digital technology has allowed musicians to re-claim creative freedom and circumvent the marketing and distribution structures established by corporations. Other research investigates how users can create their own media, sometimes combining information from different sources, in what is referred to as 'mashups' (Ennals & Garofalakis 2007).

The field of engineering also investigates this research area and tussles with what is referred to in this field as 'flexible infrastructure' systems that are not pre-set in how they can be used and instead are open to appropriation. I believe there is a link between flexible infrastructure research and this thesis's notion of a shared context, as a flexible infrastructure can deliver a shared context and also

shapes the user's experience of technology. Driving this research interest for many writers is the pursuit of imagining what the underlying structure of the internet can and should be. This desire to re-think and fundamentally challenge accepted ways of understanding infrastructure echoes the sentiment in Patel's (2009) argument, as mentioned previously. Now that the internet is an established infrastructure, it is time to move away from focusing on technology performance issues, and instead examine more qualitative concerns such as the type of societal relations technology encourages (Clark et al. 2002). A design approach that allows for change is called for by Clark et al. (2002). Similarly, a 'Postmodern Internetwork Architecture' is called for by Bhattacharjee et al. (2006), where any possible requirement can be catered for. Naous et al. (2009) add that, as many scenarios for the user are unpredictable, policies guiding an environment should be kept general and flexible. Clark et al. (2002) go on to say that a current fundamental challenge for internet developers is to facilitate the reality of an infrastructure that can allow different perspectives, with 'divergent interests' to co-exist while still meeting the traditional aims of a digital environment (such as reliability and scalability). They believe that these two agendas (facilitation of different perspectives and the traditional aims of technology design) are not mutually exclusive, and instead argue that the combination of objectives will strengthen the infrastructure of the internet. Kalogiros et al. (2009) call for an environment that can offer a 'variation of outcome', rather than a tailored set solution that tries to anticipate a user's needs. What are the approaches that will guide design in response to these new types of environments, Clark et al. (2002) ask. This thesis attempts one approach that emphasises the role of trust in digital environments arguing that a flexible infrastructure is needed to enable trust.

In order to provide the reader with a more concrete understanding of how researchers are conceptualising a flexible infrastructure, it is worth considering an example of how trust works in a digital environment. Quercia (2009) seeks to automate trust and lays out a plan whereby trust can be automated in a de-centralised environment when a system cannot access a central point of control that can direct policies about how the system should manage situations. Instead, a decentralised environment needs to be a self-reliant infrastructure that can respond

to a range of scenarios. The focus in this research is how to automatically provide recommendations to a user. According to Quercia (2009), trust is subjective, context-dependent (an interpretation in one context does not immediately transfer to another context), and also changes across time. After identifying these properties, the researcher then provides guidelines on what a flexible infrastructure that deals with trust should do. The system should move the user through four steps, automatically, without intervention from the user. Firstly, the system needs to reason on personal experiences, then compare the reasoning across categories (for instance, the last trusted recommendation from this source was about a certain type of subject matter, how well does the current area of recommendation correlate with the previous subject matter?), reason on recommendations, and then finally store the transaction. However, Quercia does not examine what these concepts might mean from a societal perspective but instead develops algorithms that, when in action, form part of the flexible infrastructure. I believe that Quercia's work constitutes initial groundwork that may benefit from more detailed, contextual input from the social sciences in the future.

9.7 Conclusion to chapter 9

The chapter began with a discussion about what interactive design can and should offer as research outcomes. Rather than problem solving, I argue that design should 'set problems': problematising the design space, questioning the relationships and outcomes, and thus reflecting the evolving nature of digital environments. Design involves judgments: setting priorities and deciding which options are appropriate. In current digital environments that empower the user, both users and designers are in a position to form judgments. Examining some of the questions underlying design judgments reveals how fraught design is. For instance, whose side is the designer on? Is the designer working in the interests of a corporation, government or a group of users? How is the user regarded? Are they regarded as simple? As an impatient agent seeking fast results? Revealing the underlying questions associated with a design is a step towards problem setting.

It is an exciting time for those interested in the development of technology infrastructure that can be configured by users because current digital technology now has the potential for the vision of a shared context to be realised. Boundaries between users and designers are dissolving. New technology developments allow an increasing number of users with minimum specialist knowledge to configure and create their own technical systems. Researchers are grappling with what sorts of new technology environments should be developed. Several researchers argue for flexible infrastructures that allow users to negotiate their needs. Clark et al. (2002), for example, maintain that as the structure of the internet has been in existence for a considerable amount of time, it is now appropriate for researchers to re-think how the internet should function in the future. These authors add that the consideration of social values in a digital environment will help to strengthen the infrastructure of the internet. My research focuses on one specific aspect of a flexible infrastructure: trust-enablement.

As argued in Chapter 3, I believe that digital environments need to be designed by both designers (who are experienced with design and trust) and users (without experience of design and who have had little opportunity to consider the ramifications and design of digital trust). Designers can place affordances – elements that allow certain types of interactions – into digital environments. These affordances work as kernels of possibilities within an environment, to be configured and used by users as they see fit. In turn, the nature of the environment changes with configuration and use over time. The following chapter presents detail about how a shared context is designed.

Chapter 10: The qualities of a shared context

This chapter constitutes a possible blueprint or framework from which applications which would support trust-enabling shared contexts might be developed. The principles on which this framework is based are those which derive from insights gained in the five studies described in chapters 4-8. In the most general terms, these have to do with the kinds of information people deem relevant in different contexts and the amount of information they feel is necessary. Broadly, I aim to show that the amount and type of information people use varies considerably from context to context, but is fairly consistently applied within a context. In design terms, unless specific applications are to be built for each different context in which trust is an issue, then there is arguably a justification for 'meta level' approaches which facilitate contextual behaviours by allowing them to be built by participants. This is what is meant by enabling trust. Trustors and trustees build, negotiate and define trust on their own terms. By way of example, rather than assuming that familiarity is the key to trust, we recognise that it may or may not be and allow participants to build appropriate models of familiarity and unfamiliarity into their online interactions. In this chapter, I provide some detail concerning the principles upon which a trust-enabling shared context generator (see e.g., Twidale et al. 1994) might work. As an initial discussion into how to enable trust from an interactive design perspective, the shortcomings of this framework are discussed in section 10.5. For instance, the notion of risk deserves more consideration than can be offered at this point.

As mentioned in the introduction, Marsh and Dibben (2003) argue that many researchers respond to the subjective nature of trust by exploring how trust can be distilled into a formula. What follows is not an exercise in variable analysis but, in keeping with what has been suggested above, an attempt to produce 'sensitising concepts' (Blumer 1954) which may guide but not determine design decisions. Trust remains an obdurate problem not least because of the many different assumptions made about it and the fact that there is a sense in which everyone is an expert (Marsh 1994). Arguably, these problems are magnified by the fact that opportunities for online interactions among people who are otherwise strangers are magnified almost daily. This has led to attempts to formalise trust on

the basis of reputation, for instance. Thus, Abdul-Rahmann and Hailes (2000) describe how agents in a virtual community can judge another's opinion via reputation and fine-tune their trust reading. Gonçalves et al.'s (2009) work explores how trading reputation information can help users to decide whether to share information and other resources in a digital environment. The nuances of reputation as a means to judge trust, for instance, problems of dishonest manipulation of information, are discussed by Gal-Oz et al. (2010). Moreover, detail about how to provide users with a sense of security and reliability in environments where security is a major issue is the focus of Murayama et al.'s research (2010). The problem here, as indicated in the five studies outlined above, is that reputation is considerably more important in some contexts than in others, and is constituted in different ways (e.g. narratively). Put simply, reputation is a loaded word. In organisational contexts, for instance, it is entirely possible that a 'good' reputation for one person (e.g. someone working in a managerial capacity) may be another's 'bad' reputation ('toady'; 'yes man'). A similar argument can be applied to any of the standard terms applied in the trust literature. The point I am trying to establish is that terms like trust, familiarity, reputation, risk, continuity, security, privacy and so on are meaningless outside of the context of their application. The path explored here is that of identifying the dimensions along which trust decisions typically are made within specific contexts and how to produce a generic trust-enabling framework that allows us to consider these variations. For instance, in chapter 7, the film professionals' project, participants drew attention to similar areas of a document as places where information might be 'trustable' or not. While they agreed on the relevance of certain texts, they did not necessarily agree on their significance as they applied different value systems when assessing them. This is the motivating force for developing shared contexts that give participants the tools they need to draw conclusions on their own terms. How then might these tools be constituted?

By tapping into the processes by which people establish and maintain trust and distrust, we can design elements into digital environments that trust-enable. The trick for design is to build in the relatively structured ways used by participants to form trust, but then allow the participants to configure and

appropriate a design to suit their individual priorities (in response to negotiation with others in the environment). A shared context offers this opportunity. The design sets the basic 'playing field' but it is up to the participant to shape the interactions. The explorations undertaken in Part 2 reveal the dimensions along which trust formation processes develop.

The shared-context framework outlined below makes two-way trust enablement possible, allowing for the positions of trustor and trustee to emerge as part of what Strauss et al. (1963) call a 'negotiated order'**.** The research of Dolšak and Ostrom (2003) is useful here. They propose rules and principles about how to create environments in the context of public administration that allow individuals and communities to negotiate over matters of importance. They point out that when rules are 'devised' by those who will be using them, the rule design tends to be highly appropriate to the nature of the environment users are working within, users are more likely to recognise and understand the rule, and more users are likely to accept the rule constraints.

10.1 Affordances for familiarity

As reviewed in chapter 9, underlying the processes of trust is the dimension of familiarity. Researchers such as Fukuyama (1995) and Uslaner (2004) argue that people prefer to trust those with whom they share values or group membership. Nooteboom (2004), however, sees the process as being about inferring underlying motives rather than needing to share or agree with the perspective of the other. More fruitful for my purposes is the idea that the undertaking of the process itself can beget a relationship of trust (Luhmann 1979). The aim of this trust-enabling shared context is to allow users to build familiarity on their own terms, where necessary, and also to cross 'gaps' – to allow one to understand the perspective of another without any implication that this will result in agreement, or indeed trust. Sometimes those interacting in a digital environment may have needs that are in conflict (Dolšak et al. 2003, p. 338). The design elements described in this chapter are affordances and configurations that aim to build dimensions along which the relevances of familiarity can be gauged. An affordance (originally Gibson 1977) is a type of functionality in a design, which allows a user to interact with an

environment in a certain fashion. It is something the user can do or activate and is sometimes represented by a visual element that refers in some way to an object in off-line environments.

Affordances tend to be set up by designers of the environment, while configurations are left to the user. Dolšak and Ostrom (2003) argue that users of an environment can devise the rules that shape an environment on two levels. On one level, there are rules and procedures informing the structure and constitution of an environment, including how it is modified and developed (for instance, decisions about who might use an environment and for what purpose). On a more superficial level there is the type of contribution that a user can input and negotiate to configure an existing system. Dolšak and Ostrom (2003) provide the example of collective choice rules as an illustration of this second type of contribution. I believe that although users in certain situations are interested in trust as a concept and want to be involved in trust interactions, I do not think that users (due to time and skill acquisition investment) would want to build a shared context from the ground up, and instead would wish to respond to an existing digital environment that attempts to meet their needs as much as possible and in a flexible fashion. The built-in flexibility of the shared context environment should facilitate the possibility of both user- and designer-generated 'rules'.

10.2 Affordances for the crossing of gaps

It is obviously the case that participants may bring different understandings to a trust interaction in a specific context. There are many sorts of gaps in these understandings, formed from a range of different perspectives and experiences. In the example of the domain of work, there could be incongruities in how people understand the nature and formality of work (Greenberg & Roseman 2003). In the context of internet dating, different participants might be seeking different outcomes. Traditionally, technology design has aimed at people in a digital environment having 'accurate interpretations' of each other (Shepherd 2006, p. 24; Boehner et al. 2008). This, I argue, begs a whole series of questions. Accurate for whom? When? In what circumstances? A range of modes is arguably necessary to enable participants to form the relationships they need. 'Sympathetic

awareness' is one alternative. It is a new approach developed by critical design practitioners between participants that can be used as a strategy to help cross gaps. Rather than defined set meanings, the focus is on 'hints and guesses' and a 'co-state of mind' from which people construct their own meaning.

It is clear that we cannot assume that familiarity breeds trust; it does not follow that more information is necessarily a desirable thing, but rather that relevant information is desired. 'Crossing the gaps' here refers not to solving the problem of inadequate information, but to allowing participants to arrive at a position where they understand what the relevance of various pieces of information might be. Such a system, if it could be built, would not work on the principle that it could 'slot in' information that people otherwise do not have, but on the principle that it can enable people to negotiate what kinds of information can be offered and received as relevant. The process of 'gap crossing' is incremental, as understandings are shaped through participants responding and building on each other's understandings. Thus a design can enable gap crossing by facilitating flow, which is the circulation of ideas (Greenberg & Roseman 2003). A digital environment that allows gaps to be crossed and context to be shared needs to allow for the exploration of unforeseen tangents and novel discoveries in the communication between participants, and also allow an individual participant to find surprise within his or her own conclusions (Pandza & Thorpe 2009). Participants should be able to change their minds. This affordance requires that the technology used for a system be flexible in respect of (at least) subject matter, aesthetics and language.

The process of crossing a gap is not static; it involves negotiation and, as Dolšak and Ostrom (2003) point out, may imply an adjudication process. The director quoted in Chapter 8 discussed the seriousness with which he takes his role of managing how the testimonies of grieving people are balanced. Although his situation is extreme, his insight does highlight how skilled interactors need to be at negotiation in order to participate in the process of trust-enablement.

> You feel on the edge of wrongness – because of the position this project puts you. It puts you in the middle of death and all the confusion people are in. And you are like the answer. Whenever I

> am with someone – and I could say something wrong, it's such a fine line. I feel like I have a big cloud on my shoulders that has never rained. It gets heavier, heavier and heavier. I don't want to be under this anymore. I don't have the answers.

As discussed in Chapter 10, the journalists involved in the project were not able to successfully negotiate the process of the shared context for a variety of reasons. Although these journalists were able to gain one visit to the community, their inability to negotiate information disclosure meant that they were not able to continue in a relationship with those in the project and obtain future stories.

10.2.a Configure subject matter

To create a situation whereby people can exchange trust evidence across a gap, there needs to be subject matter which participants can exchange and respond to. In Chapter 5, I found that participants become suspicious if there is no information in a place where information was expected. In relation to a character in the game about whom no information was provided, one participant said, 'I know it wasn't his fault. But there is still a reason why there is no information, and this can't be good news'. On the other hand, when information is provided from one participant to another, it is appreciated. Others appreciate the provision of information in an interaction. In Chapter 7, a film professional noted how he regards this act:

> It is collegial to do this. Their message is that they are providing this for you and you don't need to do this work for yourself when you might want to use this film at a later point. It also gives a sense of the layers behind a film, by bringing up the focus on the director and other people involved.

Subject matter configuration includes how information is organised and prioritized. For example, which type of subject matter in an interaction is considered pertinent or valuable? Some digital environments provide set categories of information for users to respond to. The set of responses creates a profile for a user that others can access. Dating websites often use this format;

users can search the profiles of others to find potential matches. The type of content exchanged in these profiles includes topics such as ‘marital status’, ‘occupation’ and ‘height’. This type of format has been proven to encourage certain types of behaviour. Statistical analysis of a dating database has demonstrated that men are less likely to be selected if they have indicated that they are under a certain height. Women are less likely to receive attention if they indicate that they have post-graduate education (Hitsch et al. 2006). As the presentation of information shapes behaviour (Thaler & Sunstein 2008), the categorisation of information influences the choices and interactions users make. It is possible that the statistical analysis of a dating website would reflect a different narrative if participants could construct their own categories.

A possibility, perhaps more appropriate for ‘trust-enablement’, is the folksonomic structure, or ‘tagging’ as it is commonly known (Trattner et al. 2009). That is, users are able to produce, over time, a set of custom categories that are relevant to their purposes. This may involve the user writing a set of keywords to describe an image or to link a series of images. Using this ‘tagging’ model, participants could shape how information is arranged in a shared context. For instance, it may be important for some participants to exchange opinions about political preference. Exploring and building on the tags other participants in a context have created (for instance, tags around an image depicting a political event) allows participants to create an exchange together. A game that provokes users to continue to tag content and to enjoy demonstrating to others how they have categorised material is a way to motivate participants, according to Krause and Aras (2009). Mathes (2004) suggests that two products of the tagging model are ‘serendipity’ and ambiguity. Through the guidance of the tagging provided by others, users may find material in a serendipitous fashion that they would not normally link as associated with their interests. However, due to how short tags are, the message of the tag writer may not be clear. Ambiguity, and arguably serendipity, are tools for critical design. They are aspects that can be used in a design to generate self-reflection and engagement for the user. For instance, the design of a shared context may allow users to ask a tagger of information why she/he chose to describe and arrange information in the way that she/he did, which

may lead to further exchanges. In this way, ambiguity may become the basis of a conversation. In summary, by allowing participants to negotiate what content is exchanged, trust is enabled because participants can determine what is regarded as acceptable material on their own terms.

10.2.b Configure aesthetics

Arguably all digital environments have some form of visual appearance. Earlier in this thesis (section 6.6.c), I raised the question of what visual style should be used for trust-enablement because all design has some influence on human perception and behaviour. The experience of the 'virtual teams' project described in Chapter 6 highlighted how fraught it is to create visuals. If users can configure the appearance of a site, then trust can be enabled because users are able to interact more on their own terms. As a context develops, users can continue to configure the type of environment that best supports the trust interaction they want. On one level, there are superficial graphic elements that the user could configure. On another level, there is the overall narrative the environment presents via the juxtaposition of text and image.

Aesthetics of a digital environment include the surface appearance formed from elements such as colour, graphic layout style and fonts. These are aspects the user could configure to meet his/her tastes. For instance, what colour is the background and what type of imagery is used? Are design elements orientated to the left or the right? Although these aspects may sound trivial or superficial, aesthetics affect how comfortable or uncomfortable a user feels in a space. This is how graphic designers break down the elements of a design (see for instance, Lidwell et al. 2010 for an overview); the domain of marketing refers to this approach to aesthetics as the 'look and feel'. Often design is used to appeal to the taste of a particular audience group. Cross-cultural differences within the perception of information presentation are an example of how an individual's prior experience can shape how different people 'read' a space (Desmet & Hekkert 2007). For example, red has different connotations in different cultures. In some Asian cultures, red is a symbol for luck and happiness. In some Western

cultures, red is the colour of danger. Thus people from Eastern and Western cultures may perceive a red digital environment differently.

However, aesthetics in a digital environment also includes more than superficial graphic elements. There is the element of narrative processing, which is how people draw links between different graphic elements and use stories with cause and effect associations to make sense of an environment (Shank & Abelson 1995). The domain of advertising works with this function, creating a narrative to convince a viewer of the validity of certain goals and desires associated with a purchase (Escalas et al. 2005) and connecting the narrative with the viewer's own experience. Riegelsberger et al. (2003) describe how website owners use photos, especially of people, to attempt to promote trust and that the process is fraught due to how users construct narrative. It seems that untrustworthy sites can attempt to increase the trustworthiness of their image. Several of the participants on the documentary project in Chapter 8 of this thesis raised the issue of narrative and its implications for trust. One participant explained how he only understood the impact of the documentary when viewing the film in its entirety rather than snippets. Another participant built on this comment to say how it was the detail in a story that helped him to understand the viewpoint of another. The participants were also sensitive to how others might put together a story and be affected by how the documentary reflected their connection.

10.2.c Configure language

An environment that enables trust not only needs to allow users to configure the visual appearance of a site, but should facilitate users to attend to the narrative created in an environment, including how text, image and other graphic elements combine. The use of language, such as dialect, and also the style of language (for instance, whether information is presented in a colloquial or formal style), is used to form trust perceptions and relations in a digital environment, as demonstrated in the project I discussed in chapter 7. Clark (2006) has noted that language is inseparable from social capital, and that the way in which someone uses words to bond, bridge and link with others both reveals and influences an individual's tangible and intangible wealth.

Different individuals and communities have preferences and opinions in relation to how language should be used, and draw inferences about someone's trustworthiness based on how the individual uses language (Clark 2006). The use of language, for instance, the choice to swear, use technical language, or apply different levels of familiarity, can work to include some visitors to a digital environment while excluding others. Chapter 7 found that the use of adjectives and adverbs attracted particular attention when an individual is drawing inferences from the use of another's language. Some prefer minimal use of adjectives and adverbs and find them disruptive, as one participant explains:

> This is not directly about making me trust or not trust, but the points where a claim has been laid, and I need to be able to see or judge for myself. A qualifier has been made that I don't need.

On the other hand, others wish for the persuasion and guidance they believe adjectives and adverbs offer:

> It makes the reader excited. In a nutshell you know what it is about. I know it will be a bit sad, a bit funny. You also get a sense of the director and you can read about what else they've done. You are convinced that you should see it. When a convincing synopsis like this is not presented for a good film then it's cruel because people miss out on seeing the film.

If users can configure the language element of a digital environment to create a shared context with others, then trust is enabled because participants can exchange information on terms familiar to them. The configuration should include the ability for participants in a context to negotiate what style of language should be used in the environment, rather than assumptions being made about the style suitable for a particular environment. Undertaking negotiation also encourages participants to recognise that others make choices about the use of language, and have the ability to communicate in a range of modes.

10.3 Affordances for self-management of data: identity work

Affording for self-management of data allows users to control the data they are generating across the internet. This thesis established in Part 2 that users are often highly idiosyncratic in their trust perceptions about others, especially in situations when information or other cues are limited. Additionally, Chapter 5 found that trustors will look beyond the environment as demarcated by the designer in order to find clues to trust. Perhaps a user might take note of the speed of responses of another participant and draw conclusions about the participant's type of internet connection and what this might mean as a reflection on the character or circumstance of the participant. How can participants manage the data they produce in digital environments in a fashion that enables trust? In this section, I argue that the research area of critical design provides several directions that can be applied to explore this issue.

The management of personal data is a contemporary problem that is only beginning to be explored. As discussed in section 1.3.c, current digital environments are characterised by users undertaking a high amount of information disclosure, for instance, on social network sites such as Facebook. A flood of data is being created that can be archived, searched, and taken out of the context for which it was intended. The full ramifications of these types of conditions are yet to be understood. Young people are of particular concern, as they are the first generation to grow up in a digital environment, and are leaving behind information that could be referenced in the future. The kind of information being disclosed involves 'identity work', as participants in digital environments are able to spawn a variety of online identities in different digital communities. Boyd (2008) describes how young people in particular use online identities to negotiate self-presentation (in Goffman's terms, 'impression management') and relationships with peers. Gift exchange enters into how identity is expressed (Taylor & Harper 2003). To enable trust, we might arguably want to facilitate the kinds of identities that people want to produce. Rather than advocating for one party, the trustor, in a trust interaction and seeking a 'true' and static determination of whom the trustor interacts with, the philosophy of trust-

enablement intends that all involved in a trust interaction negotiate a context together. How can design effect this?

10.3.a Configure information disclosure

The issue of information disclosure is a current core issue for mainstream interactive design, not just for designers interested in trust. Solutions to the management of information are beginning to appear on the market. In the current Facebook design, users can leave a 'status update' (a small text line describing what the user is thinking about). Recently, the Facebook designers added a space under the status update for other users to add a comment. The original writer can then respond to the original listing. Some users write comments under their own status update to expand on their thoughts. Facebook has tried to encourage users to comment on each other's listings by automatically presenting an empty box under a status update. The incorporation of this small design affordance by Facebook indicates how a minor tinkering with a design can change the nature of an interaction and facilitate more information exchanges. However, to enable trust, new ways of designing are required in order to move beyond the simple provocation of more information with little concern for the effect on the users and their relationships.

Critical design research provides insights useful to the design of trust-enablement and how participants can 'be together' (Boehner 2008 et al.) within an environment in a fashion that does not necessarily involve active participation and direct exchanges. 'Seamful design', as discussed in section 2.5, seeks to make users aware of how technology can be contradictory, complicated and difficult to predict and a part of a rich social system. These strategies could be mapped over to how users consider each other in digital environments. Rather than the other user being a complete and static entity, users could be reminded that other users change opinions, develop new ideas and can be inconsistent. Thus the trust evidence that is drawn from previous interactions needs to be understood in a shared context.

Applying the ideas from 'seamful design' and remembering that participants make idiosyncratic judgments about others, what type of affordances could be

built into a digital environment to help a user manage the trust evidences s/he is leaving behind in interactions? One approach is to help the user develop a context or explanation of the information traces she or he is leaving behind. Perhaps a design affordance could provoke a user to provide more detail about a piece information that may be interpreted as of digital trust by asking the user pointed questions that might soften or problematise the judgments others may make from the scrap of information (and which the user is motivated to answer). This is a rich area of investigation. Researchers in the domains of art and cultural studies have investigated how it is part of human nature to enjoy revealing personal information to others (see for instance, July & Fletcher 2002). The recent phenomenon of digital storytelling, where users can create an autobiographical film and share it with others, is evidence of how there are certain invitations and hooks (affordances) that need to be designed into spaces in order for participants to be motivated and enjoy the experience of exchanging information with others.

Viewing this problem from another angle, perhaps the system could remind users that a piece of information sometimes fails to represent a situation accurately. The assumption of an information snippet being a 'true reflection' is questionable. A digital environment could therefore have an element of self-reflection designed into it. The environment could work like a mirror, reminding users that the judgments they are making about others could easily be levelled against themselves. This could indicate that it is not a good idea to rush to conclusions or to draw too heavily on small snippets of information. As a future research area, I intend to examine the relationship between the application of seamful design and how participants in a digital environment negotiate their identities and trust in more detail.

10.3.b Configure authenticity

In order to self-manage the data a participant is generating, the participant may want to configure the level of revelation to others via the shared context. The projects discussed in Part 2 showed that although authentic information was sought by participants, those providing information found that authenticity needed to be balanced against sensitivity. How can authenticity work as a value to be

configured by users? Everyone has their own understandings of what reality and truth are and how much should be revealed in an interaction. The work of Satchell (2003) explores how the management of truth is part of an individual's everyday functioning. Satchell creates interfaces to allow users to filter the information being sent out to different people to facilitate truth management. For instance, a user's boss might receive updates on a user's page saying 'Oh yeah, hard at work'. Simultaneously, the user's friends might receive messages saying, 'I'm down at the pub, who wants to join in?'

In section 1.2.c, I argued that trust-enablement is complex, because understanding trust as a relationship means that the needs of all involved need to be met. If trust-enablement were to be designed around a single-user perspective, then the design perspective would be about how a user could glean as much information about others as possible. However, a context is more complex than that, and the positions of trustor and trustee are not clearly demarcated. Thus the management of authenticity within a trust-enabling system needs to balance the needs of all users. A design needs to allow users to configure the level of information disclosure and authenticity that can balance these needs.

10.4 Affordances for flexibility

The pursuit of flexibility and 'incompleteness' (to make projects and concepts that are not seen as 'final versions' but placeholders that are under constant development) is another means to facilitate a shared context and to enable trust-relevant behaviours. A project set-up with this affordance allows no one party to have the final say on what the nature of a project is. If an interface is designed as a collection of nodes that participants can develop over time rather than as a static artefact, users then have the opportunity to shape their own environments (Reymen & Romme 2008) and to hold multiple perspectives simultaneously (Garud et al. 2008). As discussed in Chapter 9, technology is at a point where the development of incomplete and flexible projects is possible, and mainstream developers and communities have access to the knowledge and tools that allow their projects to connect organically with the work of others (Czarniawska 2004). It is no longer appropriate to come up with 'optimal solutions to defined problems' (Pandza & Thorpe 2009). The community and freeform projects

'Wikipedia' and 'Linux' are cited as examples of this type of approach and demonstrate how successful the incomplete project model can be in the current environment. The designers of these sites have used their creativity to create environments in which others can apply their own creativity (Reymen & Romme 2008).

10.4.a Configure questions

One function a user may want to configure in a shared context to create flexibility is the ability to query. An element of a trust-enabling system is likely, therefore, to be the degree to which users can ask questions. The interrogation might be of a system, an organisation, another user, and even the user himself or herself (as discussed in section 4.6). A participant in Chapter 7 highlighted the need to ask for further information. He pointed out that there are certain things that you need to know about a film, and sometimes if you are undecided in your position on a film, you need certain information to push you to see the film or help you make up your mind not to see it. He said:

> Sometimes as a reader you are wavering and you need to be tipped over, one way or another. It's not about which film is better but what mood do I want to be in? You may also be looking for a particular mood or tone for a particular audience. You need to know what gravitas the film has.

A question might constitute a request for more information or clarification. Being able to ask questions allows a trustor to gather the information she or he needs and to explore what information is required for trust. The ability to ask questions allows a re-distribution of the power differential between those involved in the situation. Participants are able to ask why, what and how of each other and explore the detail meaningful to them, and thus create a shared context.

Dolšak et al. (2003), in the context of public administration, point out that an environment that facilitates sharing by users should allow them to hold those who shape the environment accountable. Questions, therefore, should be able to be asked without concern for repercussions. Whether this is the case in all

environments is not clear. Trust-enabling systems will, in this respect, need to be sensitive to what kinds of question might reasonably be asked, to whom, by whom, and on what kinds of occasions. Online discussion groups, although containing geographically dispersed membership who may not be committed to each other, still manage to influence the behaviour of participants (for instance, what questions are asked) so that users are controlled to act in ways socially acceptable to the site owners (Wellman & Gulia 1999). For instance, Davies (2003), building on the work of Wellman, observes that there are several challenges social networking site owners need to deal with, including 'trolling', whereby users act in deliberately provocative and disrupting ways to upset other users, and 'free riding', whereby users do not actively participate in a digital environment, but reap the advantages from involvement in the site. The agenda of trust-enablement may involve providing the facility for participants to decide, on their own terms and value systems, a shared set of expectations about behaviour including how questions are asked and responded to. In this way, rather than decisions coming from the site owners, participants shape how interrogation and information is negotiated.

Transparency of information is an ingredient for trust enablement. Urban's (2005) research argues that users appreciate when a trustee presents all the possible information that a trustor might need. A motorcar showroom owned by one car manufacturer that demonstrates other models of cars is an example. Potential customers are then given the opportunity to compare the different options for themselves. The car manufacturer demonstrates a faith that their model will win out against comparisons with others. A digital environment has qualities of interaction that can be harnessed for this affordance.

What type of questions might users want to ask? There might be a need for clarification, or for more detail. Different users might want to ask questions to provoke further interactions with others for socialisation. Sometimes the questions are assurances about how information will be used. In the report for B.T., one participant had concerns about how information she had disclosed might be used against her. She said, 'If I buy a book, and the book is tagged, assumptions are made. The system could be used to judge me. I want to know that the information

about my book will not be used again'. Some users might want assistance with forming a question or knowing what questions to ask. This functionality, however, crosses into the area of education and guidance and is beyond the scope of this research area. As mentioned in section 1.2.b, the agenda of trust-enablement can support the user to conduct trust but cannot make a decision on someone's behalf.

A recent art project utilises digital technology as part of its creation. When visitors arrive at the project, 'We Feel Fine' (Harris & Kamvar 2005), they are greeted by a question they need to answer in order to be able to enter the site. A previous visitor to the site posted the question and the answer provided will be sent directly to him/her. Once the user has provided an answer, she/he has the opportunity to ask his/her own question. The body of the site contains an archive of questions and answers previously explored. The site provides an opportunity to reflect on the type of questions users may like to ask if there were no societal constraints, and to compare these to the questions of other users when given the opportunity of anonymity. I include mention of this project in this discussion of configuration of questions and trust as it is an example of how a lateral approach to digital functionality can provide an experience that allows connection between users and also self-reflection.

10.4.b Configure understandings of time

Should a shared context aim to keep participants engaged or assist participants to make a quick decision? As discussed in section 2.3, conventional interactive design principles seek efficiency, speed and a reduction of complexity. This type of interactive design approaches concepts such as trust by providing a user with the quickest automatic solution. I argue in this section that the path of keeping options open needs to be explored further as a possible beneficial situation. A digital environment in the form of a shared context that allows a user to configure understandings of time can support this endeavour. The issue of time and timeliness is a critical factor in many interactions, as it affects how people integrate and synchronise with each other. When exploring how people use time, Clarke et al. (2006b) find that their arrangements are often based around negotiation and experimentation, rather than purely rational processes.

Time is a contextual understanding; different cultures divide and structure it differently with various techniques to build continuity between what is considered the past and the present (Zerubavel 2003). Thus different participants in a digital environment may have varying understandings of how time works and also the importance of time – understandings that shift according to circumstance. Zerubavel (2003, p. 110) argues that those in an interaction tend to hold different conceptual 'maps' of time that emphasise what is important to a particular perspective. For instance, nations tend to divide time into segments that reinforce their dominance and military victories. Combining different maps, perhaps in the form of a shared context, can offer a 'multilayered' and 'multifaceted' elucidation. If users could negotiate an understanding of time between each other, then trust could be enabled as different participants could seek time arrangements that suited them.

Many researchers argue that a trustee is advantaged if a trust decision is expedited. Keeping a trust decision open can be resource intensive, as a trustor needs to keep monitoring a situation and continually deciding whether to trust or not. As Fukuyama (1995) writes, the consequence of this is that a solution that is proven to be trusted can command a premium price. Although arriving at a position of trust reduces complexity, a definitive position is not necessarily ideal. Trust can make a trustor vulnerable. On the other hand, distrust can remove future possibilities. The agenda of expediting trust has a synergy with conventional thinking about interactive design of digital systems that seek to do everything as fast as possible for the user.

The conventional perspective is a reflection of the economic roots of trust research that has influenced current thinking. I agree with Ashraf et al. (2006), who argue that the economic perspective on trust emphasises the negative aspects of trust, and encourages a position of 'no trust'. This happens because in order to expedite trust, low risk options are pursued. In turn, this means that options that could be fruitful are dismissed too quickly. Conventional and traditional options are privileged over options that are new, innovative or unknown. Both trustor and trustee have the potential to lose in this scenario. More complicated and richer approaches to the use of time, trust, and digital environments are necessary. Judith

Donath (2006) maintains that there are some aspects of human life that cannot be 'short-cut'. Trust may prove to be one of these aspects.

Perhaps an optimal position for a user is to keep a trust interaction open at the smallest cost possible, neither committing to a position of trust or distrust. How can the affordances within a digital environment be designed to facilitate this arrangement? There are two design paths. One approach is the design of engaging systems that participants wish to stay in, rather than systems that are regarded as calculators that should be exited from as soon as possible. Supporting the user to keep options open is another potential design path to pursue. The research area of decision-support systems can offer examples of how this affordance can be achieved – how best to help users comprehend and manage different options. For instance, short-term memory can be assisted to help a user keep the different possibilities open to him/her.

10.5 Limitations

This chapter proposes a radical re-thinking of how trust is considered in the interactive design of a digital environment. It is an initial sketch that attempts to conceptualise problems (problem setting), not a detailed proposal for a new design. As discussed in Chapter 9, a design proposition needs to consider an overview of a situation because the discipline of design holds that all manner of elements may influence a situation and require consideration. The disadvantage to this outlook is that it is difficult to cover a raft of issues in detail. My approach attempts to draw from theories in the social sciences to conceptualise the problems of trust and integrate different perspectives on trust. This involves extrapolation and this type of process is risky, as sometimes links are made that are not relevant. Sometimes it is difficult to distinguish which extrapolations are useful without extensive exploration.

Part 2 found that participants may be more interested in negotiating trust interactions than the research area may recognise. However, by placing trust in the foreground of an interaction, the shared context I currently propose does put an overhead on participants by asking for attention to trust that may be unwelcome. Some participants may be unwilling to manage this interaction, for a host of

reasons. As mentioned in the conclusion to part 2, more detail about the type of trust interactions users may be interested in is an area for further research. Insights from this research could help inform the design of a shared context that works with the knowledge of which type of trust interactions are regarded as interesting to participants and why. This problem could also be informed by work undertaken by socio-technical researchers exploring what is known as the 'cold start problem': how to integrate new users into a digital environment without overwhelming the user but allowing the user access to the advantages of the site as soon as possible.

How participants decide to form a judgment is not explicitly addressed by the approach I have described, and this is a direction for further exploration. Several researchers provide groundwork to draw on. Jøsang (2009) applies the notion of subjective logic to trust. Rather than conventional logic, which works with judgments of 'true' and 'false', subjective logic works with more nuanced notions of individuals' subjective perceptions of what true and false might mean. On the other hand, Castelfranchi (2004) argues that while perceptions of trust might be nuanced, the decision to act on trust is binary, as it is a situation that either happens or doesn't happen. A trust-enabling environment should arguably engage with the decision-making style of the participants in a shared context.

Very few commentators have discussed the negative aspects of trust-seeking behaviour in any detail, and arguably the above framework pays too little attention to the problem of risk. Any approach that enables trust needs to incorporate how to enable risk and embrace what is considered an acceptable risk for an individual and what someone might be prepared to lose. However, risk, like the notion of trust, resists conceptualisation (Marsh & Dibben 2003). For instance, a participant in a social networking site might reveal her birth date in order to receive birthday wishes but it is unknown what the ramifications of this disclosure might be. Enabling trust may involve untangling the complexities of risk for participants; this is another possible direction for future research.

10.5 Conclusion to chapter 10

Applying insights from undertaking the projects described in part 2, this chapter has outlined a series of trust-orientated design elements that a designer can place in a digital environment and how the user may configure them. Figure 15. is a table summarising the affordances and configurations argued in this chapter.

Summary of Affordances and Configurations
Affordances for familiarity
Affordances for the crossing of gaps Configure subject matter Configure aesthetics Configure language
Affordances for self-management of data: identity work Configure information disclosure Configure authenticity
Affordances for flexibility Configure questions Configure understandings of time

Figure 15. Summary of Affordances and Configurations

Underlying my approach is an extrapolation of insights from ways the social sciences have studied trust. The concept of a shared context is a response to the problem of how strangers can conduct trust relations in a digital environment. It is a digital environment that attempts to allow participants to negotiate trust and distrust on their own terms and thus enable trust. The shared context I propose works with the insight that although participants are idiosyncratic with how they might value different aspects of trust, participants do tend to reach trust interactions via relatively structured ways. The trick is to transfer these relatively structured ways into design features in a digital environment. The work described in this chapter contains a series of affordances and configurations that are

especially designed for trust relations. Rather than focusing on one part of the problem in detail, this chapter has provided an overview of the proposition. As argued in Chapter 10, design needs to be considered from a holistic perspective as design is always subject to the wider situation within which the proposed concept exists.

Underlying trust is the process of familiarity. Participants in a trust interaction seek to understand the intention and perspective of others. In order to help participants reach a degree of familiarity, I argue that a shared context needs to be a bridge, facilitating a connection between disparate entities and reducing the level of complexity. The first affordance required of a trust-enabling shared context is the ability to cross gaps. This is the allowance for the exploration and negotiation of unforeseen tangents between participants. The system should allow participants to change their minds, rather than adhering to static commitments, and to keep participants communicating within a system. The ability to negotiate with other perspectives is a skill, and the shared context I propose intends to support participants in the negotiation endeavour. This is not to say that a trust relationship is encouraged as the outcome. Distrust may be the result of continued negotiation and the realisation of where another user might be coming from. Aspects users may want to configure to facilitate the crossing of gaps include the content matter exchanged in an interaction and the use of language within a digital environment. The technology and culture of 'tagging', within which groups of users apply and trade descriptive words to categorise content, may hold potential for the application to trust-enabling technology. Aesthetics, including how text and image combine to create a narrative, also play a role. These are all aspects that a user may want to customise when negotiating and communicating with others in a digital environment. The use of these elements may express certain ideas to others and help others understand the perspective of a participant in a digital environment.

The next affordance required is the allowance for the self-management of data and for participants to undertake identity work on their own terms. As participants cross gaps and explore the perspectives of another, they need to manage the information and data they are emitting as a result of interactions on

the internet. The practical projects in Part 2 found that participants are idiosyncratic in how they understand the information communicated by others, and thus participants should be given the opportunity to explain and provide reasoning in relation to information that others may use to form trust judgments. Social networks are provoking an unprecedented amount of material about users – information that can be searched and saved by all on the internet. As this phenomenon is new, we do not know the impact of this function on people's lives. Critical design research has developed a range of strategies that help remind users of the fallibility of technology. These strategies could be applied to how users understand the representations of others' interactions. Participants may also want to configure how much information is revealed about them. Authenticity of information was repeatedly raised as an issue in the exploration of the practical projects, however during the project described in chapter 9, I found that the revelation of information can be a fraught process and requires sensitivity. Thus an interface, if it is to balance the needs of all those involved, cannot simply pursue the inclusion of authentic information.

A shared context also needs to afford for flexibility, to respond to the needs and actions of participants. Keeping a digital environment incomplete allows no one stakeholder to claim complete control over the environment and keeps options open for negotiation. Within a flexible environment, a participant may want to ask questions and interrogate a system. It is well-documented that the designers of digital environments can create spaces in which participants can self-police each other (Wellmann & Guilia 1999). A possibility for a trust-enabling environment is the provision of opportunities for participants to negotiate between each other how behaviour is moderated in an environment, including the definitions of acceptable behaviour. Another aspect a participant might want to configure within a flexible environment is the use of time. Time is a context-bound concept and different users may bring a raft of understandings and values to an interaction. Rather than assuming that an expedited outcome is beneficial, a flexible environment could allow participants to negotiate their own timelines. Participants could have the option to keep their trust interactions open rather than committing to one path.

Chapter 10 presents a proposition for how a shared context could enable trust in a digital environment. A set of design features, in the form of affordances and configurations, are required to lay the groundwork for the shared context. Affording the crossing of gaps requires the act of inclusion. Allowing the user to configure the type of content included in the environment and use of visuals helps participants cross gaps and understand each other's perspectives. The user needs to also be provided with the affordance of the self-management of data to negotiate trust relationships. The level of revelation and authenticity requires configuration by the participant. A shared context also needs to remain flexible to respond to the needs of its participants and to stay open so that the ownership of the space is not dominated or claimed by a single stakeholder. As a first step, this research has provided an overview of how a shared context might work. Future research might involve examining each aspect of a shared context in detail. As Dolšak et al. (2003) point out, the links between different parts of an environment (for instance, how information flows from one part to another) require consideration in the design of a functional shared context.

An attempt to design for trust-enablement has limitations, and the notion of a shared context is no exception. During this thesis I have demonstrated that trust is often an idiosyncratic decision for the trustor. Trustors are influenced by small details that may connect with their past experience. For instance, a person may be reluctant to trust someone who likes a certain movie, because the person holds strong opinions about that movie. Thus, a system that helps people make a trust decision on their own terms may simply indulge the user's prejudices and not necessarily assist users to make what might be the best decisions for them. Although it is not of interest to this research to be able to claim what is the best decision for a user, this limitation requires recognition. Chapter 11 presents an outline proposal for a shared context.

Chapter 11: How to become trusted: the chameleon interface as a shared context (an outline proposal)

The original motivating problem of this thesis was: from an interactive design perspective, how can strangers become confident to trust or distrust each other in a digital environment? Via the exploration of practical projects, this thesis has gathered insights into how trust works in different contexts. This knowledge has been applied to propose a shared context as a means to enable trust in a digital environment, as described in the previous chapter. That discussion has been in the abstract. A more practical consideration is required to provide the reader with an explanation of how a shared context could be applied. This chapter therefore provides an example of how a shared context could work with a particular agenda, that of how to 'get trusted', in the form of an outline proposal. It provides an understanding of how a trust-enabling interface can work in action.

In this chapter, I provide an example of a shared context that could assist an individual to become trusted by a particular community. Throughout this thesis, when considering the position of the user deciding how to proceed, I have presented an agnostic position on the difference between trust and distrust; both are equally valid options for the user. Nevertheless, it is a reasonable supposition that from the point of view of an individual user, they would want to gain the trust of others. Hence, a fundamental purpose of the proposed interface would be to facilitate that process whilst at the same time giving others the opportunity to make reasoned assessments about whether or not to trust the actor. In this thesis, I have argued that users are interested in trust as a concept, and hopefully the user of the 'chameleon interface' would therefore be intrigued by the representations of trust in the interface and the opportunity to reflect on the different patterns of trust emerging from a community. Thus the use of the interface would be an engaging experience in itself, providing an insight seldom accessible in everyday life.

I am approaching the problem set by this thesis by proposing a system that advises/guides a user on how to become trusted in a specific digital community. As raised at certain points in this thesis, one line of trust research explores how the valuing of trust encourages homogeneity. Some argue that trustors tend to

trust those who are like themselves or share similar group membership. For instance, during the interviews exploring trust at work undertaken for B.T., I found that continuity, how long someone had been involved in a community, was very persuasive in trust considerations. Additionally, trustees are more likely to behave in a trustworthy fashion due to the cost of rejection by a community and reputation damage of untrustworthy behaviour. Chapter 8 found that participants within a documentary were very careful in their considerations of others, and the community had nuanced standards of acceptable information disclosure.

The proposed system, which I call 'the chameleon interface', provides a visualization of how trust works and what types of trust evidence are valuable when applied in a particular setting or community, thus assisting the 'acculturation' process. This would allow a user to understand the various features of 'trusting' behaviour which would typically be found in a setting, and would guide them in relation to how best to structure and provide relevant content. The term 'chameleon' refers to the animal that integrates with its surroundings by adopting the colouring of its environment, and was adopted by Marsh and Dibben (2003) in relation to trust management. The system I propose is intended to help those excluded from or new to a certain community to be able to explore the trust signals valued in that context and perhaps enter into the transactions undertaken by that community. An underlying aim is to provide assistance with the negotiation of the familiarity process. The proposed interface would explore how those already in a community prefer familiarity to be established between individuals. For instance, what type of trust evidence do members of a community seek and how do they prefer the evidence to be displayed? Also, what type of timing between exchanges is regarded as appropriate? The chameleon interface would allow the user to decide and let the user configure whether to replicate the trust values already held in the community or whether to use the system to work out how to communicate the user's 'real' values to a community.

An interface that analyses how trust functions in a particular setting needs to be dynamic, capable of taking advantage of feedback and evolving in response to changes across time. As reported widely in the research (for instance, Pentland 2008; Nooteboom 2006) and explored in my research, the interpretation of the

intentions of others is highly significant in the trust interaction. Users realise that it is possible to fake the signs of a trustworthy intention, thus they are continually trying to gauge the authenticity of information in a trust interaction. If it becomes commonly known that a certain sign of trust is faked, then that sign loses value and credibility and is instead replaced by other signs as reliable indications of trust. For instance, in the case of an individual seeking the services of a certain type of tradesperson, if it becomes known that a certain trade license can be forged, then individuals will not value that license. In this instance, other indications to trust become more important, such as recommendations from friends who have employed a certain tradesperson.

Implications and ethical problems are raised by the proposition of a system that demonstrates how to be trusted. Ahn and Esarey (2008) explain that systems that provide some sort of information about what is expected as trustworthy behaviour (for instance, eBay), actually foster trustworthy behaviour because users can learn from the system. According to their research, untrustworthy participants start behaving in more trustworthy ways. This phenomenon raises several questions, including: Does such a system help and encourage a user to 'fake' trustworthy behaviour? Does a system simply contrive trust and strip away the value of an authentic interaction between people? And if such a system existed and functioned robustly, could it help those with damaging intentions infiltrate a community, for instance, help a paedophile become trusted by children? These questions are valid, but should not stop the consideration of how trust is constructed in a digital environment, in particular, to help an individual gain the trust of a community.

11.1 Introducing the chameleon interface

The Chameleon Interface would be an observation tool that gathers data about how trust and distrust function in a certain situation. It provides a user with the trust and familiarity data relevant to the setting so that the user can apply this information. Underlying the system is the analysis of language and imagery used by the digital environments frequented by a community of interest. Patterns are drawn from which language and phrases occur from member interactions. The

system can only attempt to predict as every new future context is unique and is shaped by a multitude of influences. Use of the chameleon interface is private; other users may not know who is accessing the tool. This section provides an outline description of the proposed chameleon system, specifying the affordances, what the user would need to configure, and what themes of information would be reported on by the chameleon system.

Researchers argue that those in a trust interaction look for certain evidence to trust. Cofta (2006) has summarized the different opinions expressed in the research and claims that the evidence to trust can be divided into 3 categories: continuity, competence and motivation. In this thesis I have argued that users are idiosyncratic in how they seek and understand evidence to trust and that an interpretation is always context-bound. For instance, during the projects described in Chapters 5 and 6, I found that users were idiosyncratic in how they interpreted pieces of text reflecting continuity, competence and motivation. Thus, I have established that individuals have their own definitions of what the concepts of continuity, competence and motivation mean across different contexts. By analysing an exchange, the Chameleon Interface seeks to source a common understanding of trust evidence within a community and how trust is expressed, received and negotiated. For instance, how is competence regarded? Is a skill in a certain area valued more highly than competence in other areas? How is continuity valued? Is the length of time an individual has existed in a community regarded as important? Or are other measures, such as the amount an individual has invested, regarded as having a closer link to trust? Furthermore, how is motivation valued and expressed within a particular community? Is it interpreted as commitment? Or as the expression of positive intentions?

The affordances, configurations and themes of information reported on by the system are informed by this thesis's finding that although trust is idiosyncratic, trust (and distrust) evolve in relatively structured ways. The Chameleon system operates by implementing processes and techniques that trustors use as a basis for trust. The system also provides guidance in relation to the idiosyncrasies that may be relevant to trust previously displayed by those within a community.

11.1.a Possible technology to leverage from

The research area of information visualization provides several technology options that could be leveraged off to create this interface. Information visualization is a medium that is gaining in importance and new developments are constantly being introduced. Interfaces in this area of development use technology to source and aggregate data from a range of accessible websites. For example, 'word cloud' technology provides an image to the user depending on the text input fed to the interface. The number of occurrences of words in the original text influences the size of the word in the presentation. There are personal information generators, at which users can fill out a survey and then compare their answers against others in the community. Other technology sources data from social networks and demonstrates which types of messages are seeking the most attention (for instance, http://infosthetics.com).

11.1.b Setting up the chameleon interface

Initially, the user needs to provide the chameleon system with a description of the environment of interest. This is in order for the system to lift data from different sources and to be able to report on the trust behaviour valued in that environment. From the demographic information, the system can develop a profile of those in the community and their past interactions to build predictions of trust behaviour. Gathering this information involves investigating the following: who are the relevant people involved in the community?; what are the relevant URLS for these people (for instance, emails, homepages, social networking presence)?; what are the occupations of those involved in the community?; what links the members of the community?; and is there a core issue or pursuit uniting the community?

11.2 Sections of the chameleon interface: affording the crossing of gaps

The chameleon interface would have a range of sections advising the user on different areas of trust evidence (what is valued and how these values are expressed and negotiated). Each section has affordances placed by the designer, aspects to configure by the user, and information reports shaped in response to the community being analysed by the interface. One aspect of the interface helps its

user to cross the gap from being ‘unknown’ to being ‘known by the community’ the user would like to be trusted by.

11.2.a Use of subject matter by the community of interest

When building familiarity, people exchange content in the form of subject matter, knowledge and personal disclosure. Communities of people choose to value interactions about certain topics and themes. The chameleon system reports on what is of interest and preferred by a group of people by analysing online interactions undertaken by the community of interest. In Chapter 6, I found that participants in my project, when asked to choose information categories available from social networking sites, were idiosyncratic in their choices; participants sought a range of information categories. The chameleon system seeks to find what types of information are the most popular for a certain group, perhaps through analysing how a group of people have tagged information in the past. The user can then use this knowledge to display a connection between himself or herself and the community under exploration.

11.2.b Use of aesthetics by the community of interest

This part of the interface considers the type of aesthetics regarded by a community of interest as trustworthy and how subject matter is expressed through visuals. Design always appeals to one worldview over another and is never neutral. This aspect of design was reinforced for me as I tried to arrive at an appropriate style for the project described in Chapter 6. It became evident that it was not possible to design visuals that did not express a value and did not draw the user’s attention.

Users have different preferences for visuals that indicate trust. To some users, ‘corporate style’ graphics provide grounds to trust. This style is read as the designer holding traditional graphic skills and provides an aura of authority to the digital environment (Swaak et al. 2009). However, other users may not trust ‘corporate style’ graphics as they may think this style reflects an adherence to business values at the expense of relationships. When designers are creating for a specific target audience, they consider the values of the target group and try to appeal to this sensibility. The chameleon system works with this perspective and

seeks to analyse how a targeted group respond to and express identity via the medium of visual communication.

By analysing the visual style of the websites frequented and recommended by users of a community, the chameleon system can determine the graphic style preferred by a community and also the styles considered trustworthy. The system can then provide the user with a collection of visuals used by the targeted community. By providing access to an overview of visuals, the system gives the user the opportunity to compare and contrast these visuals. Visuals work together to provide a narrative. The resulting analysis may demonstrate that certain colours are popular in conjunction with certain imagery. Deductions could be made about how continuity, competence and motivation are expressed in a community. For example, if imagery of nature is popular in a community, then it could be possible that members of the community are motivated by a concern for the environment, and regard competence as the ability to be environmentally aware. Continuity may be the valuation of re-using materials and resources across time.

The chameleon user may want to use this information sourced by the chameleon system to inform decisions about what visuals are used in his/her web presence. The user may wish to re-design the visuals associated with his/her digital identity in response. For instance, the user may wish to change the thumbnail image associated with his/her Facebook account. Or perhaps the user may wish to re-consider the style of visuals on his/her personal website presence. As members of the community build familiarity with a user of the chameleon system, the user will express similar values to those held by the community.

11.2.c Use of language by the community of interest

The chameleon interface also explores the role of language in the expression of values in a community. Clark (2006) has noted that language is inseparable from social capital, and the way in which someone uses words to bond, bridge and link with others impacts on an individual's tangible and intangible wealth. The study I undertook in Chapter 7 demonstrates how the use and style of language impacts on trust and relationships. Different individuals and communities have preferences regarding how language should be used and also draw inferences about someone's

trustworthiness based on the way they use language. The use of language, for instance, the choice to swear, use technical language, or apply different levels of familiarity, can work to include some visitors to a digital environment while excluding others. In Chapter 7, I found that the use of adjectives and adverbs are given particular attention when an individual is drawing inferences from the use of another's language. Some prefer minimal use of adjectives and adverbs and find them disruptive, while others wish for the persuasiveness and guidance they believe adjectives and adverbs offer.

The issue of language is in-depth and complex (Clark 2006), meaning that an interface that addressed all aspects of language is beyond the scope of this research. As an initial prototype, the chameleon interface could collect data on the use of language by a particular community, and could guide its user through a conversation with a community member by advising on aspects of an interaction to allow the user to express him/herself in a fashion trustworthy to that community including the words used for greetings and conversation exits. The interface could deliver this advice because it has analysed the use of language displayed in a community. The level of formality of language is another dimension for consideration. This includes whether members of a community address each other in a casual fashion, or is communication of a more formal and distant nature? The Chameleon interface could indicate how adjectives and adverbs are used by a community. A system could also advise on what types of words and expressions are used to convey trust, including continuity, competence and motivation.

11.3 Sections of the chameleon interface: affording the self-management of data

As discussed in section 1.3.c of this thesis, digital environments provide the conditions for users to undertake a high level of information disclosure and identity work. Users of sites, such as social networking sites, reveal their priorities and biases on an everyday basis to a very large audience. The disclosures of users are saved in digital environments and can be searched and distributed very easily. Within these conditions, users who wish to become trusted by a specific

community need to manage their disclosures as the information left behind can be used as evidence at a later point in time. Different groups of people have different standards in relation to how identity is negotiated and displayed. Managing the messages one generates includes considering the indirect signals to trust that others might read into a transaction. One aspect of data interpretation worth exploring further here is the gauging of authenticity.

11.3.a Configure authenticity

In Chapters 7 and 8, the value of authenticity in a trust interaction was a focus. Trustors know that trust evidence can be faked and continually look for ways to verify the legitimacy of the trustors' claims. This can be through indirect signals to trust, which take time and investment to produce. The chameleon system can also seek to analyse a valuation system for authenticity in a certain community. A system could identify how different members of a community display their authenticity and how they determine the authenticity of others. For instance, in Chapter 8, within the discussion of the film professional project, one participant mentioned that when he reads a written document, he values the display of the writer's motivation. An understanding of the background of the writer helps him to trust the writer's testimony. This sign of authenticity may not be valuable to another community. For instance, others may instead value the university qualifications of a writer when considering whether to trust the authority of a written text. The chameleon interface can help a user identify and express the signs of authenticity relevant to a specific community.

11.4 Sections of the chameleon interface: affording for flexibility

If a digital environment is designed to enable trust between participants then an element of flexibility needs to be built into the underlying structure. The system can change in response to the needs demonstrated by the participants in the context. In order to help a user become trusted, the chameleon interface attempts to predict how a system might change.

11.4.a Configure questions

A system that enables trust allows participants to ask questions. Users reveal the concerns and priorities they hold in the type of questions they want answered. Sometimes the questions asked by users are recorded by a system and are available for other users to read. This record becomes another form of evidence used by participants in a digital environment to draw conclusions about other users. In order to become trusted, a user would want to ask the type of questions valued by a community. For instance, a community may value financial gain and may consider someone who asks a question about money to demonstrate competence and trustworthiness. The chameleon interface attempts to gather the type of questions asked in a community and presents them to the chameleon user. The user may wish to predict questions and make these queries in order to demonstrate trustworthy behaviour.

11.4.b Configure understandings of time and information disclosure standards

Several researchers have explored the delicate process of building trust. Trust is a negotiation between parties who make incremental exchanges and disclosures to build familiarity. Chapter 8 explored how importantly appropriate information disclosure was regarded by a community. Participants considered the effect of what they said on others and their trust interactions, constantly anticipating what others might do, say, think or feel.

Individuals have differing expectations of what is considered to be an acceptable exchange, including how the notion of time is considered and handled. Zerubavel (2003) argues that the notion of time is itself contextual and cultural and demonstrates how different societies divide up time differently to suit their priorities. Furthermore, there are differing views of the speed of exchanges and how quickly trustors are willing to expose their vulnerabilities to others (Donath 2006). When two parties with differing expectations interact, trust signals may be misread. For instance, in the situation of two parties meeting through an online dating site. One individual may wish to expedite the relationship, while the other

party believes that trust should be built more slowly. There may be negotiation problems between the two parties.

Part of demonstrating competence and trust is to indicate to other participants an ability to correctly manage the process and anticipate the expectations of a community. The chameleon system can analyse the traces of past interactions between strangers and community members and report on the speed and accepted disclosure style used in the specific community. The chameleon interface user can then alter the patterns of his or her negotiations as she or he sees fit.

11.5 Limitations and dependencies

For the chameleon system to work, information about the community of interest needs to be available and accessible. The information provided to the system about a community needs to be genuine and not in itself a faked construction. However, one of the most important limitations of the chameleon system is the risk of the user's behaviour appearing contrived. If the chameleon system produces advice for a user, and if all users of the system accept the advice and generate certain trust evidence, then there will be certain consequences. The actions of all chameleon users will then appear suspicious to members of the target community. To address this problem, the system would need to continually provide varied advice to the users of the system. The system could receive feedback on how the advice it provides is working. This knowledge would be absorbed by the system to provide advice to users in the future.

11.6 Conclusion

Chapter 11 has explored possible ways of appearing trustworthy to a certain community, as an example of how a shared context can enable trust via an outline proposal for a system. This perspective could be considered the 'dark side' of trust design. Rather than working with the honest representation of individuals in a digital environment, the approach is to examine how to contrive trust. Researchers such as Fukuyama (1995) have explored how trustors are more likely to trust those who they believe share their values or group membership. The result is a

tendency towards cultural homogeneity and closed communities, as exemplified by the family business, except where specific structures can enable trust on a larger and more diverse scale. For Fukuyama, the prime example of such trust enablement is the modern corporation. This chapter has described a proposition, the Chameleon Interface, which attempts to help those excluded from trust relationships in a specific digital community to enter into trust relations. It is possible that the user may find the Chameleon Interface an intriguing concept, as clearly some users find trust a concept worthy of interest.

The user of the Chameleon Interface would first need to set up the system by informing it of details of the community of interest. The system could then gather the data from a range of digital environments to analyse. The Chameleon Interface could then report to the user on different areas of trust evidence important to the community of interest, including how the values are expressed and negotiated. The aim of the interface is to help the user build familiarity and cross gaps in a fashion that indicates trust to a specific community. The system could provide information about what type of subject matter is regarded as important, and the preferred visual style. The user may wish to update the style of graphic representation used in his or her digital identity in response to the reports provided by the chameleon system. The use of language is also important in the display of trust. There are many different nuances that are expressed including the level of formality and the choice of whether to swear or not. Uses of adjectives and adverbs receive particular attention in the consideration of trust.

As discussed in section 1.3, digital environments provide the conditions for users to undertake a high level of information disclosure. Mutual Information disclosure is also part of the familiarity and trust building process. However, there are different information disclosure styles and inappropriate disclosure can result in a disturbance to trust relations. The chameleon system can help a user manage the data they generate by reporting on how a specific community unfold information to each other, for instance, how much time between interactions is deemed acceptable and the various levels of intensities. The system can also report on how authenticity of information is understood within a specific

community. There are limitations to this system, including the possibility that the information generated by the interface could appear contrived and not genuine.

Through a discussion of the Chameleon Interface, this chapter has set out an application of the research I have undertaken for this thesis. It has described how some of the ideas explored in the thesis can work as a practical project. In the conclusion that follows, I review the ideas this thesis has covered overall.

Chapter 12: Conclusion

The general research question initially identified posed the problem: how can interactive design enable trust in a digital environment? How can strangers have the confidence to know how to proceed in a digitally mediated interaction? My research includes a series of five practical projects that explore how trust is conceptualized by users and the trust research community and also how trust works as a practical accomplishment. These projects, undertaken over three years, have explored the limitations of trust research as it currently stands and suggested directions it may take, drawing on a body of knowledge developed by the social sciences. Notably, I have argued that trust needs to be conceptualised in more context-dependent and emergent ways, reflecting the ways in which trust emerges (or not) dynamically as part of interactions. In summary, I argue that users are more interested in the concept of trust than the research area currently acknowledges. If so, this finding has implications for how design should consider the user. I also found that users approach trust in an idiosyncratic fashion, dictated by their understanding of context. However, there are some commonalities in how users approach a trust interaction, largely based on the way in which stable interactions emerge, and these aspects should be considered in order to create trust-enabling design. Thus, although trust is idiosyncratic, it evolves in relatively structured ways that can be built into the underlying structure of a design. In chapters 10 and 11, I have applied the findings of this thesis to propose an outline for a shared context as a trust-enabling digital environment. This conclusion reviews those findings and the new research path they suggest.

12.1 Understanding trust in a digital environment

In this thesis, trust is conceptualised as a slippery and contested concept that cannot have a static definition applied to it, and does not lend itself easily to reduction. Trust is neither entirely subjective nor objective. As argued by Möllering (2006a), there is something ‘mystical’ and inexplicable about trust, otherwise the concept under consideration is not trust — and could more aptly be described by other terms such as ‘calculation’. As a starting point, I use the working definition of trust as the confidence of one person that another will work

in his/her interests and not exploit his /her vulnerability. However, trust is a highly personal concept. I argue that the notion of trust derives its meaning contextually, and is understood and defined by those within a situation as they go about their business. It is the fact that 'their business' is produced by their activities, and their activities have not always been adequately described in prior research that led me to the design approach of trust-enablement, which forms the model for design decisions proposed in this thesis.

Underpinning the approach of trust enablement is the aim of allowing participants in a digital environment to negotiate on their own terms whether to trust or not, and how to form relationships (Cofta 2007). This is a new development in the research area of trust, first developed in the domain of engineering. Thus I can claim that my research is the first to investigate how trust-enablement can work from an interactive design perspective. Previously, interactive design research into trust (for instance, Egger 2003) sought to give the appearance of trust or to coerce trust. Trust and technology researchers (mostly computer science and engineering researchers) have focused on the notion of the evidence and signs of trust and have attempted to divide trust evidence into dimensions and categories (see Cofta 2006 for an overview).

Much of the research undertaken by trust and technology researchers has worked with a constrained and deterministic understanding of trust; for example, the notion of the 'homoeconomicus', which has commanded a high level of influence in the trust research area. This is a conceptualisation of users as rational beings who prioritise the pursuit of self-interest. Many solutions for trust in digital environments have attempted to predict the most desirable action for a user as quickly as possible. Trust has received a lot of attention from engineering and social researchers because it is regarded as a valuable commodity for the user that can grease the wheels of trade, build social capital and help wield influence. Several researchers argue that solving trust can also help reduce complexity for a user, assisting him/her to move on to other tasks and expediting transactions. However, as discussed above, recent writing (for instance, Cofta 2007; Möllering 2008) presents a more complicated view of trust and points out that trust is formed by a combination of factors such as attitude and context that are difficult to

separate. The agenda of trust-enablement embraces a view of trust that is flexible, shifting and cannot be pre-determined. Trust is an important research area because it is a key component of human interaction and is a concept that requires explanation if users are to participate in digital environments.

This thesis has consistently found that technology researchers believe (with the exception of specific arenas where users need to control a trust decision) technology should automate trust interactions on behalf of the user. The practical projects in this thesis showed that users are interested in, perhaps even intrigued by, the concept of trust. The participants in the five projects of chapters 4-8 were keen to analyse and debate how they see trust. I do not maintain that all users are interested in all possible trust interactions at all times, but that in some situations users may be more interested in trust than the research area has previously given them credit for. A possible research path is to investigate in more detail what differentiates the type of decisions users are interested in from the type of decisions users are not interested in. I intend, as part of this future research, to present a spectrum of decisions weighted by the level of interest a trust interaction might spark. For instance, placed at the 'high level of interest' end of the spectrum may be the interaction of an internet dating encounter. An individual may be interested in how negotiations unfold. On the other hand, at the level of 'low interest' may be the interaction of a user as she or he passes through a security controlled door that is crossed every day. From the assertion that users are interested in the concept of trust, I argue that trust negotiations should be available in the foreground of some digitally mediated trust interactions. Usually, researchers seek trust to be in the background of trust interactions, automatically handled by a system without interruption to the user's interactions.

The types of trust relationships and negotiations that are possible via digital communication are shaped by the nature of the medium. Contemporary technology (for instance, web 2.0) is provisional, impermanent and in flux. Currently, digital environments are creating situations that challenge trust researchers. From traces of user interactions, a flood of data is created that can be saved, searched and distributed in ways that cannot be anticipated. Also, technology creation is becoming increasingly accessible to 'non-professionals',

dissolving the boundaries between users and designers as it becomes difficult to clearly demarcate the roles of users as distinct from designers in these new types of environments. The nature of design is challenged by these new conditions; I believe that the agenda of trust-enablement is appropriate for the needs created and shaped by contemporary technology environments. Users can enter into an infinite range of interactions with an unlimited number of people. Technology designers cannot pre-empt the type of trust interactions that might be entered into and trust-enabling design provides flexibility of structure to allow a range of encounters.

The aim of this research is also to explore what the discipline of interactive design has to offer both trust-enabling design and also the conditions spawned by the new technology developments mentioned above. Can the mainstream human computer design paradigm of user-centred design meet the challenges created as technology moves into more and more areas of everyday life? I found that user-centred approaches to design do not cater for the enablement of trust. Rather trust requires a two-way communication path – a relationship rather than an interaction. In practice, there is often little difference between a trustor and a trustee; someone who wishes to know whether to trust may also need to be trusted. The enablement of trust is therefore a relationship rather than a transaction. What approaches to design can trust-enabling design then work with? The research area of critical interactive design provides an established body of work to draw on. The aim of creating spaces where users can 'be together' in a sustainable fashion rather than the design of spaces where users need to be constantly engaged in active exchanges is identified by Boehner et al. (2008). Other developments that can be adapted for trust-enabling design such as the strategy of 'ambiguity'. Rather than allowing users to arrive neatly at one interpretation, a space can encourage a user to question an understanding and to remind a user that interpretations are subjective and shifting. Also, instead of presenting a project as a complete and finished environment, designers can create environments that are constantly in flux, changing in response to the needs of their users. However, the area of critical design tends to focus on theory rather than the practical application of design.

Moving from the traditional position of user-centred design to an approach that enables trust requires new approaches to design. User-centred design implies certain associated techniques such as interviews and mock-ups. However, the enablement of trust requires a study of practice. What mode of research can provide the approach necessary to support trust-enablement? I believe that combining critical design and a form of ethnomethodology can provide a mode of analysis suitable for the delivery of trust-enablement because these disciplines work with an open-ended notion of what might work for a user in a certain context and are open to the potential of new experimental approaches. Critical design grew out of concerns with the commercial bias of a considerable amount of early interactive design research, which has been dominated by principles of efficiency and automation, perhaps at the expense of relationships. The research area discusses strategies such as 'incompleteness' and 'ambiguity' as lateral ways to explore new possibilities for the design of digital environments. The strategy of incompleteness involves designing environments to be continually in flux, thus allowing fluid dynamics between participants. It is one critical design strategy that I have found particularly useful to the exploration of trust-enabling environments.

The other area of study informing this thesis is that of ethnomethodology. Ethnomethodology is a branch of sociology that claims that a context can only be understood by those within the situation, and focuses on inter-subjectivity and intra-subjectivity: how individuals reason, share and construct reality between each other. By not claiming an interest in and investigating the notion of a universal 'truth', the discipline side-steps questions of how perceptions are formed, allowing those interested in design to focus on the processes participants use to establish and maintain relationships. In my research, I adopt 'ethnomethodologically informed ethnography', a term coined to allow a more flexible use of ethnomethodology than its original exponents may have intended (Randall et al. 2005, p. 110). Combining design and 'ethnomethodologically informed ethnography' is not a straightforward task. Traditionally, the two disciplines have been separate. However, I agree with Randall et al. (2007) that both forms of knowledge should problematise each other to help create digital environments that can deliver the complex endeavour of trust-enablement.

In addition, my research utilises the cultural probe, which is a tool developed at the intersection of ethnomethodology and critical design concerns. A cultural probe is a data-gathering tool in the form of a practical project within which participants are able to collect their own data and may provide some sort of lateral or unexpected (by the researcher) response to a given task or instruction. Previous examples from the research area include the use of diaries and blogs (Stalker-Firth 2007) and postcards (Gaver et al. 1999). In my practical research I adopt the cultural probe in the forms of a game, the marking of a document used in everyday work, and a voiceover created to accompany a documentary. I believe that the cultural probe is an appropriate choice to explore trust as trust is difficult to pre-empt and researchers need to gain access to the processes of how individuals reach trust. Tools that allow open exploration are therefore required. Trust draws on what can be described as both 'rational' and 'emotional' sides of thought, and the cultural probe allows research into both what people feel and do as well as think.

However, most importantly, cultural probes have the potential to empower users to undertake their own research about themselves and their responses to particular situations. The boundary between researcher and designer are blurred. This aspect is not explored so much in the information-gathering projects I undertook in this thesis, but in the notion of a shared context that I propose as an approach to the interactive design of trust-enablement (reviewed in section 12.3 of this conclusion). This concept of a shared context is influenced by the practical projects described in the following section.

12.2 Exploring trust

How does trust work as a practical accomplishment in a digital environment? Part 2 of this thesis consists of a series of practical explorations, influenced by ethnomethodology, into how trust works. In particular, the focus of the practical projects was how users understand trust and the processes they work through to engage with trust. As I learnt from each project, I designed the next project and re-framed my exploration into the relationship between trust and context. Five domains were explored to provide insights from a variety of perspectives: a set of

interviews, a financial game, a virtual team exercise, an exploration of professional judgment, and an examination of trust when the content under consideration was highly emotional. In the second and third projects, information provided to participants was deliberately limited. This is to echo the type of conditions I am interested in, when participants create a trust context with limited access to the resources of reputation and the knowledge of what other people are doing. These conditions are a reflection of current digital environments.

The overarching finding from these projects, which is also one of the major contributions of this thesis, is that trust is an idiosyncratic accomplishment that is highly dependent on context. However, importantly, although trust is a highly personal interpretation, it does evolve in relatively structured ways. The trick for trust-enabling design is to tap into the methods users adopt when considering trust to create design features and to allow the user to configure the design to their preferences. I now review the practical projects and discuss the insights that were gained from them. The knowledge gathered from these projects informs the design proposition I offer as a means to enable trust in a digital environment. The design proposition, the notion of a shared context, is then reviewed.

12.2.a Review of the project featured in chapter 4

The first project was a series of interviews exploring the notion of trust evidence in the workplace. Interviewees were asked to discuss how they interpreted and negotiated evidence of continuity, competence and motivation and offered examples that illustrated the grounds to trust in the domain of work. I found that the responses, as the interviewees reflected back on a situation, supported notions of trust found in the literature.

12.2.b Review of the project featured in chapter 5

The second context explored was the situation of a financial game. Participants received small snippets of information about a character (in the form of scripted text sentences) and were then asked to judge the trustworthiness of the character by placing an investment with different options. Borrowing from the established form of trust games used in the trust research area, willingness to invest was

regarded as willingness to trust. The development of this project gave me the following insights, some concerned with the practical implementation of trust theory, and others associated more closely with how users perceive trust and how familiarity is formed.

The pre-preparation of trust evidence has limited application. Although the research literature explores the type of evidence used by trustors, it is difficult in practice to apply and interpret these observations to create trust. This reflects the complex nature of trust. To script content for this project, I used theory to inform sentences representing characters. For instance, the research tells us that continuity, the length of time a person has been involved in a community, is grounds for trust. So I scripted a sentence for a character to present to participants, 'He has provided goods for many people like you in the past'. However, participants found the trust statements within the game 'puzzling' and 'uninformative' without a clear guiding context. Participants sought to create a context in order to complete the task. The project highlights the gap that can sometimes exist between theory and practice. Trust can only be understood in context, and as every context is unique and only be understood by those in the situation, trust cannot be reverse engineered.

Trust is idiosyncratic and trustors look to unexpected sources in a digital environment to draw meaning. When the information was limited for participants, meaning was created from very little and participants worked to reduce ambiguity. Participants drew on their personal experiences and background in order to make sense and a trust choice. For instance, one participant who is a mother, said

> The statements were so simple that they reminded me of a bunch of little boys. It was like a bunch of kids asking me for money.

There was a variety of responses across the participant group. Participants also looked further than what I, as the designer, thought was the 'frame' of the decision space. Participants tried deciphering the space, such as seeking links between information found in different areas of the interface, to complete their task.

Trustors approach a game with a level of self-reflexivity and with a reading of what the situation entails. Participants in a game are aware that there are certain expectations that are constructed within a certain context and that their task

and tendency is to interpret and express their understanding and preferences within this scenario. One participant said:

> I wondered if you were testing responses comparing my emotional side or my rational side. I kept wondering which one I was valuing; business information or personal information. I guess trust is a matter of balancing both. That is what the real world is about.

Although this might be expected in the mode of a game, perhaps trustors have a tendency to understand context from this perspective in a wide range of situations.

Trustors are suspicious if no information is available. One preference was consistent across all the participants involved in this project. Participants were uneasy when there was no information about a character and there was an expectation that there should be. Trustors thought it must reflect negatively on the trustworthiness of the entity about whom no information was provided.

12.2.c Review of the project featured in chapter 6

The third domain explored is trust in the context of virtual teams and teammates. This project developed from some of the issues raised by the financial game project described above. If trustors are idiosyncratic when perceiving fragments of trust evidence, are they valuing the same types and general categories of information? What can this tell us about how familiarity is reached between participants in a work-based trust interaction? This project examines the categories of information trustors seek to create context and find grounds to trust (or not to trust).

On a website, participants were given the scenario that they were to pick someone to collaborate with in the workplace. In order to find out about the possible selections, they were instructed to choose three categories of information. The categories for the user to choose from were age, gender, educational qualification, current occupation, favourite quote, favourite music, favourite book, last electronic gift sent, favourite film, last bank transaction, contents of bag, and last three shopping receipts. These categories fall into three themes: ‘demographic information’, ‘personal preference information’ and ‘private information’.

The result was that, in this project, no one category was more popular than others. This is surprising because ‘demographic information’ such as education, occupation, age and gender are usually associated with work-related decisions. What might be driving these selections? Perhaps participants are idiosyncratic about where they seek trust evidence, and thus across our range of participants a wide selection of categories was chosen. Or perhaps because participants believe that personal or private information might be a reflection of what someone is ‘really like’, these categories are seen by participants as a means to gather authentic information about another. The creation of this project in the area of virtual teams produced the following insights.

Trust is personal, idiosyncratic and somewhat inexplicable. Similar to the insight in section 12.2.b, when the focus was the provision of minimal information to make a decision, our participants sought personal information as a resource to build trust. Certain implications for trust-enabling design follow. Trust can only be understood in context and not be fully pre-empted. If digital environments can allow participants to share and also manage the trust evidence important to those involved, then trust-enablement is facilitated.

The visual style of trust-enabling design is a fraught but unavoidable issue. There is no such thing as neutral design. The visual design of trust-enablement requires a consideration of what the project is trying to evoke. As the design of an environment influences behaviour and thought (to some extent), what type of visual appearance is appropriate for trust-enablement? A possible solution is to create environments that are infinitely configurable by participants. This means that the decision about what type of design is appropriate is put in the hands of the users. Thus design is a tool for participants to work through and reflect on trust evidence. A question leading on from what type of visual design is appropriate for trust enablement is the question of what state of mind does a designer want a visitor of a trust enabling site to be in? Relaxed? Alert? These questions are beyond the scope of this thesis and are explored by research areas such as psychology.

Unless a research scenario is ‘real’, participants are not likely to reveal what they might ‘really’ do. It is always questionable whether participants are

doing in a data-gathering scenario what they would do in 'real-life' (Sasse 2011). Therefore, we can only comprehend generally how individuals understand and approach trust and look for the relatively structured and general ways trust evolves. Thus trust-enablement is achieved by creating environments within which there are general ways of working that can be configured by users to reflect the nuances relevant to a particular circumstance.

12.2.d Review of the project featured in chapter 7

The thesis then moved to explore how trust works in the domain of professional judgment, within the area of film curatorship. Six film curators undertook a cultural probe, in the form of 'marking-up' a document that they find valuable in their everyday work. Trust in this domain, as defined by our participants, involves credibility and authenticity: how to interpret material provided by others. The following insights into trust and context were gleaned from the experience of undertaking this project.

Some facets of trust and design are common sense. For instance, the provision of well-presented factual information in a document allows others to access research and provides readers with a sense of collegiality (which can facilitate trust). The participants also raised the issue of reputation. Part of a reputation is the regard others have for the ability of the reputation holder to filter a mass of material and present recommendations. Also, our participants value authentic information. Professionals want critical and honest reporting, not the productions of marketing companies that are honed to convince and sell.

Trust can develop from similar processes and techniques, but the final analysis should be left to the discretion of individual users. In other words, users might have similar processes, in this case interpreting facts and how the facts are presented, but reach different interpretations. Our participants had different priorities that helped guide their interpretations. How can the design of trust-enablement cater for these different perspectives? One participant suggested a solution. If a writer provides to the reader the motivation (both personal and professional) behind his or her writing, then the reader is able to judge for himself or herself what the trust status of a document is and decipher the claims. However,

there is a tension here between the design for the complex, personal and idiosyncratic nature of trust and the design for automation that digital environments have traditionally been driven by.

Other insights about trust are more complex and are a reflection of how trust is personal and complex, and impossible to fully pre-empt. Trust 'filtering' and discernment are part of professional practice. As part of their work skills, our participants have a different perspective and emphasis on what trust information is valued. For instance, some professionals focus on how potential audience members perceive information. Others are interested in advocating the exhibition of the film. Interplay happens between how professionals understand the facts in a document and how the facts are presented in the document. Different professionals have individual preferences about whether a document should try to convince the reader. However, trust preferences of one user can be shared with other users. Although trust cannot be fully pre-empted, in this thesis I have explored how trust works in semi-structured ways. Some methods users adopt to explore trust are predictable and others are more idiosyncratic. Technology design can tap into what types of processes are more common across users and automate these aspects. The more idiosyncratic elements can be left to the user to configure. A future research area is to use the methodology of the cultural probe to explore which facets of trust are more predictable than others. This will help inform the design of technology such as recommender and reputation systems, within which the trust preferences of one user are shared with another.

Participants also found pleasure, the opportunity for expression of self and professional proficiency, in the act of deciphering trust. A potential future research path is an examination of the how the process of trust recommendations, either providing or receiving advice, can be designed into digital environments as a pleasurable experience. One of the issues in recommender systems design is the 'cold start' problem. Recommendations are based on prior experience and taste, and when a user enters a system, there is little or no information for the system to provide recommendations to the user. If a system could tap into how a user finds the exchange of trust information as a pleasurable experience, then a system could gather preferences about the user and side-step the 'cold-start' problem.

12.2.e Review of the project featured in chapter 8

The fifth and final practical project in this thesis explored how trust works in a highly emotional context: trust during the making of a documentary about single-car fatalities of young men in a particular community. An aim of the documentary was to create a trusted testimony that convinces young men to consider their behaviour on the roads. A designer who wishes to create digital environments that are shared contexts can learn from how the participants believe trust should be constructed on this project. Part of the documentary includes voiceovers with project participants. This research explores moments when participants discuss trust. I argue that although the project studies trust in an extreme situation, the findings are applicable to more 'everyday' situations. In the context of this documentary, it is apparent that trust is layered, interconnected and concerned with relationships rather than transactions.

Participants provided suggestions on how to create a trusted shared context. In Chapter 8, the documentary director recommended that a project should supply viewers with tools to reach conclusions on their own terms. He suggests how to create a context that convinces and motivates young men: 'You need to give them the tools to get through it themselves. The only way change can happen is when people feel like they are getting to it themselves and are not coerced'. The question from the perspective of trust-enabling interactive design is: what are the tools that help users reach their own conclusions? And what are the biases embedded in these tools? This is explored shortly in a review of my proposition of a shared context.

Understanding others' perspectives is a foundation for trust-enablement, according to the participants of the project. Providing a user with insight into how another approaches a situation and the processes s/he uses to deal with it can allow a user to understand. Trust research literature has often raised the link between understanding and trust, which equates to familiarity, as a key ingredient of trust. Another project participant adds that it is convincing when a viewer can draw an association between the content and themselves or someone they know. Allowing a participant to create a connection with content and emphasising

possible connections can enable trust. The participant drew this conclusion from his observation of different viewer reactions to the documentary.

Anticipation and consideration of how others might perceive the documentary both now and in the future, and also the impact of information disclosure on others, was raised by many of the participants. The potential for betrayal through mishandling information was at the forefront of the interactions discussed by participants. Participants acknowledged how sensitive the negotiation of trust is:

> You feel on the edge of wrongness – because of the position this project puts you in. It puts you in the middle of death and all the confusion people are in.

These insights provide guidance into how a shared context could enable trust. Some means to balance the needs for authentic testimony and sensitivity towards others can help users negotiate trust.

A final insight from this practical project is that a shared context works as a whole. This means providing the user with an understanding of how all the parts of an issue fit together. Trust-enablement is fostered because the participant is in a position of comprehension. Access to only one aspect of an environment does not facilitate understanding. This suggests that a digital shared context should aim to provide participants with a macro view of an environment as well as the possibility to access interactions at the micro level.

12.3 Design proposition: a shared context

In this thesis I present the notion of a shared context as a proposition for trust-enabling environments that can be adapted to specific design projects. A shared context is a digital environment that participants can configure to receive, manage, and negotiate trust (and distrust) on their own terms. To create such an environment, the designer needs to establish certain design features relevant to trust that can be configured by users.

The insights gathered through this thesis's practical projects are translated into this design concept. The aim is to provide a general overview of how such a

shared context concept might work. As argued in Chapter 9, design research (unlike scientific pursuits) needs to consider a situation as a whole and acknowledge that many variables feed into an understanding. I present the proposition as a sketch that can be filled in with detailed future research. The proposition should be seen as an initial attempt to apply and translate this research so far. The aim of a shared context is to create a bridge between participants in a digital environment allowing a connection to be created and sustained. I argue that this concept enables trust because it places the defining of trust in users' hands (side-stepping the problems involved in pre-defining trust) and allows users to negotiate trust and familiarity on their own terms. Trust is understood as a relationship rather than a one-off transaction.

As mentioned earlier, the proposition of a shared context works with the general ways that users approach trust; it then leaves it to the user to configure and fine-tune the environment to his or her preferences and the nuances of the particular context. It is an exciting time to research how trust works in digital environments as technology is increasingly promising to deliver radical new relationships for users. Boundaries between users and creators are dissolving and researchers are contemplating how flexibility can be built into the internet to allow the co-existence of multiple perspectives. I now explain the features that I argue should be placed in the shared context that are both relevant to and support how users build their view of trust.

12.3.a Flexibility and Incompleteness

The pursuit of flexibility and 'incompleteness' to create digital environments that are presented to users not as 'final versions' but as placeholders under constant development is a means to facilitate a shared context and to enable trust. A project set-up with this affordance allows no one party to have the final say on the nature of a project. Rather than a set code of conduct, users can negotiate together how a digital environment is policed. The understanding of how time is used is another element to be negotiated in a shared context, as different participants can seek time arrangements that suit them. Many researchers argue that a trustee is advantaged if a trust decision is expedited and seek to present a solution to the

user as quickly as possible. However, I argue that the optimal position for a user is to keep a trust interaction open at the smallest cost of effort possible, allowing the user not to have to commit to a position of either trust or distrust. This is because, although arriving at a position of trust reduces complexity, a definitive position is not necessarily ideal. Trust can make a trustor vulnerable. On the other hand, distrust can remove and close down future possibilities. How can the affordances within a digital environment be designed to facilitate an arrangement that supports users to keep trust as an incomplete relationship? There are two possible design paths. One approach is the design of engaging systems that participants wish to stay in, rather than systems that are regarded as calculators that should be exited from as soon as possible. Supporting the user to keep options open is another potential design path to pursue.

12.3.b Configurations relevant to trust

To be able to cross gaps, users need to be able to configure the subject matter under consideration by users of a digital environment. For instance, what type of issues are discussed? Some subject matter may be of more value to some participants over others, and users may wish to negotiate what is regarded as important in an interaction. For instance, dating websites initially constrict users to exchange a limited range of information. Height, weight and occupation are common categories. However, in a negotiated shared context, users might prefer to value other types of information, for instance, dress sense and conversation style. Tagging may have potential as a design technique to assist users to negotiate what type of subject matter is prioritised in an environment.

The configuration of visuals and graphic style (what the research area of marketing refers to as ‘look and feel’) is necessary for users to create digital environments within which they can negotiate trust on their own terms. The use of imagery such as photographs, illustrations, font and colour all contribute to the visual appearance of a digital environment. There is no such thing as neutral design and all visual appearances serve to attract some users at the expense of others. However, crucial to the discussion is how different types of visual

elements work together to create a narrative, and trust-enabling design can facilitate users to construct environments on their own terms.

The use of language is another area that requires configuration for the user to be able to negotiate trust on his or her own terms. There is a range of communication styles that can feature in an interaction. For instance, the use of technical language, swearing or formal address can shape an interaction. Rather than assuming that one style of language should be used over another, a shared context can encourage agreement between participants and problematise the notion that one style of language is necessarily better than another.

12.3.c Self-managing data and identity work

A large amount of data about individual users is generated across the internet. Users leave behind the traces of interactions that are accessible by an infinitely large audience. My research finds that users infer a lot from seemingly small snippets of information. This process, in turn, informs trust interactions between users. Therefore, some sort of self-management system of data can help a user negotiate identity. One approach is to help the user develop a context or explanation of the information traces she or he is leaving behind. The design of an environment can provoke a user to provide more information, perhaps by asking the user pointed questions that the user is motivated to answer. Approaching the problem from another perspective, there are other ways to enable trust when overly large inferences are drawn by users from small pieces of information. Users can be reminded of how insignificant a piece of information may be and that a fragment of information may not be necessarily reflective of a person or environment. The research area of critical design could be a valuable resource to provide guidance on how to build self-reflection into a digital environment. Design responses to this relatively new problem of the flood of data generated in digital environments are at the heart of the creation of trust-enabling digital environments.

Authenticity was raised as an important gauge of trust by participants across the projects undertaken in this research. However, the delivery of authenticity is not a straightforward procedure and requires careful negotiation, as pointed out by

the participants in Chapter 8, who were involved in the making of a documentary about road trauma. For relationships to be maintained, there needs to be a balance between authentic revelation and sensitivity with regards to the impact of information disclosure. As a trust-enabling shared context aims to encompass the needs of all participants rather than pursuing the desires of one user, the level and type of disclosure need to be negotiated by all participants. The facility to query a system, oneself and others involved in a digital environment enables trust. Participants are able to ask why, what and how of each other and explore the detail meaningful to them, and thus create a shared context. It may be that an individual seeks further information or clarification.

To close this thesis, I offer an example of how the shared context proposition might work to help a user become trusted and infiltrate a community by constructing trust. At various points in this thesis I have reported how some researchers believe trustors are more likely to trust those they feel they share values and group membership with. Thus it is difficult for those outside a community to enter and transact with a group of people. My proposed interface design application, the 'Chameleon Interface', seeks to remedy this situation. There are ethical issues raised by such a proposition, but it is still worth considering how trust can be contrived in a digital environment.

The Chameleon Interface is an observation tool that gathers data about how trust and distrust function in a certain situation and community. It provides a user with the trust and familiarity data relevant to the setting for the user to interpret. The system reports on the type of subject matter, aesthetics and language favoured by a community. The system also guides on information disclosure standards used by a certain community to build trust. Different groups of people build relationships at different paces, and also query information in a variety of manners. The user can then apply this data to inform how she or he may wish to present his or her digital identity. The aim of the interface design is to break the grounds for trust (as understood by the target community) down into parts for the user to interpret. How the user takes on this information is of course up to him or her.

An underlying theme of this thesis is the opening up of spaces and understandings. As discussed in Chapter 9, the role of research through design is not necessarily to solve problems but rather to re-problematise them. Often re-problematising includes exposing the underlying biases involved in a design situation and thus opens up possibilities. The use of cultural probes exposes the designer to surprises rather than constraining the choices and comments of a participant. The proposition of a shared context attempts to cater for a wide range of perspectives and interactions, and allows the user to keep their options open. Claiming an 'incomplete' status for a shared context allows users to regard a digital environment and the trust relationships within the context as under constant development. No one has a claim on what is right or finished, according to this approach. The valuing of openness works against the bulk of design and technology research that often seeks to de-limit a decision or design and provide a resolution as quickly as possible. Sometimes this is in the form of an automated algorithm. Many trust researchers argue that it is advantageous for the user to reach a position of trust as quickly as possible. This assumption should be questioned, because users need to be able to reach trust on their own terms, including the pace of trust exchanges. Trust cannot be forced.

This research shows, from a variety of angles, that an approach of openness is necessary for trust-enablement. As trust and distrust are highly personal perceptions which cannot be forced on individuals, a trust negotiation needs to be gained on an individual's own terms. Trust should not be regarded as a quick decision but as an ongoing relationship. Resolving a trust interaction quickly may produce negative results for the user. The user may then be in a position where she or he can be taken advantage of or may lose a gainful opportunity. Judith Donath (2006) argues that digital technology design aims to short-cut aspects of human experience and that there are some aspects that resist reduction and are inappropriate for such treatment. Trust is one of these dimensions, and I argue it requires a complex treatment. Users appreciate an environment that works in their interests and does not attempt to close them down and push them into a pre-determined option (Urban 2005).

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