Co-located Photo Sharing Behaviour Using Camera Phones

A thesis submitted to Middlesex University in partial fulfilment of the requirements for the degree of Doctor of Philosophy

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Abstract

Photo sharing on camera phones is becoming a common way of maintaining closeness and relationships with friends and family and can evoke pleasurable, enjoyable or exciting experiences. People have fun when sharing photos containing amusing scenes or friends being caught doing something 'naughty'. Recent research has seen an increase in studies that focus on the use of camera phones, remote sharing using online services or sharing in a home environment using different digital technology. However, studies that extend this focus to the equally important issues of how co-located sharing using camera phones occurs and what influences it are less common. In addition, there is a dearth of research that links photo sharing with user experience (e.g. pleasure, fun, excitement collectively called hedonic experience; HE).

The experience of photo sharing, however, does not exist in a vacuum but in a dynamic relationship with other people, places and objects and photo sharing is a social experience. This thesis explores the relationship between sharing practices within different groups of people and the various settings where sharing occurs. It investigates the situations when people experience pleasure, excitement or fun during the photo sharing activity. However, to understand the nature of HE using mobile interactive technology (digital cameras, PDAs, mobile phones) and what influences experiences a prerequisite is an investigation of photo sharing experiences using mobile phones.

The HCI contributions of this thesis include identification of different types of HE and their characteristics; provides factors influencing such experience and the vocabulary to help communicating issues related to HE when using technology. In addition, it proposes an empirically based Photo Sharing Components Model that captures the contributors of the photo sharing experience (Value of Photos, Social Affordances, Place Affordances and Technology Affordances) and the photo sharing scenario notations, which account for the different sharing behavioural phenomena occurring between different groups of people (e.g. family, friends, others) in different settings (e.g. private, public, work).

Finally, an account of how this model might be developed by further research is detailed.

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Chapter 1. Introduction

1.1. Introduction to this research

As technology continues to proliferate through our lives, there is growing interest in designing systems that would not only allow the users to perform required tasks but also, and more importantly, would provide them with an experience that is pleasurable, enjoyable and fun. The traditional usability challenge: designing for user performance has been supplemented by designing the user experience. There is a need for understanding human activities and technology that support these activities in various ways in new environments.

Interaction with technology is no longer just a duty or work requirement but is more about fun, play, and enjoyment. The transition between technologies being used in different environments indicates that we need to learn about how to live with emerging technologies, not merely about how to use them. We need to understand people's activities as well as how technology takes part in those activities and move from usability to 'new usability', which encompasses experience (Thomas & Macredie, 2002).

One of the technologies that allow its users to have fun and enjoyable experiences is digital photography. Photography has been a part of our life for a long time and has affected almost everyone; those who take photographs, those who view them and those who are captured on them. In recent years, there has been substantial interest in digital photography, with particular attention on how the digital medium facilitates sharing images (Balanovic et al., 2000; Frohlich et al., 2002; Van House et al., 2005).

Photo images play an important part of our life and are often used as a means of social interaction (Strom, 2002; Kindberg et al., 2005a,b; Van House & Davis, 2005). Social interaction can happen through photo sharing accompanied by story telling, one of the most common and enjoyable experiences (Chalfen, 1987; Balanovic et al., 2000; Frohlich et al., 2002). Frohlich et al. (ibid) suggest that viewing photo albums with pictures from the last holiday, family weddings, birthday parties or other family events during gatherings of family or friends is

not only a part of the entertainment but also something that creates bonding between the people involved.

There are different technologies that support sharing images; remote sharing using different web-based systems (e.g. Flickr, Kodak Gallery), mobile picture systems (e.g. MobShare developed by Sarvas et al., 2005) or different digital displays in a home environment (Frohlich et al., 2002; Lindley & Monk, 2006; Lindley et al., 2008). However, co-located photo sharing using mobile interactive technology has not been fully explored and this thesis investigates it.

In the past decade, mobile phones have allowed profound changes to take place in people's behaviour and practices in relation to communication (Ling, 2004), from being extensively used as a medium of verbal and textual communication to one that uses pictures to facilitate people's social life.

The popularity of using camera phones to communicate and pursue social interaction via sharing of digital photos is further testimony to the importance of the new ways camera phones have been used (Okabe, 2004; Scifo, 2004; Kato, 2005; Kindberg et al., 2005a,b; Ito & Okabe, 2005).

This thesis concentrates on exploring people's photo sharing behaviour (photo sharing being an example of users' positive experience occurring in a social context) in different co-located settings using personal technology (e.g. camera phones).

1.2. Motivation for research

This topic arose from the initial interest of user experience with technology. From the literature read it was apparent that the research in user experience had been directed in exploring negative experiences (e.g. frustration, anger) and problems that people experience when using different technologies, which affects not only completing a particular task but more so the whole experience of the technology used.

Knowing what creates negative experiences and what influences them, I wanted to learn more about people's positive experiences (e.g. pleasure, enjoyment, fun collectively known as hedonic experience). Observations of people using different mobile interactive technology in various locations (e.g. restaurants, pubs, bars, parks) revealed that positive experiences often occur in

social contexts. One of the most popular and enjoyable experiences occurring in a social context was the sharing of photos. There was a need to find out about people's pleasurable experiences when sharing photos.

Because this research does not form on work related technology, different types of mobile interactive technology supporting pleasurable and like experiences (hedonic experience) have been considered e.g. PDA, digital camera and camera phones. However, camera phones have been used as an example due to its popularity and variety of usage. Camera phones offer their users the immediacy of accessing and sharing their photos in different ways (e.g. on the screen, via Bluetooth, MMS or Infrared technology). The portability of camera phones and the fact that people carry their phones most of the time provide the opportunity for sharing to afford pleasure, enjoyment and fun to people's life. Camera phones allow people to 'catch and capture' their friends doing something silly or funny and then share the photos with others. This kind of photo evokes 'social fun' making people laugh and creating an atmosphere of a 'good time'.

Together, this prompted an interest in photo sharing behaviour in co-located settings using camera phones, both in terms of understanding how people share photos, with whom, where, what are the influential factors of the photo sharing experience and how technology (e.g. camera phone) can support sharing experience.

1.3. Research questions

The aim of this study is to answer these questions:

Research Question 1: What is the nature of people's hedonic experience (i.e. pleasurable and similar experiences) and what factors influence these experiences?

Research Question 2: How does mobile interactive technology (e.g. camera phones) and context of use influence user's experience?

Research Question 3: How can mobile interactive technology (e.g. camera phones) mediate social interaction in co-located settings?

1.4. Research paradigm

An empirical approach was employed for collecting qualitative data in order to develop a model of the photo sharing components and identify different sharing scenarios. The data for this study was gathered by using semi-structured in-depth interviews with and without probes, focus groups and field observational study. Applying the process known as theoretical sampling, the participants were selected according to their potential for providing new insights and relevant information about investigated phenomena. The interviews and the data from the focus groups were recorded with the participants' permission, and then transcribed in order to provide records for the analysis.

The open and axial coding from the Grounded Theory approach were used during the analysis of the data gathered from the three studies (see Appendix 1) that were carried out to address the research questions (see section 1.4). Both codes were used to identify concepts, main categories, sub-categories and properties of those categories that captured the core themes for further investigation. The selective coding was applied at the later stage during the development of the Photo Sharing Components Model and the sharing scenarios (see Chapter 8 and 9) where the focus was on relevant issues, which maximised the scope and parsimony of emerging theory by identifying as many variations in the data as possible with as few concepts as possible.

Three studies were designed and the following sections will provide their outlines.

1.4.1. First Study – Conceptualising hedonic experience

This study was designed to address two issues related to Research Question 1. The first involved how people understand and describe hedonic experience in context of technology. The second focused on what factors influenced such experience. In addition, a vocabulary that would be commonly used for describing and communicating hedonic experience was developed.

The detailed description and results of this study are presented in Chapter 4.

1.4.2. Second Study – Use of camera phones for social interaction

This study built on the finding from the First Study, which helped understanding user experience in a positive way (hedonic experience) and highlighted the social use of technology. The focus of the Second Study was on exploring people's pleasure and fun experiences when using camera phones for social interaction in co-present settings (i.e. when people are present at the same location at the same time). In addition, the broader understanding of the circumstances and contexts in which social practices occur were investigated.

The Second Study concentrated on three issues. The first related to where people use camera phones for social interaction. The second explored people's practices when using camera phones and the third investigated factors influencing user experience.

The objectives of the study provided answers to Research Questions 2 and 3. The detailed description and results of this study are presented in Chapter 6.

1.4.3. Third Study – Photo sharing behaviour in co-located settings

This study expanded on the results from the Second Study, which identified different social uses of camera phones, social implications for sharing photos as well as illustrated how photo sharing can create pleasurable, fun experience and make the viewers laugh. It explored further issues related to sharing photos on camera phones in different co-located settings and focused on understanding more about the role of place during the photo sharing activity. In addition, it investigated issues related to: how different places afford sharing photos, how affordances of camera phones support sharing in those places and how social affordances together with affordances of place and the value of photos shape the experience of photo sharing.

The results of this study presents answers to Research Questions 2 & 3. The detailed description and the results of the study are presented in Chapter 7.

1.5. Publications related to this thesis

The research that forms part of this thesis has lead to several publications. Table 1.1 matches the contributions of this thesis to individual publication.

Chapter	Contribution	Publications
2	Conceptualising people's hedonic experience	Stelmaszewska, H., Fields, B., & Blandford, A. (2004) Conceptualising user hedonic experience. Proceedings of ECCE'04, pp. 83-89
		Stelmaszewska, H., Fields, B., & Blandford,A. (2005) Emotion and technology: an empirical study. HCI'05 workshop on 'Emotions in HCI design'.
6	Understanding of social uses of camera phone	Stelmaszewska, H., Fields, B., & Blandford,A. (2006) A camera Phone Use in Social Context**.** Proceedings of HCI'06, Vol. 2, pp.88-92
		Stelmaszewska, H., Fields, B., & Blandford,A. (2008) User Experience of Camera Phones in Social Contexts**.** In Handbook of Research on User Interface Design and Evaluation in Mobile Technology, vo.1, pp.55-68
7	Understanding the photo sharing behaviour	Stelmaszewska, H., Fields, B., & Blandford,A. (2008) Sharing photos 'here and now': case study. Presented at the CHI'08 conference workshop on 'Collocated Social Practices Surrounding Photos'. Florence, Italy. April 5-10.
		Stelmaszewska, H., Fields, B., & Blandford,A. (2008) The roles of time, place, value and relationships in co-located photo sharing with camera phones. Proceedings of HCI'08, vol.1, pp141-150.
8	Understanding sharing experiences in different places	Stelmaszewska, H., Fields, B., & Blandford,A.. Photo Sharing Components Model: a 'thinking tool' for theorizing co-located sharing experiences with camera phones. IJHCI (submitted)

Table 1.1 A summary of the publications contributing to this thesis.

1.6. Structure of the thesis

As outlined above, the research reported here draws upon two different areas: user experience and photo sharing. Hence the need for two literature chapters, which review relevant work within these areas and outline the background to the thesis (provide the sharing experience context of this research).

Chapter 2 presents a critical review of relevant literature regarding different aspects of user experience and factors influencing it. In addition, it provides an overview of relevant models and frameworks of user experience in Human-Computer Interaction and other disciplines in order to highlight existing deficiencies in our understanding of user experience.

Chapter 3 presents a review of research methods that were employed during this study. Specific characteristics of the research design, data acquisition and data analysis procedures are discussed.

Chapter 4 provides a description and results of the First Study (Conceptualising hedonic experience), which focuses on people's perception and understanding of hedonic experience with technology.

Chapter 5 presents a critical review of relevant literature on photo sharing, which helps in locating the research questions within the body of previous research in the area of Human-Computer Interaction. The review is divided into two main sections. The first section discusses personal digital photography and how it is shared in a home environment as well as is how is it shared 'on the move'. The second section provides an account for camera phone uses.

Chapter 6 provides a description and results of the Second Study (Use of camera phones for social interaction) that focused on social uses of camera phones.

Chapter 7 presents a description and results of the Third Study (Photo sharing behaviour in co-located settings), which explored people's photo sharing behaviour in different co-located settings.

Chapter 8 summarises the results from all three studies in the form of a Photo Sharing Components Model framed within camera phones used in a leisure context as well as translating the findings into a theoretical formulation.

Chapter 9 discusses how the components of the Photo Sharing Components Model were used to create the photo sharing scenarios that were represented in a notation providing explanatory scenarios for discussing different sharing behaviour. It gives an account of the relationship between different components of the sharing scenarios and the sharing behavioural outcomes. In addition, the chapter identifies and explores the similarities and differences existing between different groups of sharing scenarios, within which the key components are discussed.

Chapter 10 provides the summary of the thesis in terms of the research questions posed in this chapter, contribution and limitations of this thesis, as well as future work.

Chapter 2. User Experience

2.1. Introduction

This chapter develops the concept of user experience presented in chapter 1 through a discussion of different aspects of experience and factors influencing it. It provides an overview of relevant models and frameworks of user experience in Human-Computer Interaction and other disciplines in order to highlight deficiencies in our existing understanding of user experience. The following sections will discuss different meanings, dimensions and aspects of experience focusing on positive experiences (e.g. pleasure, enjoyment, fun) as well as emotional design.

2.2. Meanings of 'experience'

The past years have witnessed a growing interest and enthusiasm for 'designing user experience' by designers, practitioners, interaction designers and business people. Across the body of literature relevant to HCI, four different understandings of experience can be discerned.

Csikszentmihalyi's view on 'optimal experience' (flow) emphasizes the importance of people performing any activity for the satisfaction of the activity itself (1975). He claims that to achieve optimal experience, a balance between the challenges perceived by a person and his or her skills is required.

A different view on experience is the one of Jordan (2000). His hedonistic approach to product design suggests that the purpose of design is to supply pleasure (pleasurable experience) and minimise displeasure and this is one of the determinants for purchasing a product (ibid).

Preece et al.'s (2002) description of user experience is one that looks at the context of goals as 'what the system feels like to the users…[and how they] experience an interactive product from their perspective' (p.19). The authors present user experience as subjective since it depends on the primary objectives of software (ibid).

Dewey's pragmatic approach (cited in McCarthy et al. 2002) suggests that experience consists of 'relationship between self and object, where the self is

always engaged and comes to every situation with personal interests and ideologies'. He also proposes that the interaction between people and their environment does not only include thought but also feeling, suffering, doing, handling and perceiving, which creates and is a part of experience (in Ziniewicz, 1999). Dewey's views on experience put its focus on people and situations, which are dynamic and changed by experience.

The described meanings of experience will be discussed further in the section 'Theories of experience', where examples of different models and frameworks following particular meaning of experience will be explored.

2.3. Dimensions of user experience

Perhaps the biggest challenge in user experience research is the fact that there is no unified theory of user experience. A number of researchers have put effort into developing frameworks and models to describe user experience focussing of different aspects of it from the negative experiences like frustration and anger to positive ones like enjoyment, pleasure, and fun. For example: Westell & Newman (1996); Pickard (1997), Klein et al. (1999) focused on when and where people get frustrated when interacting with computers. Others like Monk (2000), Hassenzahl et al. (2000), Jordan (2000), Hassenzahl, (2003), McCarthy & Wright (2004a,b) and Norman (2004) investigated what creates the experience of pleasure, enjoyment and fun within different system designs.

The following section explores issues related to both dimensions of experience: negative and positive.

2.3.1. Negative experience

Over the years there has been substantial research investigating people's negative experience with computer technology (Wastell & Newman, 1996; Pickard, 1997; Klein et al. 1999; Matellmaki & Keinonen, 2001).

Wastell & Newman (1996) contend that there is a strong link between a well-designed system, task performance and well-being of a user of a system. The issues of well-being were also highlighted by Klein et al. (1999) who claim that negative emotions: frustration, anger, confusion and similar emotional states can affect productivity, learning, social relationships, and well-being. Other researchers stress more the relationship between emotions, usability and user

experience (e.g. Matellmaki & Keinonen, 2001). They argue that understanding people's emotions is not only important for evaluating usability of a product but is also a key element in designing user experience. A similar view was shared by other researches including Hassenzahl (2003), and Norman (2004). The latter takes the issue of user experience even further claiming that 'positive emotions are as important as negative ones – positive emotions are critical to learning, curiosity, and creative thought' (ibid, p.19).

2.3.2. Positive experience

The concept of positive experience has been a topic for many studies in various research communities such as psychology, human factors, design and human-computer interaction (Csikszentmihalyi's 1975, 1988, 1990; Ghani, 1991, Ghani et al., 1991; Ghani & Deshpande, 1994; Webster et al., 1993; Hoffman & Novak, 1996; Monk, 2000; Wright et al., 2003; Pace, 2004a,b; Pike, 2004).

The aim of these studies was to understand and analyse different aspects of experience that deal with people's positive emotional states (e.g. pleasure, enjoyment, or fun).

2.4. Theories of positive experiences

There are different aspects of positive experience that have been discussed by many researchers in recent years. Fulton Suri (2002), Marcus (2002), Knight & Jefsioutine (2003) and Wright et al., (2004) reported that factors such as pleasure, enjoyment and fun are an important part of the overall experience and interaction with a product. Other studies within Human-Computer Interaction explored users' enjoyment when working with technology (Malone, 1982; Webster et al.,1993; Mäkelä & Battarbee, 1999; Brandtzaeg & Følstad, 2001; Brandtzaeg et al., 2003; Vorderer et al., 2004) or investigated fun and entertainment in different uses of information technology (Draper, 1999; Agarwal & Karahanna, 2000; Monk, 2002; Hassenzahl, 2003; Blythe & Hassenzahl, 2003; Shneiderman, 2004; Newman, 2004). Others like Kashdan et al. (2004) reported users experiencing pleasure when absorbed in specific novel activities using technology.

Although pleasure, enjoyment, and fun are part of the positive experiences they have been discussed as individual entities with specific characteristics and

differences between them. However, some researchers viewed different aspects of positive experiences together. For example, Malone (1981,1982) discussed enjoyment and fun with interactive interfaces and games, Blythe & Hassenzahl (2003) explored differences between fun and pleasure, Monk (2000, 2002) focused on enjoyment and fun within leisure applications.

The following sections will give an account of these settled differences and discuss user experience models that encapsulate issues related to pleasure, enjoyment and fun.

2.4.1.1. Experience of pleasure and fun

The phenomenon of pleasure has been a theme for discussions since the time of Plato and Aristotle. The former viewed pleasure as the absence of pain whereas the latter perceived it as something 'caused by the stimulation of the senses through action' (cited from Blythe & Wright, 2003, pp. XIII-XIV).

Studies that have attempted to empirically explore the nature of pleasure with technology are few in numbers (e.g. Jordan, 2000; Hauge-Nilsen & Flyte, 2002; Marcus, 2002; Fulton Suri, 2002; Knight & Jefsioutine, 2003; Hassenzahl, 2003).

Hassenzahl (2003) proposed a model of user experience defining its key elements and their functional relationship discussing pleasure as a consequence of experience with product. The model addressed issues of the subjective nature of experience itself, perception of a product, and emotional responses to products in different situations. The author shows that pleasure aggregates pragmatic (manipulation) and hedonic (stimulation, identification and evocation) qualities, which are the constituents of a product character. He suggests that when a product with a certain character is used this leads to producing emotional (satisfaction and pleasure) and behavioural consequences (e.g. increased time spent with the product).

The consequences of a particular product character are not always the same and they depend on a specific situation where they are used (i.e. work, social, or other). The apparent product character can also change within a person over time as the experience with a product increases. For example, a product can lose its sense of novelty after prolonged use since it is no longer perceived as new and stimulating.

As proposed by Hassenzahl (2003) and was also noted by McCarthy & Wright (2004b) these consequences (satisfaction and pleasure) are viewed as the outcome of experience with or through technology. The consequences depend not only on the product character but also the environment that a product is used in (e.g. work, leisure). According to Hassenzahl (2003) 'pleasure is linked to using a product in a particular situation and encountering something desirable but unexpected' (ibid, p.38). He continues that the emphasis should be rather on the product character and the usage situation rather than on the consequences. The argument here is that the consequences are equally important and if one wants to design products that will allow users to have positive experiences while using them then the issues of consequences (e.g. pleasure) are of paramount importance.

Another view of pleasure aspect of experience is the one of Jordan's (2000). His hedonic attitude to product design suggests that the purpose of design is to supply pleasure and minimise displeasure and this is one of the determinants for purchasing a product. The author stated that where pleasure with products is concerned, it can be defined as 'the emotional, hedonic and practical benefits associated with products' (Jordan, 2000, p. 12).

Emotional benefits are those that affect people's mood when using a product (e.g. excitement, fun, or satisfaction). *Hedonic benefits* are those that affect the sensory and aesthetic pleasure (e.g. a well-designed chair can be comfortable to sit on, pleasurable to look at and might give pleasant tactile feedback. *Practical benefits* are those that are the results of tasks, which a product is used for (e.g. an effective and efficient production of a document).

Following this approach to pleasure Jordan (ibid) proposed that pleasure with products is a combination of four different pleasures: socio-pleasure, ideo-pleasure, physio-pleasure, and psycho-pleasure.

Socio-pleasure derives from interaction with others. Products that facilitate communication or are the topic of conversation themselves contribute to this kind of pleasure.

Ideo-pleasure derives from people's values that a product can satisfy. A product might be chosen because it reflects or embodies values that are important to the person.

Physio-pleasure derives from the sensory organs (touch, taste, smell) as well as feelings of sensual pleasure. Visual qualities are important in addition to audio, tactile and olfactory.

Psycho-pleasure derives from people's cognitive and emotional reactions. It is rewarding because of the way people enjoy challenge, learning and problem solving psycho-pleasure is very rewarding.

This framework focuses on the relationship that people have with products and the main idea behind it is that products should satisfy people's needs and user experiences resolve around those needs. It appears to be general and practical at the same time as it encapsulates the most relevant factors that people find significant when experiencing products. Jordan (2000) argues that it is important to consider all four pleasures when designing products, however, not all products might provide all of the discussed pleasures. It might depend on the product itself and the fact that it can be experienced in a particular way. Although it might be difficult to classify pleasure under one of the four pleasure categories, the important thing is that the framework can help to ensure that all issues related to pleasurable use of products are taken into consideration and not missed. The pleasures discussed within the framework are more general and are not confined to a particular product/system.

A different approach to user experience is the one of McCarthy & Wright. (2004a,b), which focuses on technology being an experience rather then it being barely a tool.

They propose four intertwined threads of experience and six sense-making processes to help clarify this idea. The four threads are: sensual (look and feel), emotional (anger, joy, disappointment, frustration, fulfilment, satisfaction or fun), compositional (relationship between parts and the whole of an experience), and temporal (sense of space and time) (Figure 2.1). According to McCarthy & Wright (2004a,b) the different threads provide ways of talking about technology and consequently growing awareness to people's experience with it. The sense-making processes are intended to be used as a tool for analysing experience.

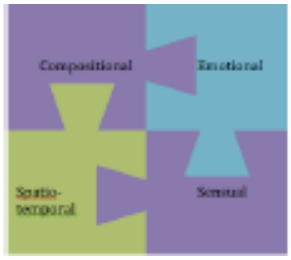

FIGURE 2.1 THREADS OF EXPERIENCE ADAPTED FROM MCCARTHY & WRIGHT (2004A)

The notion of threads captures the multi-facetted nature of experience. However, an important aspect of experience is that people are trying to construct and make sense of it. McCarthy & Wright (2004a) propose six inter-related, non-linear and sense-making processes that can be used as a tool for analysing experience. These processes are reflexive and recursive. They are reflexive in the sense that experience is viewed through a person (self or others) and they are recursive in the sense that it is engaged in sense making. The processes of sense making are: anticipating, connecting, interpreting, reflecting, appropriating, recounting (Figure 2.2).

Experience often has different meanings or represents different values when recounted in a different place and time. Recounting is a way to relive the experience, to find new possibilities and meanings to it and also to repeat the experience again.

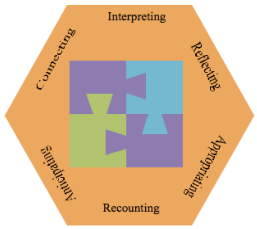

FIGURE 2.2 SENSE-MAKING PROCESSES ADAPTED FROM MCCARTHY'S & WRIGHT (2004A)

McCarthy & Wright's (2004a) framework and sense-making processes provide a way of seeing experience, talk about it, analyse the relationship between their parts and understand how technology does or could participate in making users' experience satisfying. The advantages of the framework are: firstly, it provides a basis for understanding experience with technology from four points of view. Secondly, it points out what is common to all experiences and how we make

sense in experience (the model describes not only what happens when experience occurs but also how it happens.

However, the concepts presented are difficult to understand and follow. The vocabulary used does not make it easy for a wider audience to understand the meaning and applicability of presented concepts. It seems that at this stage, the framework can only be applied by experts who are familiar with its theoretical concepts. The case studies using the framework are set up, primarily, in a work environment (pilot and ambulance control), which does not reflect the understanding experience in different contexts (e.g. leisure). Perhaps further studies of technology used in different contexts might further test the wider applicability of it. However, the framework provides a way of talking and thinking about concepts of experience that may help designers to design 'for experience' against design 'an experience'.

Although this model does not directly address issues related to positive experience, it focuses on what is common to all experiences, it gives a basic structure of elements influencing experience, which my study investigates.

The importance of fun and pleasure was accentuated by the work of Blythe & Hassenzahl (2003). According to the authors (ibid) pleasure is seen as a deeper form of enjoyment than fun where activity is performed with a deep feeling of absorption. Enjoyment is context-dependent and relational. It depends on a particular situation where an activity takes place and every situation is unique in terms of a person's current goals, previous knowledge and experiences, the behaviour domain and social norms. This work has broadened our understanding of differences between two aspects of user experience; fun and pleasure. However, Blythe's & Hassenzahl (2003) approach to fun and pleasure is very general and does not explore the relationships between individual connotations assigned to both aspects of experience.

2.4.2. Experience of enjoyment and pleasure

Enjoyment is another type of positive experience and according to Seligman and Csikszentmihalyi (2000, p.12) it differs from pleasure: 'Pleasure is the good feeling that comes from satisfying homeostatic needs such as hunger, sex, and bodily comfort. Enjoyment, on the other hand, refers to the good feelings people experience when they break through the limits of homeostasis – when they do

something that stretches them beyond what they were – in an athletic event, an artistic performance, a good deed, a stimulating conversation'.

Others explored people experiencing enjoyment in the context of computer systems (Malone, 1982; Webster, Trevino & Ryan, 1993; Ghani & Deshpande, 1994; Makela & Battarbee, 1999; Brandtzeg et al., 2003, Brandtzæg & Følstad 2003; Vorderer et al., 2004).

Malone (1982) viewed enjoyment from the designer perspective. He favours the idea of designing enjoyable interfaces using data acquired from a study of computer games (Malone, 1981). The original framework comprises three categories: challenge, fantasy and curiosity. However, learning from computer games Malone expanded his framework for designing enjoyable interfaces by introducing the concept of two uses of computing systems: toys (used for their own sake e.g. games) and tools (used for achieving external goals e.g. drawing program). The use of a computer system determines people's motivations for using it. Depending on the use of computer systems, different categories of the framework are applicable when designing enjoyable interfaces.

Proposed by Malone (ibid) a set of heuristics for designing enjoyable interfaces seems a good starting point where other issues rather then usability and utility of a system are concerned. However, it focuses only on one aspect of experience; namely enjoyment leaving out other positive experiences. In addition, bearing in mind the time of the study (early 80') it might not fulfil requirements of more contemporary systems.

Hassenzahl and his colleagues (2001) also brought a new light on issues related to user experience; this time concentrating on how to design enjoyable software. Following Glass's view that 'products of the future should celebrate life! They should be joy to use' (1997), Hassenzahl at el. (2001) reason that hedonic quality, that is task-unrelated qualities, is important when 'joy to use' is concerned. The need for novelty and change was claimed to be a driving force behind the two-facets of hedonic quality (ibid); one is concerned with the individual's personal development or growth, the other with social and societal issues. Based on the user's perception of hedonic quality the preferences for a software product is made.

2.4.3. Fun and enjoyment

As mentioned some researchers viewed fun and enjoyment elements of positive experience together. Others investigated issue of fun as a separate entity.

Monk (2000, 2002) moved from work to home and leisure environment and studied how technology can be made enjoyable and fun to use. He uses two applications to do that; one is Virtual Pub (within leisure environment) and Mavis (within home environment. The author proposes to expand the existing usability guidelines that focus on ease-of-learning and ease-of-use to capture the issues dealing with enjoyment and fun (Monk, 2002). His work has produced new insights into our understanding of fun and enjoyment in the home and leisure environment. One of the issues that has been raised relates to providing fun communication for a group engagement.

Fun and entertainment are becoming increasingly important in different uses of information technology (Draper, 1999; Agarwal & Karahanna, 2000; Monk, 2002, Hassenzahl 2003; Blythe & Hassenzahl, 2003; Shneiderman, 2004; Newman, 2004). Currently there are three basic perspectives on enjoyment and fun in HCI research: (1) *Usability reductionism,* where enjoyment is seen as a result of ease of use; (2) *Design reductionism*, where enjoyment and fun are features added on by designers; (3) *Market reductionism,* where the concept of fun is viewed as an advertising mechanism. However, these perspectives do not provide much support when the design and evaluation for fun and enjoyment are concerned (Wilberg, 2001).

There have been few attempts, however, to study fun and entertainment, even though the need to incorporate fun in design was pointed out early on by Malone (1981) and Carroll & Thomas (1988). Others like Wilberg (2001) explored fun of use of entertainment web sites, Wright et al. (2003) looked at fun and engagement within games, Shneiderman (2004) investigated how to design user interfaces that are more fun, and Newman (2004) measured fun in web-based communities.

Designing for fun or enjoyment is difficult as some products support more enjoyable experience, thus, the experience always depends on the user's wanting to be entertained (Wilberg, 2001). If a person likes music the experience with iPod could be very enjoyable and even fun when exploring its

new features, on the other hand for a non music lover the iPod will not provide interest. There is fun of novelty, and there is enjoyment that relates to either activities labelled as work or entertainment. In some environments, people are keen to be entertained and have a good time. One of such environments is a computer game setting that was studied by Malone (1981). The outcome of his study was a set of heuristics that revolve around three major factors: challenge, curiosity, and fantasy.

These findings are valuable as they provide a description of the key elements that determine how a game could be entertaining. They can be utilized as a starting point when designing games that are fun and enjoyable. However, the study presents some limitations; firstly, the sample group (children) could be seen as a weak point as the results do not necessarily represent older players. Secondly, this study was conducted in the late seventies to early eighties and it could be argued that games of that time bear very little resemblance to the contemporary ones.

A different view of fun is the one proposed by Hassenzahl (2003). He defines fun as a mode of doing that is the opposite of productive work. Fun focuses on action, productive work on goals. Hassenzahl's (ibid) model of goals and actions in work and fun discusses two modes for product interaction in situations: goals and action. The goal mode relates to practical and work-oriented activities, whereas the action mode relates to having fun and entertainment. The author argues that the same product used in a work environment could evoke different emotional reactions (e.g. stress) than when used just for fun outside the work environment (e.g. excite or challenge). The model of goals and action helps to elucidate why products can be experienced differently sometimes as stressful and irritating (in a goal mode), other times challenging, exciting and fun when in the action mode (ibid). However, the model does not explain how and why these modes change or what other factors may influence experience, for instance aesthetics.

It is becoming evident that the fun and enjoyment element of the design has approached the stage where it needs to be taken into consideration when designing applications not only for an individual but for a group interaction. Although, the work described above illustrates how important it is to design systems that facilitate fun and enjoyment the approach taken is from the game

perspective or a virtual environment supporting the interaction of individual players (Melone, 1981).

2.5. Summary

At the current stage of HCI research, the design for usefulness, ease of use and ease of learning is well understood and represented by a set of recognised principles and guidelines. However, the questions about what leads to a system that evokes different positive experiences including: pleasure, enjoyment, fun, or excitement, still remained unanswered.

The body of the literature discussed different aspects of UE that have been studied individually for a deeper and better understanding of it. Nonetheless, HCI lacks either a unified terminology to communicate different experiences or a framework that takes different aspects of user experience into account.

Even though different in detail, these frameworks and models have a common goal: to enrich current understanding of the nature of experience and emotions, which is essential to all practices of design and create a more complete and holistic HCI.

What is missing in the existing models is that their focus is primarily on individuals in work related applications and ignores social related experiences in different co-located settings (e.g. private, public). This thesis investigates user experience in the social context with applications used for leisure/social purposes (e.g. camera phones).

This research explores a variety of aspects of UE including pleasure, enjoyment, fun, and excitement, collectively called hedonic experience, in the context of technology (camera phone) as well as investigates what influence such experiences. In addition, it builds an understanding, a common language and a map of areas requiring further research and practice.

The next chapter provides a description of the methodology applied in the studies conducted within this research, discussing the research approach, data acquisition techniques and data analysis method.

Chapter 3. Methods

3.1. Introduction

This chapter provides the explanation and justification of the qualitative research paradigm and the Grounded Theory research method that were selected for this study. Specific aspects of the research methods that are discussed here include qualitative research approach, data acquisition techniques, data validation and data analysis procedures.

This study was designed to be consistent with the assumptions of qualitative research. The following section discusses the nature of the qualitative research and the reasons for its selection.

3.2. Qualitative research

Qualitative research has its beginning in sociology and anthropology (Denzin & Lincoln, 2000) but it has been recognized and utilized in HCI field by many researchers (Monk, 2000; Wright et al., 2003; McCarthy et al., 2006). Qualitative research 'can be used to uncover and understand what lies behind any phenomenon about which little is yet known. It can be used to gain novel and fresh slants on things about which quite a bit is already known … can give the intricate details of phenomena that are difficult to convey with quantitative methods' (Strauss & Corbin, 1990, p.19). It emphasises meaning, experiences, or descriptions from raw data of what people said (in interviews or recorded conversations) or what was observed (Coolican, 1999). Creswell (1994) defines qualitative research as:

'… an inquiry process of understanding a social or human problem, based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting' (pp. 1-2).

Following comments of various researchers (Creswell, 1994; Guba & Lincoln, 1994; Miles & Huberman, 1994; Merriam, 1998; Coolican, 1999; Denzin & Lincoln, 2000) qualitative research can be characterized in terms of the research design:

- Qualitative research is primarily concerned with process (how social experience is created and is given meaning) rather then just outcomes.
- Qualitative researchers are interested in the perceptions of their participants (how people interpret and what is the meaning of their experiences). Interviews and observations are typically employed to obtain people's perspective on investigated topics.
- In qualitative research, researchers are the primary catalyst for data collection and analysis, rather than questionnaire or interview protocol.
- Qualitative research involves fieldwork (observing or recording people's behaviour and events in natural settings).
- Qualitative research is descriptive, meaning that data is reported in words or pictures rather then numbers.
- Qualitative researchers rarely present their findings applying statistical measures.
- Qualitative research applies primarily inductive reasoning rather then deductive reasoning, meaning that theories and hypothesis emerge from data.

According to Strauss & Corbin (1990) there are many reasons for choosing qualitative research:

- Research experience - based on researchers' prior experience and satisfactory results using qualitative methods.
- Research problem – some research areas are more suitable for using qualitative research, for example, research that studies the nature of people's experiences such as addictions or religious conversion.
- Uncertainty of a phenomenon – less is known about a phenomenon, making it more difficult to convey it with quantitative methods.

The factors that primarily influenced the decision to employ qualitative research were the nature of the research problem, the level of uncertainty of the phenomenon under investigation and the diversity of contexts. In the case of exploring how people use camera phones when sharing photos the study had to be designed in such way that data gathered will explain users' behaviour in a natural environment, hence qualitative research is the best choice.

Morse (1991) presents the characteristics of a qualitative research problem as follows:

‘Characteristics of a qualitative research problem are: (a) the concept is “immature” due to a conspicuous lack of theory and previous research; (b) a notion that the available theory may be inaccurate, inappropriate, incorrect, or biased; (c) a need exists to explore and describe the phenomena and to develop theory; or (d) the nature of the phenomenon may not be suited to quantitative measures.’ (p.120)

Many of these characteristics are apparent in the research problem stated in Chapter 1 of this thesis. Hence qualitative research is the most appropriate way to investigate this problem. Following Strauss & Corbin’s (1998) view on using qualitative methods to ‘explore substantive areas about which little is known’, and to acquire ‘details about phenomena such as feelings, thought processes, and emotions that are difficult to extract or learn about through more conventional research methods’ (p.11) is yet another persuasive factor for using a qualitative research approach for this study.

Many researchers applied qualitative research to their studies when investigating different phenomena related to mobile phones and photo sharing. It becomes a common practice for exploring photo sharing; for example, Okabe (2004) investigated the camera phone use in Tokyo, Ito (2004) explored Japanese mobile phone use and Taylor & Harper (2002) observed the use of phone and text messaging services amongst young people. More recently, Kindberg et al. (2005a,b) applied this type of research to investigate the purposes and use of camera phone images.

3.3. Data acquisition techniques

Any empirical study needs to acquire data for analysis. Common ways of data elicitation in understanding people’s behaviour research are: interviews, focus groups, participant observations, qualitative observation, the diary method and many more. The data acquisition techniques for this research composed of semi-structured in-depth interviews with and without probes, focus groups and field observational study.

3.3.1. Semi structured in-depth interviews

As the main aim was to obtain insights of people’s perception and understanding of hedonic experience and factors contributing to it as well as

finding out about people's photo sharing practices, semi-structured in-depth interviews were selected in order to fulfil these requirements.

The semi-structured interview method has many advantages: it is interactive, it allows for a greater depth of understanding of investigated issue and it provides the interviewer with more information (Denzin & Lincoln, 1998). Furthermore, the characteristic of semi-structured interviews is that not all participants' responses can be predicted; therefore, the interviewer needs to leave room for improvisation and questions, which evolve during the interview. Although this might change the structure of the interview, it could reveal interested issues that may otherwise be missed when employing a structured interview method.

This interview method was applied by Jordan (2000) during experiential case studies, which were conducted in order to find out how people perceive a pleasurable product and discuss benefits that it gives them. Similarly, Pike (2004) used semi-structured interviews to acquire information about people's activities and feelings when experiencing flow as well as information on issues related to factors causing their flow experience using web.

As stated previously semi-structured interviews are very powerful for obtaining rich data; they allow the interviewer to follow interesting threads of information presented by an interviewee. However, to explore deeper and more thoroughly relevant issues in-depth interviews are the most suitable method. Their dynamic style offers a greater flexibility to discover issues not prompted by the interviewer but introduced by the interviewee.

In-depth interviewing was a particularly appropriate method for data collection as the main focus of this technique is to 'understand the significance of human experiences as described from the actor's perspective' (Minichiello et al. 1995, p.12).

3.3.2. Using 'photo probes' with interviews

The idea of 'photo probes' is based on 'Cultural Probe', a term originally invented by Bill Gaver (Gaver et al., 1999). A 'Cultural Probe' in its original sense was used as a means to obtain inspirational responses from different communities during a design process. It can consist of a variety of artefacts (e.g. camera, postcards with statements, blank photo albums, media diaries) and is completed by the user or community in order to learn more about them.

The probes help the user to generate feedback and inspiration that could be used in a design process. The original concept of a probe was meant to be only an inspiration, without the output of the probe being structured, summarised or analysed (Gaver et al. 2004).

Since the invention of 'Cultural Probes' others have adopted the probe approach to gain knowledge about various communities and use situations (Mattelmäki & Battarbee, 2002; Crabtree et al. 2004; Hulkko et al. 2004; Ciolfi et al., 2005). The approach encourages users to reflect on their life, work or activity being investigated and is ideal in situations where a significant amount of detail is required but available resources restrict obtaining required information. Probes offer a practical and creative way of learning more about people's everyday activity, behaviour, or practices in a context where it is not always possible to conduct full participant observation or gather relevant information through the use of different methods (e.g. interviews).

The interview with 'photo probes' technique was applied in studies conducted by Kindberg et al. 2005a,b) exploring the reasons and circumstances for taking photos as well as discussing their life cycle. The same technique was also used in Van House's (2006) research, which explored the richness of data gathered using photos during the interviews against interviews only. Both of these studies pointed out the benefits and the richness of data gained when using photos with interviews. In order to gain an insight of photo sharing practices this method was used to obtain rich data that provided information related to the topic in question.

Using semi-structured in-depth interviews allow the gathering of rich information about the topic in question. However, since this research focuses on photos it was decided to use participants' photos as probes in order to obtain richer data that goes beyond the "traditional" data gathering through interviews and introduces new issues and themes to understand people's photo sharing practices and experiences. Interviews performed in this manner (using 'photo probes') are more detailed than would have been possible otherwise and are useful in also getting detailed reports on activities, in creating memory and in revealing patterns of activity. Hence, 'photo probes' were used to provide a particular kind of information from each of the interviewees photos regarding the circumstances of taking and sharing them, who they shared with, when, how

and what kind of experiences they evoked during a sharing activity. This helped in providing information that could be hard to remember with traditional methods of enquiry (e.g. interviews).

3.3.3. Focus groups

Focus groups are a qualitative method, which can be used alone or with other qualitative or quantitative methods to improve the depth of understanding the needs and requirements of users and customers (Vaughn et al. 1996). The author suggests (ibid) that focus groups usually contain these core elements:

- A trained moderator who sets the stage with prepared questions or an interview guide,
- The goal of eliciting participants' feelings, attitudes and perceptions about a selected topic.

Focus groups are an excellent technique for exploring what people think about a given topic, and how they think about it. They provide a flexible and adaptive approach to individual situations and contexts, thus ensuring a valid representation of information about investigated phenomena; the core of this thesis is a perception and understanding of hedonic experience with mobile interactive technology and the photo sharing behaviour using camera phones. According to Lunt & Livingstone (1996) this methodology provides a social occasion that allows for public opinion to develop through debate as it could happen in real world situations. However, focus groups do not aim to generate consensus on a discussed topic but look for obtaining qualitative information, which in turn provides an insight into a views, understandings or fears of participants (Krueger, 1994).

Focus groups can be used for obtaining information, generating research hypotheses, stimulating new ideas or concepts, diagnosing problems with or gathering information about services or programs, providing terminology appropriate for the research, and interpreting experimental results (Stewart & Shamdasani, 1990). Moreover, the comments and opinions shared by participants can trigger a whole range of responses and views, which enriches the data collected (Payne, 1999).

Focus groups consist of 3-7 people and aim to present a genuine, comfortable environment where people reveal their thoughts and feelings and share their

views of the issues and assumptions. The validity of this methodology relies on carefully selected group of participants (sampling). Naturally occurring homogenous groups can carry out a natural conversation. However, those groups might want to impress one another and be biased in their responses.

Krueger (1994) implies that there are many advantages of using focus groups. One is that greater amounts of data can be collected in a shorter and more efficient time. Another is the synergy of the group promotes more creativity and provides more opportunity for thoughts, ideas and experiences (Vaughn et al., 1996). In addition, the moderators are able to observe the interaction within the focus group, which could provide valuable insights in relation to the topic discussed (Stewart & Shamdasani, 1990).

The summary of advantages of focus groups presented by Hollander (2004) includes:

- They enable participants to share explicit stories and to take on in-depth exploration
- They provide external validity because the context is similar to conversations that people have in everyday life.
- They 'reduce experimental demand because the researcher can fade into the background' while participants carry on the discussion (p. 607).

However, there are some disadvantages of using this methodology, which Bryman (2004) highlights, which include:

- The researcher has less control over the nature of the discussion when compared to an individual interview.
- Data collected is more difficult to analyse because not only is a huge amount of data gathered that needs transcribing, but the analysis needs to capture both the themes and the pattern of interaction.
- Groups might be difficult to gather and participants might not turn up.
- It requires a trained moderator who can encourage all participants to take part and discourage those who try to take over the discussion.
- Participants may be more eager to express views that are socially and culturally acceptable in comparison to individual interviews. The main concern of using focus groups is whether participants are honest and share their true feelings and thoughts (Hollander, 2004).

The role of a moderator is to introduce the topic of the discussion and help to draw out opposing arguments without appearing judgemental of the participants' views. However, it is a difficult role for a moderator to keep the group focused and not be led by their questions or by dominant participants.

3.3.4. Field observational study

Field observation techniques have been applied by many researchers whose aim was to observe people in their natural settings. Ling (2002) studied the use of mobile telephony in public spaces in and around Oslo, Weilenmann & Larsson (2001) investigated use of mobile phones among teenagers in Götenberg, whereas Taylor & Harper (2002) observed the social practices of teenagers use of mobile phones where their practices can be interpreted as 'gift-giving'.

According to Denscombe (1998) observational research techniques offer a distinctive way of collecting data and exclusively involve the researcher or researchers making observations. There are many positive aspects of the observational research approach. Namely, observations are usually flexible and do not necessarily need to be structured around a hypothesis. For instance, before undertaking more structured research a researcher may conduct observations in order to form a research question. This is called descriptive research.

In terms of validity, observational research findings are considered to be strong because the researcher is able to collect a depth of information about a particular behaviour. Trochim (2001) states that validity is the best available approximation to the truth of a given proposition, inference, or conclusion. However, there are negative aspects of observational research, which include reliability and generalizability.

Reliability refers to the extent that observations can be replicated. However, seeing behaviours occurring over and over again becomes a time consuming task.

Generalizability, or external validity, is described by Trochim (ibid) as the extent that the study's findings would also be true for other people, in other places, and at other times.

In observational research, findings may only reflect a unique population and therefore cannot be generalized to others. There are also problems with researcher bias. Often it is assumed that the researcher may "see what they want to see." Bias, however, can often be overcome with training or electronically recording observations. Hence, overall, observations are a valuable tool for researchers.

There are different types of observations: direct observation, unobtrusive observation and naturalistic observation

Direct (Reactive) Observation means that people are aware of being observed, the danger being that they are reacting to your presence. As stated earlier, there is a concern that individuals will change their actions rather than showing what they are really like. This is not necessarily bad, however. For example, the contrived behaviour may reveal aspects of social desirability, how they feel about sharing their feelings in front of others, or privacy in a relationship. Even the most contrived behaviour is difficult to maintain over time. A long-term observational study will often be able to observe people's natural behaviour.

Other problems concern the generalizability of findings. The sample of individuals may not be representative of the population or the behaviours observed not representative of the individual (a person could be caught on a bad day). Again, long-term observational studies will often overcome the problem of external validity.

Unobtrusive Observation involves any method for studying behaviour where individuals are unaware they are being observed. In this case, there is no concern that the observer may change the subject's behaviour.

When conducting unobtrusive observations, issues of validity need to be considered. Numerous observations of a representative sample need to take place in order to generalize the findings. This is especially difficult when looking at a particular group and even though many groups possess unique characteristics, which make them interesting to study, such findings are not strong in external validity. In addition, replication is difficult when using non-conventional[3.1] measures. Observations of very specific behaviours are difficult to replicate in studies especially if the researcher is a group participant. The

[3.1] Non-conventional means unobtrusive observation

main problem with unobtrusive measures, however, is ethical. Issues involving informed consent and invasion of privacy are paramount here.

Naturalistic Observation is a method of observation commonly used by psychologists and other social scientists, which involves observing subjects in their natural environment. Researchers use unobtrusive methods in order to avoid interfering with the behaviour they are observing. This method, which is often utilized when conducting lab research is unrealistic, cost prohibitive, or could unduly affect the subject's behaviour. One of the advantages of naturalistic observation is that it allows the researcher to directly observe the subject in a natural setting. The disadvantages include the fact that it can be difficult to determine the exact cause of behaviour and the experimenter cannot control outside variables.

In this thesis naturalistic observation with unobtrusive methods were employed to gather extensive data on people's photo sharing behaviour in various public settings.

3.4. Theoretical sampling

Theoretical sampling 'is the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyzes his data and decides what data to collect next and where to find them, in order to develop his theory as it emerges' (Glaser & Strauss, 1999, p.45).

Taylor & Bogdan (1998) claim that theoretical sampling involves a procedure whereby 'researchers consciously select additional cases to be studied according to the potential for developing new insights or expanding and refining those already gained' (pp.26-27).

'Choices of informants, episodes, and interactions are being driven by a conceptual question, not by a concern for "representativeness". To get to the construct, we need to see different instances of it, at different moments, in different places, with different people. The prime concern is with the conditions under which the construct or theory operates, not with the generalization of the findings of other settings' (Miles & Huberman, 1994, p.29).

The aim of theoretical sampling is 'not to strive for a representative sample but to identify purposive cases that represent specific types of given phenomenon' (Minichiello et al. 1995, pp-13-14).

As theoretical sampling is carried out on the basis of emerging concepts 'neither the number nor the type of informants needs to be specified beforehand' (Taylor & Bogdan, 1998, p.92). The study starts with researcher's general idea of the type of participants, which is modified after the first interviews.

As the research question addressed in this study becomes more focused concepts and their relationship were discovered. Consequently, sampling decisions depended on analysis of data obtained, which related to the developing theory.

Theoretical sampling applied in this study maximised possibilities of emerging concepts and themes. An adequate theoretical sample group depended on the diversity of the participants that provided sufficient information to the research questions and developed the theory that is required.

Following the concept of theoretical sampling after the set of initial interviews involving Computer Scientists the user group was modified (including people from different professional backgrounds and college students) allowing research to cover a wider spectrum of people and therefore gain a broader understanding of their perception and understanding of hedonic experience.

Users selected for this study were people who use personal technology of any kind (e.g. diary (electronic or paper), mobile phone, digital camera or PDA). A diversity of users was spread across gender, age, education, occupation and computer literacy, with the aim of uncovering a broad range of perspectives.

3.5. Data validation

As previously stated the dual method for data acquisition was employed to strengthen the validity of the data. The criterion for validity has its roots in a positivist tradition and has been defined by a systematic theory of validity (Winter, 2000). According to the author validity was the result and culmination of other empirical conceptions such as universal laws, evidence, objectivity, truth, actuality, deduction, reason, fact and mathematical data.

In qualitative research, which has been applied in this study, great stress is laid on the findings of study being credible, consistent and not mere fiction (Coolican, 1999). This can be established through data validation. There are different forms of validation; the one applied in this study is known as triangulation.

Triangulation is the application and combination of at least two research methods or data gathering exercises used by qualitative researchers in order to check and establish validity in their studies (Guion, 2002). Validity, in the context of qualitative research, relates to establishing whether the findings are true and certain. 'True' refers to the findings that are accurately reflecting the real situation whereas 'certain' refers to the findings that are supported by evidence and the weight of evidence supports the conclusions (ibid).

Triangulation is not aimed merely at validation but at deepening and widening one's understanding of phenomena in question.

There are four types of triangulation: (1) method triangulation, (2) data triangulation, (3) triangulation through multiple analysts, (4) theory triangulation (Patton, 1990).

Method triangulation – involves the convergence of multiple qualitative methods (e.g. interviews, focus groups, observations) to study the phenomena. If the conclusions from each applied method are the same, then validity is established. Although this method of triangulation is extensively used, it requires more resources and time to investigate and analyse data obtained from different methods.

Data triangulation – involves the convergence of different sources of data (e.g. representatives of a social group). A key point is to categorise each group or type of stakeholders for the study that is conducted and include a comparable number of people from each stakeholder group. This type of triangulation is the most popular and easy to implement.

Investigator triangulation - involves the use of multiple investigators. Typically, this would be represented as a team of evaluators within the field of study. Team research permits a high level of flexibility in research strategies and tactics. Each member of the team would study the phenomena applying the same qualitative method (e.g. interview, observation, or focus group). When the results of individual evaluators are compared and arrive at the same conclusion, the validity has been determined.

Theory triangulation – involves the use of multiple theoretical schemes in order to interpret the phenomena. Unlike the investigator triangulation, this method generally requires using professionals from outside of the field study, which is

believed will bring different perspectives. If the same conclusions are drawn, then validity is established.

However, it was claimed by Silverman (1993) that triangulation poses a number of limitations:

- "Each method used depends on the same reliability issue i.e. the researcher could be equally inconsistent at categorising in interviews as in recording observations.
- Triangulation looks at different contexts and therefore ignores the context-bound nature of ethnographic situations, which are bound by social interaction. Rarely does the inaccuracy of one approach to the data complement the accuracy of another.
- The aggregation of data, even when grounded in the same theoretical perspective does not produce an overall truth" (Silverman, p.157)

In this study, *method triangulation* was employed, which involved field observational studies in conjunction with interviews. The reason for this was to observe where, who with, how and what was experienced when sharing photos and then compare the findings with the data gathered during the interviews. Sections 6.4.1.1, 6.4.2.3, 7.4.2.1.2 and 10.2.2 provide evidence of findings that have been confirmed by both methods. This method of data triangulation provided confidence that the findings of the data had a consistency across the methods used and therefore was not dependent on one method only to collect the data. In addition, a deeper and clearer understanding of the settings where people use camera phones was gained.

3.6. Data analysis

As the data gathered was of a qualitative nature, data collection and analysis occurred in parallel in the study. The reason for this is that it allows for 'theoretical sampling on the basis of emerging concepts' and it 'enables validation of concepts and hypotheses as these are being developed' (Strauss & Corbin, 1998, p.46). Grounded Theory is particularly well-suited for developing holistic, contextually rich models and is appropriate for studies in HCI where the aim is to understand the phenomena in question.

The general goal of the Grounded Theory research is to construct theories in order to understand phenomena. A good grounded theory is one that is: (1)

inductively derived from data, (2) subjected to theoretical elaboration, and (3) judged adequate to its domain with respect to a number of evaluative criteria (Glaser & Strauss, 1999). Glaser & Strauss (1999) claim that the Grounded Theory emerge inductively from its data source in accordance with the method of "constant comparison." The constant comparison method is a fusion of systematic coding, data analysis and theoretical sampling procedures which enables the researcher to make interpretive sense of the diverse patterning in the data by developing theoretical ideas at a higher level of abstraction than the initial data descriptions (Glaser & Strauss, 1999).

Once the data is collected it is analysed in a Grounded Theory format by applying three kinds of coding: open coding, axial coding and selective coding (for coding examples from studies 1-3 see Appendix 1). Taking from Grounded Theory, the data obtained in the studies, was closely examined and compared for similarities and differences allowing the theory to be developed. Grounded Theory also provides methods for questioning the concepts that are emerging in such a way that the researcher is less likely to impose their opinion on the data.

A theory cannot be built with actual incidents or activities taken from "raw data." The incidents, events, happenings are potential indicators of phenomena, which are given conceptual labels (Corbin & Strauss, 1990). Central to Grounded Theory is the idea of coding, which links phenomena with conceptual labels. Using coding, data is fragmented from its original format (e.g. transcripts from interviews) and then reconstituted in terms of underlying concepts and relations developing a theory.

Three types of coding were applied: open coding, axial coding and selective coding. These followed Glaser's (1978) view that the constant comparative method is the key process when developing theory: 'The essential relationship between data and theory is a conceptual code. The code conceptualizes the underlying pattern of a set of empirical indicators within the data … the code is of central importance in the generating of theory …' (p.55).

Open coding is defined as 'the analytic process through which concepts are identified and their properties and dimensions are discovered in data' (Strauss & Corbin, 1998, p. 101). It is the initial step of theoretical analysis that leads to the development of categories and their properties (Glaser, 1992). Open coding requires application of what is referred to as 'the comparative method', that is,

the asking of questions and the making of comparisons. Data are initially broken down by asking simple questions such as what, where, how, when, how much, etc. Subsequently, data are compared and similar incidents are grouped together and given the same conceptual label. The process of grouping concepts at a higher, more abstract, level is termed categorising. (Strauss & Corbin, 1990). Open coding begins with conceptualisation. The data is broken down into separate/individual incidents (e.g. events, actions, ideas), which are examined and compared for similarities and differences. All significant incidents are assigned as codes (Strauss & Corbin, 1998).

Glaser proposes following guidelines for performing open coding (1978, pp.57-60):

- Ask questions of the data. The process of open coding keeps continually asking three questions while comparing data: What is this data a study of? What category or property does this incident indicate? What is the participant's main concern?
- Analyse the data line by line to develop a dense theory and to make sure that no relevant data is omitted.
- Do your own coding.
- Always interrupt coding to record ideas in theoretical memos.
- Stay within the confines of the substantive area and field of study. During a theory development, data may be taken from substantive areas (other than the one studied). Until the researcher is sure about the relevance of the data this practice need to be avoided.
- Do not assume the analytic relevance of any face sheet variable until it emerges as relevant. Different variables such as age, sex, social class and race should not be included in theory unless this emerges from the data as relevant.

Whereas open coding fractures the data into concepts and categories, axial coding puts those data back together in new ways by making connections between a category and its sub-categories (i.e., not between discrete categories which is done in selective coding). Thus, axial coding refers to the process of developing main categories and their sub-categories (Strauss & Corbin, 1990).

"Categories are higher in level and more abstract than the concepts they represent. They are generated through the same analytic process of making

comparisons to highlight similarities and differences that is used to produce lower level concepts. Categories are the "cornerstones" of developing theory. They provide the means by which the theory can be integrated" (Corbin and Strauss, 1990, p. 7).

Another coding utilized in this analysis was selective coding. It is the process of restricting coding to only those concepts that relate to a core category developed in axial coding. The core category reflects the main theme of the study and according to Glaser (1978) "sums up in a pattern of behaviour the substance of what is going on in the data" (p.61). Once the core category has been identified selective coding begins. In case of more then one potential core categories, the one category must be selected as a core and the remaining ones become subservient. This simplification is required as writing about all potential core categories "with no relative emphasis is to denude each of its powerful theoretical functions" (Glaser, 1978, p.94).

Selective coding helps focusing on relevant issues and maximises the scope and parsimony of emerging theory by helping the researcher to identify as many variations in the data as possible with as few concepts as possible. Working towards a core category assists in reducing the original set of categories to those that are relevant, which will consequently yield a theory with a smaller set of higher-level concepts and broader applicability (Glaser & Strauss, 1967).

Writing theoretical memos is an essential step in developing a theory. According to Glaser (1978) memo "is the theorizing write-up of ideas about codes and their relationships as they strike the analyst while coding" (p.83). Through memos' writing emerging theory is captured and recorded. Glaser (1978) provides useful guidelines for memo-writing:

- Ideas. A memo may be a few words, a sentence, a paragraph or even a few pages; anything that captures researchers thoughts.
- Freedom. Memos do not have any grammatical, spelling or punctuation constraints and their most important thing is to support ideas.
- Memo fund. Memos can be accumulated during the study and they are called 'memo fund'. They can be used as a source for all writings from the study.

- Sortable. Memos that are part of ‘memo fund’ can be easily sorted by ideas. Memos need to include: date, key concept or relationships, and links to other relevant notes and memos.

We started with open coding assigning concepts to different categories (themes that make sense of what participants have said). Emerging concepts were compared with new incidents verifying the concepts as occurring patterns in the data. Consequently, codes with similar concepts were merged into themes representing the high level of concepts that encapsulated participants understanding of hedonic experience.

The next step was to group themes into categories and sub-categories applying the axial coding and investigate the relationship between them. The concepts, themes, categories, sub-categories and relationships between them were not preconceived but emerged from the data.

The final step of analysis took place through selective coding. At this point, the categories developed using axial coding were applied to develop a story that becomes a theory. Examples of open, axial and selective codes are in Appendix 1.

The research method selected for this study is adopted from Grounded Theory and it allowed the theory to be formulated by systematically gathering and analysing relevant data. The rationale for this approach is to keep the researcher open to the concepts and relationships that emerge from the data rather then have preconceived assumptions of what should be found in the data.

3.6.1. Constant comparative method

Since qualitative research was employed to this study, data collection and data analysis occurred in parallel. The theory was derived from the data applying a constant comparative method of analysis during the stages: identifying categories and their properties, merging categories and their properties, developing and writing the theory.

The constant comparative method (CCM) together with theoretical sampling constituted the core of qualitative analysis in the Grounded Theory approach and in other types of qualitative research. Creswell (1998) notes that the researcher attempts to “saturate” the categories by using a constant

comparative approach. That is “to look for instances that represent the category and to continue looking (and interviewing) until the new information obtained does not provide further insight into the category”.

According to Lacey and Luff (2001), in the constant comparative method, categories emerging from one stage of analysis are compared with categories emerging from the next. The researcher looks for relationships between these categories constantly comparing them until “theoretical saturation” is reached, that is no new significant categories are emerging.

The constant comparison method was frequently used in both open and axial coding. During the theory development process, within this thesis, this method was utilised at four stages: generating categories and their properties (during the open coding stage), integrating categories and their properties (during the axial coding stage), developing and writing the theory (during the selective coding stage). Also, this method was applied as an internal check on validity ensuring that the model developed and the photo sharing scenarios (see Chapter 8 & 9) retained their importance to match with the information emerging from the raw data.

3.6.2. Theoretical saturation

Theoretical saturation is the point at which no new categories, concepts, dimensions or incidents emerge during the theory development process. At this stage the theory has been satisfactorily developed and tested by the researcher (Strauss & Corbin, 1998). At the end of data analysis, the analysis can reach closure when all categories are theoretically saturated (ibid). Therefore, data collection and analysis cease when the researcher achieves *theoretical saturation.*

The criteria for determining saturation are a combination of the empirical limits of the data, the integration and density of the theory, and the researcher’s theoretical sensitivity.

Flick (1998) comments that, "The criterion of theoretical saturation leaves it to the theory developed up to that moment, and thus to the researcher, to make such decisions of selection and ending" making the distinction between method and art very fuzzy (p. 187). Following this line of thinking the author (ibid) suggests that inductive theory building is an art, but this does not prevent the

use of systematic procedures offered by grounded theory methodologists to ensure a strong structural foundation for the creativity to flourish (Flick, 1998).

In this study, theoretical saturation was reached when the collected data from the interviews did not provide any new evidence to support developed theory on co-located photo sharing practices.

3.7. Ethical concerns

Part of an interview procedure was to obtain agreement or consent from the participants taking part in the study (Mathers et al. 1998). The consent form reminded the participants that their participation in the study was voluntary and their interview data would be treated with confidentiality and anonymity.

Since the interview involved voluntary participation, the participants were informed about the following:

- My name, position and contact details,
- The name of the organisation under which the research was conducted (Middlesex University)
- A brief description of the purpose of the study,
- The agreement about time, location and duration of the interview,
- Procedure for confidentiality and anonymity of participants' data
- Declaration that participation in the study was voluntary and the participant could withdraw at any stage

All the data from the study sessions were type-recorded with the permission of participants and stored securely, and all the reports on the study, including this thesis, have been written in a manner to protect anonymity of the participants. In other parts of this thesis, pseudonyms have been used for the names of the participants.

3.8. Summary

The study reported in this thesis was carried out as a qualitative, Grounded Theory study. The Grounded Theory approach has been identified to be appropriate for this thesis because it builds a theory about a phenomenon by systematically gathering and analysing relevant data, it allows for flexibility and scientific rigor and it takes researcher's viewpoints. The purpose of this research method is to build theory not to test it; the researcher begins the study

with an open mind rather then with a preconceived theory and allows the theory to emerge from the data.

Different combinations of data acquisition techniques were applied to the studies. In the First Study, semi-structured in-depth interviews together with focus groups were used; in the Second Study semi-structured in-depth interview with ‘photo probes’ and field observational study were employed whereas during the Third Study a set of semi-structured in-depth interviews using ‘photo probes’ were used to provide useful qualitative data for this thesis. Applying the theoretical sampling process throughout all three studies, participants were selected according to their potential for providing relevant and insightful information about the topic in question.

The detailed findings of the analysis are described in Chapter 4, Chapter 6, and Chapter 7.

Chapter 4. The First Study: Conceptualising hedonic experience

4.1. Introduction

User experience and in particular hedonic experience (HE) is difficult to articulate and even more difficult to design for experience (Hassenzahl et al, 2000, 2001; Jordan, 2000; Hassenzahl 2003; Battarbee, 2003; McCarthy & Wright, 2004b; Wright et al., 2003; Forlizzi & Battarbee, 2004). Therefore, to be able to help people in obtaining such an experience when using technology an understanding of what people mean by it, how they perceive it and what factors contribute to it are critical issues.

The First Study was designed and conducted in order to gain a better understanding of the concept of hedonic experience and to generate a bank of vocabulary that would be commonly used in relation to HE.

4.2. What the study investigates

As well as considering explicitly people's perception of hedonic experience when using mobile interactive technology (e.g. mobile phones, digital cameras, and PDAs), their hedonic experience in the context of different physical activities such as exercising, walking, and orienteering was also considered to help in obtaining insights about issues related to the concept of hedonic experience.

The first study addressed two issues: the first, related to how people understand and describe hedonic experience in general, the second focused on what factors contribute to it.

The primary questions that the study aimed to investigate were:

Question 1.1: How do people understand and perceive hedonic experience (i.e. pleasurable and similar experiences) in general?

Question 1.2: What factors influence these experiences?

Question 1.3: What kinds of feeling and emotions do people associate with the technology they use?

The first study was to acquire a better understanding of what it means to have hedonic experience in the context of interactive technology, what factors contributed to it as well as providing a set of vocabulary that can be commonly used for describing and communicating HE.

4.3. Description of the study

The data collection procedures for this study composed of semi-structured in-depth interviews and focus groups. The following sections discuss the make up of the participants, the area of investigation, procedures taken during the data gathering and questions used.

4.3.1. Participants

Two sets of studies were carried out including: 11 interviews and 2 focus groups (10 participants); age between 18 – 45. Subjects from the interview group consisted of six computer scientists, two college students, one self-employed hairdresser, one civil servant, and a PA working in a Computer Science Department.

Participants in the focus group studies consisted of ten computer scientists from different universities based in London: six PhD students, three researchers and one lecturer.

Users selected for this study were recruited using personal and group interest networking and they all had experience of using various mobile interactive technology (e.g. mobile phone, digital camera or PDAs) for at least one year.

4.3.2. Interview procedure

After the initial set of interviews, which indicated how people describe hedonic experience (pleasurable and similar experiences) and vocabulary used, the procedure for the subsequent interviews was modified.

Presenting a definition of investigated phenomena to the participants, taking part in this study, has been also applied by many researchers (Chen et al. 2000; Novak et al. 2000; Csikszentmihalyi & Delle Fave, 1988 and Han 1988). It helps participants to understand the phenomena, before being asked to elaborate on it.

Before inviting the users to participate in the interviews, they were provided with a definition of *hedonism*[4.1] followed by an explanation and description of hedonic experiences. The participants were then asked if they had experienced such things and could therefore talk about their own examples of HE in different contexts.

Each interview lasted between 30 - 50 minutes. It was tape-recorded and the data transcribed and analysed.

In addition to recording the interviews, brief notes were taken of users' comments and important issues that needed to be followed up.

4.3.3. Interview questions

In order to answer the Research Question 1 (see section 1.3) participants were asked to describe any instances of HE when using different types of mobile interactive technology, the feelings associated with it as well as why the feelings were experienced. It was found that the concept of HE was difficult for participants to explain and HE was an issue not thought of before. This prompted additional questions helping participants to articulate their thoughts and feelings. Typical questions asked:

- Have you ever experienced anything pleasurable or similar?
- Where did it happen? Who were you with at the time?
- What did you do?
- Could you describe it?
- How did this experience make you feel?

These questions provided a basic structure helping to ensure that all relevant issues were explored. However, the in-depth form of the interviews allowed the probing of additional questions triggered by the interviewees' comments. Answers to those questions supplied a broader view on investigated topics.

[4.1] Hedonism the doctrine that the pursuit of pleasure is the most important thing in life [Greek hēdonē pleasure]; a devotion to pleasure as a way of life
(http://www.thefreedictionary.com/hedonism; retrieved on 5.10.2006)

4.3.4. Focus groups procedure

As with the interview procedure the session started with obtaining the consent from the participants taking part in the study followed by a brief introduction of the topic of the study.

The core questions were as with the interviews (see section 4.3.3).

Each focus group session lasted between 50 – 65 minutes and was tape-recorded, transcribed and analysed. Participants were also informed that they could abandon the session if they feel uncomfortable.

4.4. Results of the study

In an effort to gain a better understanding of how people perceive and understand hedonic experience in the context of mobile interactive technology as well as identifying factors influencing it an analysis of the data was performed. The data from both interviews and focus groups was analysed applying the Grounded Theory approach. The headings of the 'Results of the study' are organised according to the main categories and sub-categories developed during the open and axial coding.

4.4.1. Hedonic experience in the context of technology

Participants identified four types of hedonic experience when using mobile interactive technology: *pleasure, excitement, fun* and *happiness.*

The most frequently mentioned examples of technology were: mobile phones, digital cameras, PDAs, and computer software (database or browser). Although most of the time they were used outside the work environment some of them like PDA's and computer software (database) were often utilized for work related activities. This seems to contradict the view of other researchers (Csikszentmihalyi, 1990; Kidd, 2002) who claim that the experience of 'flow' happens usually during the activities related to leisure rather then work.

The findings from the study have indicated that there are four categories that evoke different types of hedonic experiences (Table 4.1). These are: usability/functionality, interactivity/social element, appealingness and novelty.

Determinants of experience	Pleasure	Excitement	Fun	Happiness
Usability/ Functionality	✓			✓
Interactivity/ Social element	✓	✓	✓	
Appealingness	✓			
Novelty	✓	✓	✓	

TABLE 4.1 HEDONIC EXPERIENCE IN THE CONTEX OF TECHNOLOGY

The following sections provide detailed descriptions of identified categories.

4.4.1.1. Usability and functionality

This represents issues that are related to: how usable and efficient the technology is, how transparent the functionality is allowing people to easily learn how to operate it thus avoiding any stress as well as how useful the functions are for performing the required activities.

It emerged from the data that *usability/functionality* can have a direct impact on happiness:

> *'… it makes me happy … it's also very good, very useful tool that makes life easier' (Lily)*

when discussing database software. Participants reported being happy when their activities were supported by useful functions and their interaction was stress free.

> *' … I've been putting all my stuff onto my phone because it has an alarm that actually reminds me … and this makes me feel more in control and less stressed because I don't need to remember, the phone does the job for me. It makes me feel … happier, more relaxed because I don't have to remember everything' (Nora)*

The issue of a good usability that endorsed pleasurable experience was raised by many participants and when asked if technology can give pleasurable experience.

> *' … It has to do all the things that I want it to do without all the hassle'. (Mira)*

This is an important issue for the other researchers as well including Hassenzahl (2003) and Pike (2004). The former argues that utility and usability

are primary instrumental and can lead to a product's character, which can produce a set of consequences (e.g. pleasure) whereas the latter claims that good usability leads to flow experiences and the requirements for a flow-inducing interface match with those for a usable user interface.

Both of these factors do not only evoke hedonic experience but also they influence it. Functionality play an important role when determines the usage of a specific technology. People very often look for functions that would help them to perform specific activities when they are 'on the move':

> *'…I have used it as my travelling office… So I would write a report if I'm on a plane using my PDA, or work out the conference budget …I was planning the conference … so I could do that….I could do all that and it's all recorded and I bring it back to my office and uploaded my machine' (Victor).*

It was apparent that it is important to provide functionality that is transparent to the users and allows the efficiency of the technology being exercised to its full potential.

Finneran and Zhang (2003) have similar views on this matter claiming that the artefact should be transparent so it will not interfere with a person's focus on the task. It was suggested also by other researchers that helpful features supporting the operation of a specific product engender pleasurable experience (e.g. Jordan, 1998).

Although many researchers (Finneran & Zhang, 2003; Jordan, 1998, 2000) have clear views on the relationship between functionality of a specific technology and pleasurable experiences evoked, it emerged from the data that experience relates to two factors: where technology is used, and which functionality supports its specific usage.

People enjoy sending pictures via emails to their friends and members of their family. However, the experience changes when people share pictures stored on their PDAs. The excitement comes from the PDA allowing its users to view, edit, or create a slide show of stored pictures and share them with others gathered in co-located setting.

It was claimed by many participants that usability is a crucial factor when user hedonic experience is concerned.

‘ … it has to do all the things that I want it to do without all the hassle’. (Mira)

Having technology for its look and ‘coolness’ is not enough to evoke and sustain hedonic experience. It needs to support peoples’ activities in a ‘pick up and use’ manner. Otherwise, people abandon it and choose another technology that will do what it is expected (Blandford et al., 2001).

Usability is of high importance not only in relation to ‘goal oriented’ usability but also in the context of hedonic experience. Pike’s (2004) study agrees with this view claiming that the ‘requirements for a flow-inducing interface seem to be exactly the same as demands for a usable user interface’ (p. 9). The issues of good usability that endorse flow (enjoyable experience) were discussed also by Finneran and Zhang (2003). They claim that perceived ease of use is a person’s perception of being able to use an artefact, which in turn influences flow. Jordan (1998) claims that usability is a major issue that contributes to having a pleasurable experience.

‘ …it feels that you’re finding things or you’re getting something that you want to get … without too much effort… it’s good … that’s pleasurable’ (Ted).

4.4.1.2. Interactivity/Social element

The *Interactivity/Social element* category comprises issues: interactivity with others, functions that are used in a social context (e.g. reminders of people’s birthdays), and sense of affiliation. In the context of this study, affiliation is perceived as one’s feeling as a part of something (e.g. a team, or a group of owners of the same piece of technology). It transpired from the data that being an owner of a specific very advanced technology (e.g. PDA, or a digital camera) brings pleasurable experience. When asked about pleasurable experience with PDA one of the participants remarked:

‘… whenever I take it out people always get …uuuuu, what’s that’s … it makes me feel proud …’ (Victor)

In addition, participants reported feeling excitement when using their personal technology to interact with others not only when sharing, for example, pictures via the internet but also sharing technology at the same location (co-presence).

It seems that sharing and demonstrating how technology works, revealing its functionality and scope of operations excites people.

> *' … And you show them you have your Word document and you show them that you can take photographs and you can store them, and of course you can play games on it but I don't normally play games on it. And then you can have photographs, Excel spreadsheets … makes you feel exciting …' (Victor when discussing his PDA):*

The data suggests that excitement, fun and pleasure coming from the use of technology is considered as a medium for interaction, which allows people to communicate between each other in a new way.

> *' … yeah, yeah, it's great. It's very nice that I can email pictures …' (Lily)*

This view is shared by Jordan (2000) too when discussing social pleasure evoked when owners of a specific product share it and converse about it with others. He claims that associations with specific products create a sense of belonging in a social group as well as forming a social identity, which in turn gives people pleasurable experiences.

What transpires from the data is that when technology is used in co-located settings people experience something other than just pleasure from being a part of a group or owning a piece of technology. They experience excitement and fun as technology supports the activities they perform with others. One such activity is sharing photos, which is very much a social experience. The content of photos shared varies in nature, something funny that people like to share just to make others laugh. This 'social fun' is unique and brings people together.

> *'Yes, I like taking funny pictures and then send them to my friends … we have fun when they email back the comments and stuff… and this can go on forever, well not quite that long. But that's what we do … we love it.' (Lily)*

The feeling of pleasure and excitement is often experienced in a social context; transferring files through wireless communication or viewing photos with others. Being able to share photos that are unique in nature or simply funny evokes these positive experiences making people feel excited and creates the 'social bonding' between them.

'The thing that I like about photography is not getting the settings right but getting the composition right and actually getting the child or a bird or whatever it is composed and … that's incredibly difficult … just managing to take the photo with the thing in the frame because you get a lot of photos with birds of branches where birds were there just a second before, a child that was looking at the camera just a second before but actually but now is scratching a nose or looking another way or whatever. ...so that's difficult but when you get them … showing them to others … It's really exciting because those photos are unique and it was hard to take some of them so … it's exciting to show them .' (Peter)

Kidd (2002) also suggests that people using digital cameras successfully enhance their social bonding.

The social element can be cross-referenced with functionality and as long as technology provides functionality to facilitate social interaction the experience of excitement or fun will be evoked (see also section 4.4.1.1).

4.4.1.3. Appealingness

It transpired from the data that appealingness combines two attributes: aesthetic and physical factors. The former relates to attractiveness of technology (e.g. leather finish, shape, format (slim line)) whereas the later to the size (how big vs. how small), weight, and the feel in one's hand. This was also suggested by many researchers as being the key elements when discussing usage of technology (e.g. Jordan, 1998, 2000; Tractinsky et al., 2000; Hassenzahl et al., 2000; Hassenzahl, 2003).

'… it must be small so I can keep it in my handbag … looks pretty… My new one is very slim, silver one … I just like the way it looks … it's really cute …' (Mira)

' … it's attractive and it's small … it's got nice shape, … it feels nice in your hand …' (Victor),

'I like the slickness, and that kind of movement is well designed, well engineered and it just gives a sense of pleasure… the gadget that I'm getting the most pleasure from is the iPod. Why do I have that? Well … it's a number of levels that I get pleasure out of it. One when I intellectualize it.

When I think about giga bytes of memory … to me being able to put a lot of stuff onto something and to have it in a little box. Not just music but my ideas, my backups … that's need to me. That gives me pleasure, that I'm able to do that …Then there is a physical nature… iPod as you know is very slick, very smooth, well design, and shinny and nice … all form factors and all things that goes around, the wheel. … it's just err… elegant'. (Moty);

' …should be easy to hold.' (Lily).

This is in line with Jordan (1998), Hassenzahl (2003), and Norman (2004). Jordan (ibid) claims that appearance of products (style and colour) strongly contributes to pleasure and vice-versa lack of aesthetic appeal could contribute to a displeasurable experience whereas Norman (2004) identifies three levels of design that shape peoples' experience: visceral, behavioral, and reflective. The visceral level is one that relates to aesthetic and physical features of an artifact. Norman (ibid) claims that the physical features: look, feel, and sound dominate in producing positive experience. Moreover, he suggests that even 'highly rated products may be turned down if they do not appeal to the aesthetic sense of the potential buyer' (p. 69).

Other researchers including Jordan (1998) and Tractinsky et al. (2000) suggest that there is a strong link between aesthetics and usability. They claim that equilibrium between aesthetics and usability is crucial in creating pleasurable electronic products.

As well as discussing positive attribute of products (stated above), participants were concerned with problematic features that may lead to negative experiences.

' … I don't want it to be cluttered or too loud. Whether it is too loud in colour, too much on a screen or just too much stuff and too many buttons. That would not be good' (Lily).

The negative effects of a cluttered page layout and inappropriate use of colour on users' experience were also reported by other researchers (e.g. Pace, 2004a; Pilke, 2004). The former argues that by minimazing the distractions (e.g. less cluttered web interface, reduction of: use of inappropriate colours, disorganised content and pop-up advertisements) faced by users, the

opportunity of flow experience (experience that promote enjoyment) might be maximized.

4.4.1.4. Novelty

When 'novelty' was concerned important factors included: a sense of surprise, an element of novelty, and sense of discovery. In the context of this study, the former represents some features that were not expected (e.g. the ability to download ring tones from the web into a mobile phone, or the behaviour of an eye focus camera) whereas the latter relates to new features of technology (e.g. wireless communication).

> *' … my new mobile phone has these polyphonic ring tones … I got them from the web … it's my favorite band … this is very exciting [laughing] … the thing that I can hear it on my phone [laughing]. My old phone didn't have that.' (Mira)*

It was noticed that the sense of discovery is linked to curiosity which can allow one to be absorbed in specific novel activities and is essential to experiencing pleasure (Kashdan et al., 2004).

The experience of pleasure and fun was reported when discovering novel features of technology.

> *'… my camera gives me pleasure …is a sense of fun in trying out something that probably I didn't believe that is going to work very well … it was just a bit of fun when I first got it.' (Peter)*

The sense of discovery fits well with Pace's (2004b) study of the roles of challenge and skill in the flow experienced by web users. In that study, the element of discovery ("finding, learning or observing something for the first time" p.355) is linked to joy. Similarly, the joy of discovery was also described by Csikszentmihalyi (1990) and Hassenzahl et al. (2000). The latter claim that for a system considered to be appealing and enjoyable or fun to use, it needs to meet a number of requirements; these are: it needs to be interesting, novel, and surprising. The study reported here demonstrates a strong connection between *novelty* and experience of excitement and fun when technology is concerned.

> *' … the buzz comes when the other person has a palm as well, so you say: let's exchange the cards …and you do the wireless link up and you exchange documents. um… on the fly, that's quite cool.' (Victor).*

This is in line with other researchers including Hassenzahl (2003), Novak and Hoffman (2003), and Csikszentmihalyi (1990). The former claims that stimulation (novelty) is a key factor for experience and argues (predicts) that pleasure happens when expectations are exceeded. Hassenzahl (2003) also discusses satisfaction, which relates to fulfilment of expectations whereas Csikszentmihalyi (1990) argues that novelty is a requisite for a new challenge to happen. Approach taken by Novak and Hoffman (2003) suggests that peoples' yearning for curiosity and novelty when using the Web correlates to the perception of their skills and the challenges provided by the Web.

The data shows that novelty diminishes with time; the longer people use the product the excitement and fun associated with discovering and exploring new features might be lessened.

> *' … the eye tracking is just a toy … it was just a bit of fun when I first got it … then it was OK to use it … just to know that I have this feature and if I want I can use it made me feel good ' . (Peter)*

This is consistent with Hassenzahl's (2003) findings, which suggest that 'a product that was perceived as new and stimulating in the beginning may lose some novelty and ability to stimulate over time' (p. 32). It can be argued that when novelty diminishes the excitement and fun could be transferred into pleasurable experience as one learns how to appreciate what a specific feature of a product has to offer. In the context of questions related to how the technology (in this case the eye tracking feature within the digital camera) makes you feel (exciting or fun):

> *' It feels good. I know how to use it now so it's good. … no, not any more. It's good to know that you have this feature and you can use it to take good pictures. … yeah, it feels good.' (Nora)*

This suggests that these experiences are not settled but rather dynamic. However, at this stage of the study the suggestion for making this claim more conclusive would be to investigate the issue further.

4.5. Discussion and conclusion

Traditional usability is about how well a user's task can be supported whereas the emerging focus on user experience is reaching far beyond this. User experience is a part of every interaction between user and system. When

designing interactive systems it is important to understand what creates a particular experience. This will result in products being not merely utilitarian but enhancing the quality of experiences.

Knowing and understanding users' needs is an important step that needs to be taken, in order to fulfil users requirements to design systems that allow experience to be pleasurable, enjoyable, or exciting. The study reported here is the first step in this direction.

The proposed different types of hedonic experience and their characteristics provide a starting point for a better understanding of how people perceive and understand hedonic experience and what factors influence it. During the study, the repository of vocabulary was created to help communicating issues related to hedonic experience.

When discussing hedonic experience with interactive technology four types of experiences were identified: pleasure, excitement, fun, and happiness. They were evoked when: the *functionality* of a device is delivered, the device is used in the *interaction/social* context, the device has the element of *appealingness* to its users and the *novelty* of the device or its features was present.

The *interaction/social* element is similar to the one discussed by Jordan (2000), where pleasure with a product arises from facilitating social interaction and by doing so creates a sense of belonging to a social group. Furthermore, the *appealingness* discussed in this chapter relates to Jordan's physio-pleasure, which is concerned with touch, taste and smell as well as feelings of sensual pleasure. The similarities between the two are in the way people feel when holding and touching a piece of technology (e.g. mobile phone or PDA).

However, the findings suggest that there are potential areas worth further investigation:

- Experience as a dynamic entity. It appeared that experience changes over time (e.g. from fun to pleasure) and depends on the user's familiarity with a specific technology or a feature within technology.
- The social element as a significant part of user's experience with technology. The experience changes when technology is used for a social interaction within diverse social settings. Furthermore, technology can be used not only as a communication medium but more interestingly

as a catalyst to support a non-technological communication. Different dimensions of social interactions using technology can be explored.

- The social element is linked to functionality of technology that supports social interaction. The same features of technology can evoke different experiences when used for social interaction in co-located settings.

This chapter shed light onto the nature of hedonic experience and factors influencing it including: functionality, usability, social element and applealingness (aesthetic/ physical factors). The next study continues exploration of hedonic experience in the context of mobile interactive technology following the suggestions discussed above.

Where technology is concerned one of the most important contributors to the user experience is the social element of its use. People reported feeling excited and having fun when technology was used for social interaction especially when showing others funny photos that are passed from one person to another as a means of making them laugh and creating the ‘social fun’ experience. One of the technologies that support social interaction is mobile phones, which are very popular and used by people from both genders, age group or professional background.

The following chapter introduces the research done into photo sharing (as an example of experiences in social context), which set the agenda for the Second Study exploring the social practices of co-located photo sharing using camera phones.

Chapter 5. Social practices of sharing photos

5.1. Introduction

As stated in the previous chapter the photo sharing activity is an example of technology used in a social context that is both enjoyable and fun. Since the aim of this thesis is to investigate people's photo sharing practices in co-located settings using camera phones and what influences their sharing experience a review of previous research within this area is presented with the aim to provide a perspective within which to locate the research questions (see section 1.3) for the current work and also to provide reference points for discussing issues through the thesis.

The topics covered in the review relate to personal digital photography, sharing photographs at home, 'on the move' and the social uses of camera phones.

5.2. Personal digital photography

In recent years, there has been substantial interest in digital photography, with a particular interest in how the digital medium facilitates sharing of images, which include web-based systems, mobile applications, multimedia messaging and digital display devices that are used in a domestic environment (Balabanović et al., 2000; Frohlich et al., 2002; Counts & Fellheimer, 2004; Lindley & Monk 2006; Kim & Zimmerman, 2006; Lindley et al., 2008; Frohlich & Fennell (2007); Durrant et al. 2008).

Many researchers state that sharing is an important use of photos, which develops social activity, strengthens relationship between individuals or groups of people and creates social bonding by reviewing and communicating past experiences and memories with others (Chalfen, 1987; Frohlich et al., 2002; Van House et al. 2005). However, sharing can take place in various environments (e.g. home, remotely, or on-line) and be supported by different technology.

It has been argued that photo sharing plays an important role in family life and often occurs in the home environment where different electronic media are used

to support it. The following section discusses the most prominent work within this area.

5.2.1. Sharing in home environment

A vast body of literature focuses on display and sharing of photos in a home environment; Frohlich et al. (2002); Frohlich (2004); Frohlich & Fennell (2007); Crabtree et al. (2004); Lindley et al. (2006), Lindley & Monk, (2006); Taylor et al. (2008), Durrant et al. (2008), Swan & Taylor (2008) just to name a few.

Frohlich et al. (2002) studied practices of use of conventional and digital photos in order to explore people's needs in the context of future photo sharing technologies. Although the focus of the study was on both types of photos (conventional and digital) participant's preferences were to use prints rather then digital photos. The authors claimed that the flexibility of printed photos support photo sharing in different social contexts. Moreover, they suggest that people's practices involving photos could be grouped into four categories: archiving, sending, remote sharing and co-present sharing (ibid).

Drawing on his earlier work, Frohlich (2004) proposed a framework for domestic photography called the diamond framework. The framework allows thinking about the activities in photography focusing on the relationships between the photograph, the photographer, the subject and the audience involved in sharing (see figure 5.1).

The diamond framework gives an account of the six classes of interaction that capture different forms of 'home mode communication'. These are: recognition, recollection and self-reflection, interpretation, storytelling (3rd person), storytelling (1st person) and reminiscing. The lines between various elements of the framework represent interactions between them; the dotted line illustrates different kinds of 'solitary reflections on the photograph that are presented by different human participants' whereas solid lines 'represent social interactions between participants (i.e. the photographer, the subject and the audience) around the photograph' (Frohlich, 2004, p. 44).

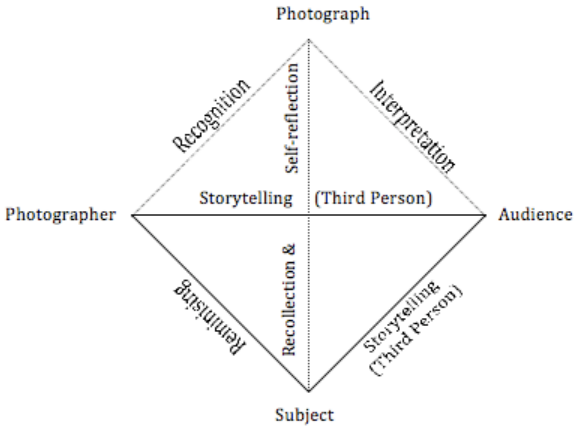

FIGURE 5.1 THE DIAMOND FRAMEWORK FOR DOMESTIC PHOTOGRAPHY ADAPTED FROM (FROHLICH, 2004, P.44)

The framework is general and practical at the same time as it encapsulates the interaction between different people and a photograph that can be motivated by reminiscing, recognition or just a storytelling activity. All discussed activities take place in a home environment between a private audience and involve sharing by viewing the photograph on the display.

These findings are valuable as they provide useful information about sharing in a home environment involving family members. Building on Frohlich's work about the motivations behind sharing photos and the social interaction through the sharing of photos between homogenous audience (family), this thesis explores people's sharing activity in different contexts (home environment, public and work environment), with different audiences (family, friends, others) and also using different methods of sharing as afforded by camera phones.

Within the same study, Frohlich (2004) investigated the idea of using sound in photography to recommend audiophotographs as a new media form rather than video clips as part of the next study exploring the use of physical souvenirs and memorabilia used alongside photography, which play an important role as story triggers, reminders, props and statements (Frohlich & Fennel, 2007).

However, the findings of Lindley & Monk (2006) suggest that despite the proposed advantages of printed photos (Frohlich et al., 2002), different media are being increasingly used in collocated photo sharing environment. The authors (Lindley & Monk, 2006) imply that people use technologies such as PC, laptops, and TV, which are in line with findings of Balanović et al. (2000) and

Frohlich et al. (2002), as well as traditional printed photos and photo albums to share photos in the home environment, the way depending on the affordances of media used (e.g. laptops allow sharing on a larger screen anywhere). It was suggested that affordances of different technology used for digital display of photos affected the whole experience of photo sharing (Lindley & Monk, 2006). For instant, a TV allows a large group of viewers to watch photos on a large, high-resolution screen at the same time enhancing the sharing experience.

Similarly to Lindley & Monk (2006), Durrant et al. (2008) investigated resources afforded by digital photo display technology for a home environment. The authors proposed three alternative systems that presented novel photo display in order to provoke questions about "the use of photo display technologies and how they may be incorporated into people's routine photo display practices" (p. 2301, ibid).

This thesis builds on the findings from the studies discussed above, specifically on the idea of how affordances of different digital display support sharing photos amongst members of family, and expands it to different groups of people involved in sharing (friends, acquaintances).

Some of the research discussed has been in order to understand the users, organisation, and retrieval of images to support the design of systems supporting these activities. Other work provides explicit knowledge about sharing practices of paper-based and digital photographs occurring in a domestic environment. Balanović et al. (2000) and Frohlich et al. (2002) discuss the use of different media employed to share photos such as laptops, PC computers, TV for co-located sharing, email and web-based applications for remote sharing.

This thesis expands and goes beyond previous research examining the affordances of different media used for sharing activity, exploring the affordances for sharing of camera phones used in different settings. In addition, it investigates how the affordances of these settings (e.g. private, public, work) shape the photo sharing experience. Moreover, the work discussed above evolved around 'sharing photos later' after transferring them to different media (PC, laptop, TV) instead of sharing them immediately. Learning about how people share photos using such technology helped me raise questions about

different kinds of sharing that occurs ‘on the spot’ (immediately after the picture was taken) and how it is supported by the camera phones.

5.2.2. Sharing of mobile images ‘on the move’

Although sharing photos is a part of family life and happens usually in a home environment (Frohlich et al., 2002; Frohlich, 2004; Frohlich & Fennell, 2007; Lindley & Monk, 2006, Taylor et al., 2008) sharing also takes place outside the home and involves other people (e.g. friends, acquaintances, colleagues).

Moving away from home and the technology that supports sharing there, camera phones are used to make sharing possible when ‘on the move’. Taking advantage of the characteristics of camera phones (e.g. portable, accessible and always carried around) new picture publishing and sharing systems have been developing (Mäkelä et al. 2000; Sarvas et al. 2004; Ahern et al. 2005a,b; Davis et al. 2005; Sit et al. 2005, and more recently Naaman et al. 2008) to help people sharing their photos using mobile technology.

One of the earlier studies in this field was conducted by Mäkelä et al. (2000). A European Funded Project (‘Maypole’) was carried out before the release of commercial camera phones. Participants from two socially connected groups of people were provided with prototype devices allowing them to exchange images. The results suggested that photos increased or maintained group cohesion, expressed affection, supported conversation, and told a story, which is in line with the work of Balanović et al. (2000), Frohlich et al. (2002) and Sit et al. (2005). In addition, it allowed family members to keep up with one another’s lives and that the system was used daily rather then driven by specific occasions. The Maypole study found that participants began to use images in a different way; that is to capture everyday items and use them in funny ways or to make stories. Often the sharing happened on the camera screen and in some cases participants wanted to keep those images for longer periods of time and often print them. However, there is very little data on supporting ways of sharing photos on camera phones.

Sharing mobile images changes its form depending on the different systems built within camera phones supporting the sharing activity. These systems allow for remote as well as co-located sharing (e.g. MobShare, MMM2, PhotoRouter, Zurfer).

MobShare developed by Sarvas et al. (2004) provides an immediate and controlled sharing of photos in remote locations; the immediate sharing involves transferring images after capture whereas controlled involves sending images to a circle of acquaintances whose contacts are stored in the phone's address book. The photos are transferred from the phone to an organised and manageable web album that can be viewed by those invited to the sharing sessions. Although the sharing is immediate, the recipients view the photos on the web browsers at their own locations. The authors (Sarvas et al., 2004) claim that sharing images directly from the phone involves fewer processes taking place; there is no need to transfer images from the camera phone to the networked PC. 'Mobile phone images can be shared immediately after capture from the actual capture device, and the images can be shared over the network to distant locations' (ibid, p.726). The idea of sharing camera phone images discussed here certainly fulfils the requirements of those who would like to share photos with recipients at distance locations without the need for using additional technology (e.g. PC) or extra cost (e.g. using MMS services). The camera phones discussed by Sarvas et al. (2004) are used as a means of capturing images and transferring them to a remote location for viewing on computer screens.

Another system MMM2 (Mobile Media Metadata) developed by Davis et al. (2005) although similar to MobShare (camera phones with an in-built system that uploads photos to a web-base archiving and sharing application) the difference is in the sharing location. MMM2 allows for both co-located and remote sharing. After taking photos the owner decides whether to share them immediately or later. In the former case, the system will pick up the Bluetooth-sensed co-presence and send the photos. The co-presence list is built by the MMM2 user and is stored on the phone. In the later case, the photos are uploaded to a user-specific web-based sharing page where they can be shared with people at distant locations (e.g. send as an email, post to a blog, add to the photo album). Although, MMM2 allows co-present and remote sharing as reported by Van House & Ames (2007) the downside was found to be 'some confusion about the location of saved images and many users didn't know how to share images with co-present others on the phone' (p.5), which directed attention towards issues related to how co-located sharing with different groups of people takes place using camera phones.

Both systems discussed, MobShare and MMM2, had studied the social behaviour involved in sharing photos from camera phones at remote locations whereas Zuefer (Naaman et al., 2008) focused on 'consuming and viewing photos on the mobile device' at co-presence of others (p.1740). The system provides the users with comprehensive photo browsing facilities while 'on the go'. Zuefer supports 'personalized, comprehensive and customizable access' to photos from Flickr (ibid, p.1739) as well as it allows its users to access different categories of photos and follow photo-related discussions on Flickr. The authors (Naaman et al., 2008) claim that people often preferred to share their photos on the phone screen (using Zuefer) rather then viewing them on a computer using Flickr.

All discussed systems pointed to the prevalence of issues relating to the need for designing dedicated systems to support capture, sending, organising and viewing as well as the sharing aspects of camera phone photos. These systems allow for remote sharing using either mobile phones or web-base applications mimicking a face-to-face sharing activity as well as co-present sharing using camera phone screens or Bluetooth technology. They added to the discussion of people's sharing behaviour and identified issues related to co-located sharing, which this thesis explores.

5.3. Camera phone uses

Mobile technologies including camera phones have been increasingly used to facilitate people's social life outside a work environment. The popularity of using camera phones is further testimony to the importance of the new ways camera phones have been used to change the way people communicate and pursue social interaction via sharing digital photos. A number of researchers studied picture taking and sharing using mobile phones in Japan (Ito & Okabe, 2003, 2005; Okabe, 2004, Okabe & Ito 2003, 2005 and Kato, 2005).

The study conducted by Ito & Okabe (2003) focused on uses of camera phone in the Tokyo-Kanto area. The participants (15) included high school students, college students, two housewives, and three professionals. The researchers asked people to keep camera phone diaries recording: the time of using it, who they contact, who initiates the contact, where they were, what kind of communication type was used, why that kind of communication was chosen,

who was in the vicinity at the time of communication, any problems encountered with the usage, and the content of the communication. In addition, participants were asked to keep a record of: photos they took, photos they received, and photos they shared. Okabe & Ito (2005) claim that mobile multimedia is primarily used for personal archiving, visual notes, intimate sharing as well as for news and reporting. “Mobile phones … define new technosocial situations and new boundaries of identity and place … create new kinds of bounded places” as argued by Ito & Okabe (2005, p. 260).

A similar view has been taken by Okabe (2004) who reasoned that capturing and sharing visual information cannot be taken out of their social relations and contexts. Although people may snap a stream of photos on their camera phones, most people only email photos that are in some way personally ‘newsworthy’ (Okabe, ibid).

The work of Kato (2005) supports this view and goes further suggesting that uses of mobile/camera phones change people’s daily activities in Japan. The author argues that the new ways of pervasive photo taking through camera phones allows people to document their lives on a daily basis and ‘it contributes, to some extent, to change the ways in which we record and preserve our “life documents” on a daily basis’ (Kato, ibid, p.2), which can be preserved and shared as a life of local community. People take snaps with camera phones and post them on the community board for others to view and comment on.

Other researchers such as Scifo (2004), Kindberg et al. (2005a,b), Van House & Davis (2005), Davis et al. (2005), Van House et al. (2005) and Van House (2006a,b) studied uses of camera phones from other nations (e.g. Americans, English and Italians). They claim that people use photos as a way of social interaction during social gatherings, family events, birthday parties or just when meeting with friends.

What people capture on mobile phones and what they do with these images was extensively investigated by Kindberg et al. (2005a), whereas others like Sarvas et al. (2005) focused more on the lifecycle of a mobile phone pictures.

The study of Kindberg et al. (2005a) involved 34 participants from two age group populations: young users (16-21 years old) and adults (over 21) including 15 Americans and 19 English experienced camera phone users who used a

variety of camera phone types with different features such as video, Bluetooth or infrared, MMS and radio service. The results of the study was six-part taxonomy, which describes the intentions behind the camera phone images. These include: affective intentions enriching a mutual experience; communication with absent friends or family and personal reflection or reminiscing; functional intentions supporting different tasks: mutual, remote and personal. This work clearly illustrates that sharing is an important factor, which motivates people to take pictures in the first place.

Building on this study Kindberg et al. (2005b) identified five activities when using camera phone. These are: capturing, receiving, sharing, printing, and archiving. The results show that sharing of images took place mostly on the phone's screens and sometimes by transfer using infrared or Bluetooth, or a PC. Furthermore, Kindberg et al. (ibid) identified four major categories of purpose for using camera phone images: social, individual, affective and functional. *Social* category captured images that were taken to share with others whereas *individual* images were those taken and kept for themselves. Images from the *affective* category captured photos for some sentimental or emotional reason whereas *functional* images were those taken to support a particular task. These categories were further combined in order to discuss intentions of taking and uses of camera phone images.

The *social/affective* category was further divided into two categories: mutual experience captured images to be used for a shared experience (either in the moment or later), and absent friends or family captured images to be used for communication with absent friends or family (either in the moment, by sending them, or later by viewing them on the phone screen).

The *social/functional* category consisted of a mutual task where images were intended to be shared with people present at capture, in order to support a task (either in the moment or later) and remote task were images were intended to support a task by sharing with remote family, friends, or colleagues (either in the moment or later).

Another category, namely *individual/affective*, included personal reflection images that were intended for personal reflection or reminiscing.

The last category *individual/functional* consisted of personal task images that were intended to support some future task not involving sharing.

Kindberg et al.'s (2005a,b) extended study brought light to the area of camera phones that had not been extensively explored before, focussing on people's intentions at the time of capture and subsequent patterns of use of those photos. The authors claim that one of the reasons for capturing the photo is the intention to share them with others for many reasons (e.g. to share them with people present at capture). Moreover, Kindberg et al. (2005a/b) explored the issues of time sharing; meaning sharing either at the moment of taking or later. These issues are strongly linked to the topic of this research. Building on the findings from Kindberg et al. (ibid) this thesis expands the area of social and affective purposes of using camera phones and placed them in different environments (e.g. private (home), public (places of eating, socialising and entertaining) or work (office, communal areas) with the focus on how the attributes of these places influenced the sharing behaviour. Moreover, this thesis investigates further the issue of time in relation to how people share photos at the time of taking them and how they share them later.

Although Scifo (2004) studied the domestication of camera phones in Milan (70 people ranging from 14 to 34 years old), his results provided similar views on people's practices of camera phones. He claims that taking photographs on camera phones and using MMS communication allowed users (youngsters) to identified themselves within a social group and intensified communication within that community. Moreover, the author found that with MMS people allowed others to access places, individual and social situations, and emotions captured on their photos. Scifo (ibid) also claimed that camera phone pictures extend one's experience and memory that is portable in a visual and shareable form.

Others like Taylor & Harper (2002) moved further showing that teenagers' practices are similar to 'gift-giving' rituals, which shaped the way teenagers understood and used their mobile phones. The 'gift-giving' practices included sharing certain text messages, call-credits and mobile phones themselves. All these practices establish and cement allegiances and sustain rivalries (ibid). Licoppe & Heurtin (2001) have reported similar findings in their study of mobile phone uses in France. However, their work reports on the use of mobile phones for remote voice calls and refers mostly to the exchange of calls and telephone numbers.

Studies reported by Weilenmann & Larson (2001) also focused on teenagers' mobile phone uses, however, exploring the collaborative nature of mobile phones use in local social interaction. They suggested that mobile phones are often shared in different forms including: minimal form of sharing (SMS messages), taking turns (several people handling a phone), borrowing and lending of phones, and sharing with unknown others. The latter involves the phone being handled by teenagers who are unacquainted until one of them makes the initial contact (e.g. boys giving girls their mobile phone to enter their phone numbers).

The relevance of social relations and uses of personal photographs were also identified by Strom (2002), Van House et al. (2004, 2005) and Van House & Davis (2005). Strom claims that pictures "strengthen the relationship between the user and people being photographed" (p. 308), which is reflected in the work of Van House et al. (2005) who argue that through photo sharing people develop social bonding and the feeling of 'togetherness'. Expanding on their first study (Van House et al., 2004), where social uses of personal photography were identified, their consecutive study (Van House et al. 2005) involved 40 first-year graduate students from the School of Information Management and Systems, aged between 22 to 35, and 20 other people, mostly SIMS faculty and second-year graduate student researchers. All the students were taking the same classes and working together on projects as well as socialising. The authors (ibid) discovered five different sets of social uses of personal photos: creating and maintaining social relationship, constructing personal and group memory, self-expression, self-presentation and functional communication with self and others.

Like the work of Kingdberg et al. (2005a/b) Van House & Davis (2005) investigated different social uses of personal photos. This thesis built on the findings from their work within this area.

Other work of Van House et al. (2005) check the references studied personal photographers from the US using film and digital cameras. They found that camera phones were often used as a substitute for other cameras and they were used for taking different kinds of pictures and social uses. In one instance people used camera phones to capture mundane images of their daily lives or opportunistic images of unexpected events and sights; in the other instance

they took pictures for personal chronicling. In both cases, these pictures were mostly used for relationship building. Recent work of Van House (2007) explored the uses of images in social interaction using a public on-line system called Flickr. The user group consisted of 12 Flickr users, mostly graduates students from UC Berkeley aged between 20 and 40. The researchers found that people posted their pictures on Flickr creating chronologies of images for memory, identity, and narrative, maintaining relationships, for self-representation, and self-expression. It is also used to share images with intimates, acquaintances, or even strangers. Although the study focused on remote photo sharing, there are similarities between co-located and remote sharing practices when the purpose for sharing is concerned.

The previously stated studies extensively explored practices of using mobile/camera phones within different international user groups (Americans, English, Italians, Japanese, French and Swedish) amongst teenagers and adults (14 to 35 years old). The findings provided a deeper understanding of what people capture on camera phones and what they do with those images. Furthermore, the studies discussed the ways people use mobile/camera phones for collaborative social interaction. In addition, this literature has discovered intentions behind the use of camera phone images that could be shared remotely as well as in collocated environments. Although these studies focused predominantly on what people capture and why, it provided a basis for areas that this thesis investigates; that is how, who with, when and where the collocating photo sharing occurs.

5.4. Summary

Given the plethora of research in this area, it is surprising to find so little attention given to the photo sharing experience using camera phones in different co-located settings: the ways people use camera phones as a medium for social practices.

The body of literature discusses various aspects of sharing including: different locations of sharing (e.g. home or ‘not home’), different groups of people involved (family, friends and acquaintances), and different technology supporting the display and sharing of photos (e.g. PCs, laptops, mobile and web-based applications, mobile/camera phones), and different time of sharing

(at the time of capture or later). Nevertheless, it lacks the insights of how different groups of people share photos and what affects their experience; how the place with its different attributes shapes the experience and how technology (i.e. camera phones) supports social interaction through the photo sharing, which this thesis investigates.

The following chapter provides a description and results of the Second Study which was designed to explore: people's experiences when using camera phones for social interaction in co-present settings; circumstances and contexts in which social practices occur; and what influences sharing experience.

Chapter 6. Second Study - Use of camera phones for social interaction

6.1. Introduction

The study reported in this chapter builds on the results of the First Study (section 4.4), which provided answers to questions about how people perceive and understand hedonic experience with technology and what influences their experience. It was evident that one of the most important factors is the social use of technology and the most popular technology was mobile phones. However, the First Study did not provide insight about this hence the Second Study is specifically concerned with people's experiences when using camera phones for social interaction in co-located settings (i.e. when people are present at the same location at the same time).

Camera phones have gained increasing popularity and use amongst mobile technology users (Kindberg et al. 2005a; Okabe, 2004; Scifo, 2004). The work of Kindberg et al. (2005a) explored the intentions of taking and uses of camera phone images. Although both researches clearly demonstrate that the sharing is an important factor, which motivates people to take photos, they did not investigate where, how and when the sharing takes place and what influenced it. This is the area that is examined with this thesis.

People use camera phones everywhere: on the bus or train, in the restaurant, coffee bar, or park. It was found that people's behaviour and social practices are influenced by the place where camera phones are used (e.g. public or private). Since little is known about how social interactions using camera phones occur in co-located settings it was decided to continue the empirical work with a qualitative study in order to provide some perspectives, which might be developed through subsequent study.

6.2. What the study investigates

The focus of this study was to obtain insights into the ways people use camera phones as a medium for social practices that occur in co-located settings. In

addition, the broader understanding of the circumstances and contexts in which social practices occur were investigated.

This study concentrated on three issues: the first related to where people use camera phones for social interaction, the second focused on people's practices when using camera phones, and the third concerned factors influencing the experience.

The primary questions that the study addressed were:

Question 2.1: Where people use camera phones?

Question 2.2: How and where social interactions using camera phones occur?

Question 2.3: How camera phones facilitate people's experience?

Question 2.4: What factors influence people's HE of camera phones?

The study provides a better understanding of the nature of people's experience occurring during social interaction in different co-located settings. It identifies different places, people's practices and experiences during the time of social interaction, recognizes interactional problems that occur when camera phones are used and provides information about factors influencing the photo sharing experience.

6.3. Description of the study

Two different methods were utilized to investigate the matters in question: semi-structured in-depth interviews using 'photo probes' and field observational studies (see sections 3.3.2 and 3.3.4).

The next sections provide information about participants, the interview procedures and questions asked.

6.3.1. Participants

Five participants from different universities were recruited using personal and group interest networking to take part in this study. They were students representing various level of academic progress from different universities based in and outside London. All participants were aged between 18 and 27; they had been using camera phones for taking and sharing photos for at least one year (see Appendix 3 for participants' demographic data)

6.3.2. Interview procedure

The technique of asking participants to share their pictures and talk about circumstances and reasons for taking them as well as discussing their life cycle has been applied by many researchers (Kindberg et al. 2005a,b). It helps participants to stimulate their memories of events, places and situations that were captured by a particular picture or video.

Applying semi-structured in-depth interview technique using probes (photos stored on participants' camera phones) allowed open-ended questions to be asked where participants gave the full account of the story depicted on the photos and video clips. This interviewing strategy permitted the exploration of the key points in details with each participant and obtained extensive information on the investigated topics.

Each interview took between 30 - 50 minutes and was tape-recorded with the users' permission, which then were transcribed and analysed.

As the method for data analysis was based on the concept of the grounded theory, where data collection and analysis occur in parallel. The process of transcribing the interview recordings presented a good opportunity to analyse not only the participants' responses but also the interviewing practices.

Brief notes were taken in addition to the recording of the interviews to keep track of users' comments and important issues that needed further investigation.

6.3.3. Interview questions

Since the initial focus of this study was to explore social practices with camera phones used in co-located settings and where these practices take place, the interview questions were divided into three groups. One group of questions aimed to investigate issues related to the different settings where photos were taken and shared. Participants were asked to talk about different places where they used camera phones and what they experienced during the time of sharing. The second group explored issues related to purposes and motivations behind using camera phones. Participants were asked to illustrate why and how they used camera phones in different places. The final group of questions was related to different methods of transferring and sharing photos and videos.

Participants were asked to discuss how they transferred photos, how easy or difficult the process was, who they transferred photos to or from, and how the sharing activities occurred.

Since the interviews involved viewing pictures from participants' collections, the initial questions asked included:

- What the photo showed, where it was taken, was it captured or received by the participant?
- What was the use of the photo, including whether it was shared, with whom and how?
- What was the context of use and intentions with regard to sharing the photo?
- What was the purpose and motivation behind sharing the photo?
- What did they experience during sharing activity?
- What influenced their experience?

These questions provided a basic structure that helped in ensuring that all relevant issues were explored. However, the in-depth form of the semi-structured interviews allowed for additional questions to be asked that were triggered by interviewees' comments. Answers to those questions contributed to a broader view on investigated topics.

6.3.4. Field observation procedure

The data from the field studies was gathered in a variety of public places [6.1] including pubs, restaurants, leisure and entertainment places in London (e.g. Kenwood House and its grounds, Covent Garden, Comedy Store), museums (British Museum, Science Museum), and public transport (tube and buses) in order to get a greater insight into the use of camera phones in public places. The selection of public places was based on the idea of covering a wide range of places that are publicly attended but vary by their location and functionality.

[6.1] Public places are described as places where different social activities take place and that are accessible to the general public.

In some cases, it was planned to make observations while at other times the situations occurred and were noted. In total, over 35 hours were spent observing camera phone uses. During this time, eighteen events of individuals and groups interacting with photos and video clips were observed and detailed notes were taken (for examples of the field notes see Appendix 4).

The data from the field observational study was then transcribed and analysed following the Grounded Theory approach.

6.4. Results of the study

In order to gain a better understanding about people's practices and experiences with camera phones used for social interaction in co-located settings and identifying factors influencing it the analysis of the data from both interviews and field observational studies were performed applying the Grounded Theory approach. The headings of the 'Results of the study' are organised according to the main categories and subcategories developed during the open and axial coding.

6.4.1. Camera phone use in different places

The field observation study revealed many instances of people being engaged in social interaction using camera phones in different co-located settings. The in-depth semi-structured interviews provided extended information to support these phenomena. The data shows the relationships between place and the photo sharing practices, which will be discussed in the following sections.

Camera phones are an integral part of our lives. People carry them to work, to social events, to leisure activities, even when going shopping. Every time we use camera phones, we experience something. The experience, however, does not exist in a vacuum, but rather in a dynamic relationship with other people, places and objects (Mulder & Steen, 2005). What we experience and how camera phones are used is also determined by place and space.

In the context of this study, Ciolfi's et al.(2005) concept of place and space was followed. The authors (ibid) articulated a notion of place as physical space that is experienced by people through a set of dimensions, which exist in connection with each other. These dimensions are: physical/structural, social, cultural, and personal.

The *physical/structural* dimension relates to physical qualities of the places (e.g. materials, colours, disposition of artefacts).

The *social* dimension relates to social interaction and communication within the place.

The *cultural* dimension relates to rules, conventions and cultural identities of place and its inhabitants.

The *personal* dimension relates to the feelings, emotions and memories we associate with a place.

Each of these dimensions occurs during the experience of a place that is shaped by the interconnections between these dimensions (Ciolfi et al., 2005). All of these dimensions show how the notion of place brings together individual traits and preferences, social interaction and cultural influences with the physical nature of the space.

People's use of camera phones differs depending on the place (e.g. public and private[6.2]) and the following sections discuss this matter in detail.

6.4.1.1. Public places

It was observed that when using public places like a tube or a bus people tend to use their camera phones for individual purposes; that includes reading and answering text messages, playing games, viewing and sorting out images, playing music or ring tones, examining different functions on their camera phones or viewing and sorting images stored on their phones. Interview data indicated that people do this to overcome the feeling of boredom or simply to 'kill time' while waiting for a bus, as one of the participants commented:

> *' I listen to the radio … when I'm on the tube, when walking around or waiting for a bus and I don't have anything to amuse me with. I use the calendar and the diary quite a bit. Otherwise I'd forget everyone's birthday'. (Steven)*

Similarly, another participant, on using camera phone on a bus, commented:

[6.2] Private places are described as places owned, used and accessed by individuals (e.g. houses, flats, gardens).

‘ … the setting itself is boring not much inspiration to take pictures and things … you have to be with someone to do it.’ (Adam)

Another reason for using the phone in a private manner (using the phone to interact with oneself) rather then shared (interacting with others through voice) could be following public space regulations, which is in line with Ito (2003, 2004) and Okabe & Ito (2005). It was reported in the literature that some public spaces are regulated by different means: signage, announcements and by more informal peer-base regulations (ibid). Ito (2003) claims that these regulations are mostly exercised on public transport. Posters and signage exhort passengers from putting their feet on the seats or not smoking. The study by Okabe & Ito (2005) reported that people use email rather then voice calls when on trains and subways following ‘sharing the same public space’ regulations. Although, this kind of behaviour was observed amongst the Japanese youth population, similar findings were reported by Klamer et al. (2000) who conducted a European survey investigating whether mobile phones used in public spaces disturb people.

A different kind of behaviour was observed in museums (Science Museum and Natural History Museum in London). Camera phones were rarely used and only for individual purposes: receiving calls or messages, making phone calls or text-ing. This was observed during the field study and confirmed by interview data. People treated museums as places to go on outings with friends and family, which they had planned for and therefore they took digital cameras with them to capture something specific that they would like to keep as a memory. In this case, the quality of pictures is of high importance.

‘… I like to take pictures of a nice scenery or … er… flowers or trees or just really nice views or things… then I use my digital camera because of the quality of the picture.’ (Maria)

Other public places like pubs, restaurants, clubs, places of entertainment and leisure provided a different social context for camera phone activities. The data illustrated that people more often engaged themselves in social interaction using camera phones during gatherings with friends and family, when going out with friends or during trips or excursions with friends (see figures 6.1 & 6.2). This kind of behaviour was confirmed by both field observations and interviews. Most of the participants claimed that the important issues for using camera

phone is to be with other people. It is people that create the experiences that people enjoy:

> *‘ When you have other people around you then you have a different kind of experience. … you are more likely to do silly things. So then you take pictures and when you view them you can laugh and have fun. When you are on your own … no, you don’t do these things. You need to have people around you to have fun.’ (Adam)*

FIGURE 6.1: A GIRL SITTING WITH HER FAMILY AND TAKING PICTURE OF THE ARTISTS PLAYING (USED WITH PARTICIPANTS PERMISSION)

FIGURE 6.2: PEOPLE TAKING PHOTOS OF A PANTOMIME ARTIST (USED WITH PARTICIPANTS PERMISSION)

However, camera phones can be good for improving personal skills (e.g. playing golf). When playing one of the participants asked someone from the team to video record his moves so that they could be viewed later searching for any mistakes or faulty technique.

> *‘… I sometimes ask people to take a picture of me when playing cricket or golf. When I take my swing. I get them to record it on a video so I can see how do I look when I take the swing or the shot … so I pick up my own faults, which I can’t see myself when I’m doing them … I’ll show it to my friend who is a better player … to get his advice how to fix it or what I’ve been doing wrong.’ (Steven)*

6.4.1.2. Private places

As well as using camera phones in a variety of public places, people reported using them in private places such as homes, flats, gardens or cars. They took pictures or videos of friends, members of family or even themselves behaving in

a funny or silly way and then shared them with others co-located or they used pictures and videos stored on their phones for entertaining purposes.

> *' …so what we did was just running through clips and passing them from one group of people to another … [laughing] this was funny… I like to take pictures of funny situations and when my friends are drunk they do funny things so we go back and try to remember what happen and we always have a good laugh. Sometimes we like to compare who managed to take the most funny shots … it is really funny seeing people doing crazy things.' (Adam)*

Although the practice of using camera phones differ between public and private places, what was common to both places was the presence of people, which changed the whole experience of sharing.

In addition, the data shows that people use camera phones for different purposes and motivations behind the use vary as well. The following sections explain the matter further.

6.4.2. Purposes for using camera phones

As stated previously people use camera phones for different purposes; reading and answering texts, receiving and making calls, viewing and sorting images, which are typical features that camera phones offer. However, the data shows that photos were also used for practical reasons, which is consistent with Kindberg et al. (2005a) and Van House et al. (2005). For example, some participants indicated that camera phones were used as replacement for a mirror:

> *'… on my previous phone I had a video function. It was a video talk so you can instead of looking at the mirror you look in a camera … when doing my hair' (Adam).*

> *' … if there is no mirror around I just take a picture of myself, look at it … sort out my hair, try again [laughing]. It's like a mirror. It's useful' (Maria)*

The data shows that purposes for using camera phones were related more to an individual's use of a camera phone than social interaction and they varied in relation to the places they were used at (see section).

The emphasis of this research is on motivation behind using camera phones rather than the purpose for using them. The purpose, therefore, will not be discussed.

6.4.2.1. Motivations for using camera phones

The camera phones have become very popular. People use them for their primary goals; that is communicating with others via different means (e.g. voice, text) or more interestingly they use camera phones for social interaction and to experience fun and joy. The following sections discuss these matters further.

6.4.2.2. Social uses of camera phone

Camera phones have been used for individual as well as group purposes. Consistent with other studies (Kindberg et al. 2005a,b) it was found that people take photos for individual purposes that include creating memories and evocations of special events, trips, holidays, or beautiful landscapes. A common practice is to share images with friends and family, in a way that is deeply embedded in social interaction. Sharing digital photos is often done remotely via email or by posting them on the web (Counts & Fellheimer, 2004). However, it was observed that other practices occur in co-located social contexts. These included 'sharing a moment now', 'sharing a moment later' or using photos to initiate social interaction with strangers.

6.4.2.2.1. 'Sharing a moment now'

Sharing digital photographs is often done via email or by posting them on the web (Counts & Fellheimer, 2004). This study shows a different way people share photos taken on a camera phone that is less about evoking or recreating an event or scene after the fact, and more about augmenting that event as it happens. It was observed that people take a 'spur of the moment' photo or video and share it with people who are present at the same location at the same time. People reported having fun when taking photos/videos of their friends behaving funnily and then viewing them collectively at the location. This kind of behaviour motivates and shapes social interaction.

> *' … she was happy and funny (referring to a friend) … far too engaged with dancing to notice what was happening around her … and I just thought that I'll just take that picture. … there were a few of us friends so*

then I showed them and then other friends were taking more pictures of her dancing and we were waiting for her to realise what was going on … we were all taking pictures of her … we shared all the pictures and picked out the funniest one. It was so funny because she couldn't believe that we did that and she didn't even notice it.' (Steven)

'… when one of our friends gets too drunk and we are sitting in the pub … and our friend [referring to a different friend] had a camera phone and was taking pictures of her and showed them around the group. Because she was posing without realising it was hilarious [laughing] and he was showing them around and she was like [mimicking and laughing]' (Maria).

'When I'm out with my friends then I'll definitely use it (referring to a camera phone). … Sometimes I take pictures of my friends and then we'll sit down and go through them selecting the best one'. (Lucy)

Data shows that photos were used also for practical reasons, which is consistent with Kindberg et al. (2005a) and Van House et al. (2005). It was observed that when on a trip, people took a picture of a map displayed by a leader and then followed his instructions using the display on their camera phones (Figure 6.3). This kind of activity allowed every person within the group to see clearly the map and use it for further reference.

FIGURE 6.3: A GROUP OF TEENS ON A TRIP (USED WITH PARTICIPANTS PERMISSION

6.4.2.2.2. 'Sharing a moment later'

When people you want to share photos with are around the opportunities for social interaction are present but what happens when they are not around? The practices of viewing photos later (when the occasion arises) have been reported

by other researchers. Okabe (2004) described situations where people show their friends the photos stored in the photo gallery during some social gatherings.

Participants reported that co-located social interaction was associated with their experience when viewing pictures/videos stored on individual's phones but taken previously (not at the time of gathering). The data shows that the intentions behind it included sharing memories of special events, reporting on events to those who were absent, or creating and sharing a documentary of a friendship or family life.

> *' with the cam_phone I can capture the moment … and being able to view them later will bring all the memories and the fact that those pictures can be shared … so people can have fun'. (Maria)*

In addition, the data showed that people were more inclined to use photos for storytelling, which is in line with (Balbanović et al., 2000; Frohlich et al., 2002; Kindberg et al., 2005a) and, as suggested by Fox (2001) and Vincent & Harper (2003), mobile phones have been used to maintain personal relationships between friends and family. Since camera phones are part of everyday life, it is not surprising that the same behaviour was observed in the context of camera phones used when photos or videos were shared during social gatherings.

> *' … it's really great entertainment and you can tell some stories as well if you have some party or just friends and then we sit and go through each others collection of photos. It's good especially for those who where not there (laughing) … we can tell them stories behind those pictures … everyone from the group can join us.' (Maria)*

Ito & Okabe (2005, p.260) claim that: "Mobile phones … define new technosocial situations and new boundaries of identity and place, … create new kinds of bounded places". One can argue that camera phones go beyond that and 'sharing a moment later' practices offer participants more than mere story, pretty pictures, or reminiscence of past events. When people view pictures together, and tell the story behind them they are transferred to the place and space where the pictures were taken. They conjure memories, feelings, and emotions and evoke senses associated with the events and situations that were photographed.

‘ … when you are having a good time you don’t always know what’s happening around you. … I don’t always know what everybody is doing so I miss a lot of stuff but when we view all the pictures taken during a particular party or we go for a short trip together … only then you really can see what happened. We really like doing that’ (Adam).

‘…you can not only see the pictures but there are always some stories behind every picture. … so later when you show the pictures everybody gets involved and just add a story to it and that’s great. I like it. And others who were not there can feel like they were there err… kind of’ (Maria).

6.4.2.2.3. Social interaction with strangers

Studies reported by Weilenmann & Larson (2001) explored the collaborative nature of mobile phone use in local social interaction amongst teenagers. They suggest that mobile phones are often shared in different forms including: minimal form of sharing (SMS messages), taking turns (several people handling a phone), borrowing and lending of phones, and sharing with unknown others. The latter involves the phones being handled by teenagers who are unacquainted until one of them makes the initial contact. Weilenamm & Larson (2001) describe practices of teenagers (boys giving girls their mobile phone) to enter their phone numbers. This kind of social interaction is similar to the one that emerged from our studies.

Social interaction can coalesce around different media, from text and graphics, to interactive games. Such interactions often occur between friends or family members sharing the same technology (i.e. computer, digital camera or mobile/camera phone). However, a striking finding was that camera phones were used as a new channel and medium for initiating social interaction with strangers. It was reported that people take photos of others (whom they like) in order to show their interest, introduce themselves, or simply start a new social relationship.

‘I was at the Harvester, a restaurant/pub thing, …and there was a small window with glass between it looking like a fake door and the guys were looking through that doing (making funny facial expressions) and then I saw one holding his camera phone against one of the window things and

there was a picture of me going (shows facial expression) and I didn't know that they were taking it … I didn't really mind. It's good humour… it was kind of friendly, sort of vague flirting without talking … just taking pictures.' (Luisa)

'We were in the bar … having fun and there was this guy dancing [laughing] kind of a very funny dance … almost like an American Indian kind of dance … and one of the girls from our group took a photo of him because she liked him and she was showing it to us so instead of looking at him we could see his picture … and when he saw her taking pictures of him he did the same to her… the whole situation was funny … at least we had fun watching them two taking pictures of each other instead of talking …' (Maria)

This kind of behaviour typically occurred in public places such as pubs, bars, or clubs where people gather for social events, and where interaction with others is a part of the entertainment. In this study, the focus was on social interaction taking place with and around digital photos. Such interaction is not always appreciated by those involved. Some participants felt offended and annoyed with those taking photos without obtaining permission.

Pictures are not the only phone-related way people try to 'chat up' others. Phone features like Bluetooth can be used to connect to strangers and initiate communication. This behaviour was observed in public places (pubs, restaurants, bars). The practice was to switch on the Bluetooth and ask others (whoever is picked up by the Bluetooth) to activate the connection. However, this kind of interaction often raised suspicions, from people not knowing who wants to 'chat' them up.

'… someone wants me to activate the connection … but what do I do … I don't want any 'Boss' [the name of the Bluetooth connection] connecting to my phone. What if they do something to my phone?' (from the field observation)

The fact that people do not see the 'talker' and they do not have the full control of who they interact with seems to be a barrier to engage in interaction with a stranger.

Communication takes place not only through technology but also alongside it. Moreover, Van House et al. (2005) argue that technology (e.g. online photo blogs) is used to create new social relationships.

It can be suggested that camera phones provide new channels and foci for social interaction within co-located settings.

6.4.2.3. Experiencing of fun and joy

Sharing photos at co-located settings proved to be a way of social interaction bringing fun and joy to people's lives (see also section 4.4.1.2), which was confirmed by the field and interviews data.

> *'I show them (referring to family) what I managed to capture and then we have a good laugh.' (Adam)*

> *'… you take pictures and when you view them you can laugh and have fun. …we were looking like stupid [laughing]. It was really funny … yeah. It was fun. Another time when I was out with my girlfriends … we just tried the video thing on my phone. And then I found it a couple of weeks later and it was like oh … [laughing] yeah, that was really good and we had a good laugh … yeah it was fun [laughing]' (Lucy).*

'…it's so funny just looking back at the photos she was taking when out with her friends and stuff … there is one of her going like this [mimicking and laughing]' (Maria)

These kinds of experiences were also observed during the field observational study. Very often when people shared images they were laughing and it appeared they were having a good time. Here are examples of this:

Field observational study 1: Covent Garden, London, afternoon

Four people sitting at the table in the coffee shop (two adults: male and female, and two children: a boy and a girl).

Male sits opposite female and the boy sits opposite the girl.

Male takes his camera phone out of his pocket and does something [can't see]. Then he passes the phone to the female saying:

Male: ‘Look what you missed.’

The female takes the phone and looks at it. She starts laughing.

The girl leans towards the female to see what she is watching on

the phone. The female is holding the phone.

Then the boy moves towards the female and points something on the screen saying:

Boy: ‘Can you see it? Can you see it? It was funny.

The female, girl and the boy started laughing.

Then the male gets up and stands behind the female. All of them are laughing now.

Boy: ‘You must see the guy’.

Dad, show them the man, show them.

Both, the boy and the male are laughing.

Boy: ‘He was really funny, wasn’t he Dad?’

Male: ‘Oh, yeah’ [continue laughing]

The male takes the camera phone from the female and does something.

Male: ’Where is it? Where is it?’

The male looks a bit upset continuously looking for something on his phone.

Male: ‘OK, I’ve got it’.

He passes the phone to the female. She takes the phone and holds it between her and the girl. They both are laughing.

Girl: ‘Mum, I told you to go with them’.

Female: ‘ I know, I know but we can watch it now’.

The whole family is laughing.

Female: ‘Could you put back the first one.’ [asked of the male]

Male takes the camera phone from the female and looks for something. Then gives the phone back to the female.

The whole family continue laughing and talking.

Field observational study 2: Comedy Store, London, evening [interval]

A couple sitting next to each other.

Male takes his phone out of his pocket and shows something to the female. He is holding the mobile between them as they watch some pictures. They both laugh.

Then the male puts his phone away.

Then the female takes her mobile phone from her bag and does something with it. Then she shows something to the male and they both laugh. The female holds her mobile between them.

Then the male takes his mobile from his pocket and asks the female to send it [I assume it is a picture)] to him.

They both do something with their phones.

Male:' Which one do you want?'

They both look at the male phone while he is doing something with it.

Female:' This one, and this one, and this'

The male does something on his phone.

Male: 'Press accept'

They both keep laughing.

The interval finishes and they put their phones away.

It was pointed out by participants that the important issue is to be with other people. It is people, who create the experiences that others enjoy and have fun with.

> *'When you have other people around you then you have a different kind of experience … you are more likely to do silly things. So then you take pictures and when you view them you can laugh and have fun. When you are on your own … no, you don't do these things. You need to have people around you to have fun' (Adam).*

The features of camera phones have changed their use of them. They no longer support only utilitarian purposes but go beyond that and bring their users

joy and fun. Being able to take shots of funny situations and share them instantly with others is a feature offered by camera phones. However, it is not only the technology and features that are provided but rather the opportunities given by it and what users do with those features.

6.4.3. Social implications

When camera phones are used for social interaction people have different concerns that affect their usage and experiences. These relate to issues of privacy, trust, social agreement and control over the phone.

6.4.3.1. Privacy

The most common social reason for people sharing or not sharing their pictures with others was the level of privacy involved. It was articulated by many participants that they are more inclined to share images on their camera phones with close friends whereas some collections would always remain private, available only to a close circuit of people.

> *' … private pictures I keep private and the others I can share … yeah' (Adam).*

In addition, there is a degree of privacy within a group of friends. For those that are very close and socialise a lot the level of privacy is lower as one of the participants pointed out when providing an answer to the 'Do you share those 'funny' pictures with everybody?'

> *' Only with close friends. We share quite a lot so it's ok even if they were not with us on that particular occasion. It's different with them … we share a lot of pictures or other stuff" (Adam).*

6.4.3.2. Trust

Another issue commented upon was trust giving participants' camera phones to others when sharing images. As noted in several of observations and interviews people were reluctant to part from their camera phones and let others hold them when they suspected some mis-trusted behaviour.

> *'… I can pass my phone around if I know that nobody will do something silly … once I gave my phone to my male friends and one of them sent some of my pictures to his friend without asking me if he could do that. I*

was very upset about it. … since then I'm OK with my girlfriends but some guys … no… I don't let them even touch my phone' (Maria).

6.4.3.3. Social agreement

When social interaction takes place, all involved parties need to share the common social ground. Participants claimed that there is not always shared understanding of what is and what is not acceptable within a group. There are occasions when members of the same group do not feel comfortable and they have some reserves for their pictures to be taken and shared with others.

'The other night when I was with my friend and this group of guys we met before errrrrrrr … the guy said: 'Oh yeah, lets get a picture' but we went like: 'no, we really don't want to'. And they had one done anyway and then they were showing it … like to everybody … and this kind of annoyed me a bit. Because … it's fair they wanted it but we didn't really' (Lucy).

6.4.3.4. Control over the camera phone

Another concern was raised in relation to who has control over the camera phone not only when taking pictures but also when sharing with other people. It is important for people to be in control of their pictures and that only those pictures from 'public' collections are shared; that is consisting of material that others can see. The other collections ('private') are only available for sharing within a very small group of people usually those who appear in the pictures.

'… private pictures I keep private or I'll share with those who are on them and the others I can share … yeah'. (Adam)

'… well, it really depends who I'm going to show my pictures to. You know … even with friends … the point is that I can let some of my friends go through my gallery but I'll open just some folders and let them view whatever they want within these folders. With others especially boys … well they always look for something and I just don't allow any of them to touch my phone. I only show them what I want them to see and the rest of my collection is private'. (Maria)

6.4.4. Means of sharing and transferring photos

As discussed in section 6.4.2.2 people like to share images with others. However, before they can do that they often need to transfer photos or videos to the recipients. The data indicates that people use different means of transferring images such as Bluetooth, MMS, emails, or Internet photo web sites. Some of them are in favour due to economical reasons.

> *'… Bluetooth … I use it quite a lot for transferring stuff and pictures as well … multimedia messaging cost money, Bluetooth is free … I have Bluetooth around me; Bluetooth for my laptop, for my computer … my friend has a laptop so I Bluetooth it to him. … I transfer the pictures from the phone to the laptop and then send them via Messenger or email them.' (Steven)*

However, economic reasons are not always that important when people want to share their images with friends. This was confirmed by interview data (see section 7.4.2.1.2). The following observed episode is an example of this:

Field observational study 3: Pub, evening

Ten people are sitting at the table (3 females and 7 males). One male, Jim, takes the camera phone out of his pocket and plays with it.

Jim:' I have something really cool to show you'. He does something with his phone. After a while Jim said:' OK, I've got it'. He plays the video and passes his phone over to a male sitting next to him, Roy.

Jim: 'Just press the button.'

Roy plays the video and moves the phone towards another male, Paul. Another male, Martin moves from his seat and stands behind Roy and Paul watching the video clip.

Martin:' I want this clip. Can you Bluetooth it?

Jim:' Yeah'

Jim takes his phone back from Roy and sets up the Bluetooth. Martin does the same on his phone. After a short while Jim transfers the clip over to Martin's phone.

Once images are transferred different media like computer or TV screens can be used to display photos to improve their visibility and enhance the experience of people participating.

> *'I transferred them onto my computer … I'm quite organise with my pictures so I categorise them and put them in kind of albums and sometimes when I'm with friends we like to go through pictures and have fun' (Adam).*

> *'…sometimes what we do is we use Bluetooth to transfer our pictures to one of our computers and then have a slide show so everybody can see it …you see the phone screens are very small and if we all want to have fun we need to see those pictures simultaneously. With camera phones we can't see clearly if there are more then two or three people looking. It's just not enough space …' (Maria)*

Since the camera screens are small and do not support easy clear viewing for a group of people when sharing pictures in the home environment, people often made use of external display technology, such as TV or computer (see section 7.4.2.2.2).

6.4.5. Barriers to sharing

Although camera phones appear to be a new medium for social interaction that is enjoyable and fun, they are not without problems that limit the extent to which they are used. The data illustrates that people experience different kinds of problems that hinder their experience or make it impossible for sharing to take place. These barriers can be grouped into three categories: usability issues, technical issues, and cost related issues.

6.4.5.1. Usability issues

One of the important issues reported relates to difficulties with sending pictures either via MMS or Bluetooth. People stated having problems either finding the function to carry out the transfer or not being able to set up the phone to transfer (in the case of the Bluetooth). One way of dealing with this problem was to ask friends for help.

> *'I Bluetooth them [referring to pictures] … I can do it now but I had to ask my friend to show me how to do it …'(Maria)*

Alternatively, people just abandon the transfer, as the hassle was too much to handle.

Another barrier to sharing photos was the lack of a quick and easy way of finding archived pictures. People spent time, sometimes a long time, trying to find the pictures they wanted to share with their friends. This caused frustration and dissatisfaction.

'Where is it?!!! S… Hrrrrrrrrrr.' (Jim from the field observation)

Quick access to camera functionality and photo image features is an important issue in the context of sharing and it raised concerns amongst participants.

'… one of my friends helped me to set it up so I can use it by pressing just a couple of buttons instead of going through menus and stuff. It was horrible. I missed so many great pictures because of that and I was very upset about it. … it's very important. I could have so many great pictures but couldn't find the camera function on my phone … it was very frustrating.' (Maria).

6.4.5.2. Technical issues

The lack of compatibility between different camera phones was yet another issue that stopped people from sending photos. In addition, they often knew (not always) that those who they wanted to send pictures to will not be able to retrieve them.

'… none of my friends really do this … you have to have the same phone or something to be able to send it and for them not to just say: 'message not being able to deliver or whatever'. Some people tried to send pictures on my phone but I never got them.' (Lucy)

Even though people enjoy taking pictures and sharing them with others they pointed out that one of the down sides of camera phones is poor quality of pictures. However, people have less expectation from camera phone pictures as what they require is to catch funny moments that can be shared with friends.

'… the quality is not that good [referring to pictures] and it was quite dark but these two [pointing at the screen] were totally drunk and I thought you wouldn't like to miss this [laughing]' (Steven)

Small screens of camera phones were yet another problem that people reported when sharing was concerned. The common practice to overcome this problem

was to pass the camera phone from person to person within the group so everybody could view the image and have fun while doing it.

However, it was reported that this kind of sharing 'spoils the fun' as it takes time for everybody in the group to view, make comments, share experience, or just simply have a laugh about it.

> *'… because the screen on the mobile phones is rather small so we couldn't see clearly what she was doing so what we did was just running through clips and passing them from one person to another. [laughing] This was funny but that's the problem with camera phones. You can't see clearly, you can't share it with other people. The screen is too small. It would be better if we all could see it simultaneously. Like this it takes time for everybody to see it so it really spoils the fun … well a little.' (Adam)*

> *'… the phone screens are very small and if we all want to have fun we need to see those pictures simultaneously. With camera phones we can't see clearly if there are more then two or three people looking. It's just not enough space …' (Maria).*

6.4.5.3. Cost related issues

Another barrier when sharing is concerned comes from the cost of sending images and printing them. Many participants articulated that it is expensive to send pictures via MMS and they prefer to use alternative options that are free (e.g. email or Yahoo Messenger):

> *' … I rarely use MMS because a lot of people don't know how to use is and besides it's expensive. Email and yahoo Messenger are free …' (Steven)*

> *' … printing costs, yeah … since it's digital it's got longer life span and ability to transfer to friends. (Adam).*

Although participants pointed out that they took advantage of taking unlimited number of photos (limited only by the capacity of the memory card) and storing them on their camera phones they were concerned about the cost of printing those pictures. However, as the quality of photos is relatively poor and the cost involved with printing is high, participants rarely printed pictures.

6.5. Discussion and conclusions

This chapter described distinctive practices of co-located camera phones use, and how these practices change in relation to settings in which they were used. It has been argued that camera phones provide a new medium through which people can sustain and enrich they social interaction through taking and sharing photo images or videos. However, these activities are inseparable from social relations and context, which is in line with Okabe's (2004) and Scifo's (2004) findings. Moreover, it is argued that this study provides a better understanding of how this emerging and evolving technology facilitates social interaction in the leisure-related practices of its users.

When designing camera phones that facilitate social interaction, understanding of emerging uses, practices and social activities is essential for the effective design of the systems that support photo sharing. So providing functionality that is transparent and supports users' sharing activities is of paramount importance. It might also enhance the use of camera phones by creating pleasurable and fun experience instead of satisfying only their functional purpose.

The findings of this study show that people experience fun and joy when sharing photo images with others. The funny type of photos makes viewers laugh and provide a platform for 'social fun' when reminiscing social events or outings. People like showing funny images to their friends or even strangers hoping that the element of humor that it is captured will evoke positive experience and all involved will have a good time. It is important to remember that having fun and a good laugh is one of the motivations for photo sharing. In addition, humor, joy and fun reported in this study are the experiences that often accompany the sharing of photos creating the atmosphere of 'social fun'.

An awareness of the conditions that support enjoyable social interaction has been discussed as an important issue in the context of the design of systems (Monk, 2000). However, the data shows that there are barriers that hinder the experience of sharing such as: usability, technical and cost related barriers.

The data suggest a number of social implications that shape sharing activities. These are: privacy, trust, social agreement and control over the camera phone.

It emerged from the data that people share photos on camera phones in different places (e.g. public or private), which determines the way that sharing

occurs. In addition, the sharing takes place at different times: just after taking a photo (‘sharing now’), or at a later time (‘sharing later’).

One of the interesting findings, related to with whom people shared their photos; the data illustrates that different groups of people are involved: friends, family or strangers.

However, some of the findings encourage further explorations that are investigated in the next study including:

- How, when and why the photo sharing occurs in different places and how the affordances of those places shape the sharing experience,
- Who people share their photos with and how? What influences the sharing experience,
- What is the relationship between place and people involved.

This chapter presented interesting information about the uses of camera phones in co-located settings. The next chapter will continue investigating the photo sharing practices in the context of different places (e.g. public, private, work) and how the attributes of those places can facilitate different sharing behaviour.

Chapter 7. The Third Study: Photo sharing behaviour in co-located settings

7.1. Introduction

This study builds on the results of the Second Study (Chapter 6), which identified social uses and practices of camera phone users occurring in co-located settings. The findings suggested that people's sharing behaviour and use of camera phones changes depending on the place in which sharing occurs (e.g. restaurant, pub, home). However, the Second Study did not explore details of the relationship between place and practices, which this study focuses on.

The notion of place and space has been a topic of research within Human-Computer Interaction, Computer Supported Cooperative Work (CSCW) and Interaction Design in recent years (Harrison & Dourish, 1996; Turner & Turner, 2003; Fitzpatrick, 2003; Ciolfi et al. 2005). The authors proposed the notion of place as the concept for understanding human interaction with others, artefacts and resources with a physical environment (locale) and as a metaphor when designing interactive systems to support communication and collaboration as well as developing 'virtual spaces'.

This study shows that people adapt their photo sharing activity in relation to where they are and who they are with. Consequently, their experience of sharing photos on camera phones is influenced by affordances[7.1] of place, social affordances, affordances of camera phones and the content of the photos shared.

The purpose of this study was to gain a better understanding of people's photo sharing behaviour occurring in different places and how the properties of place can facilitate different sharing behaviour. Furthermore, to study how social

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[7.1] Affordance is a property of the environment that affords action to appropriately equipped organisms, which is a three-way relationship between the environment, the organism, and the activity (Dourish, 2004). Gibson (1986) suggests that the affordances of the environment are what it offers users, what it provides or furnishes, either for good or ill. In HCI this is a design feature that helps users in carrying out physical actions in the interface but the term often used in the HCI literature is 'cognitive affordance' (Norman, 1999; Hartson, 2003).

affordances together with the affordances of place and the value of photos shape the experience of sharing.

The next section presents a detailed description and results of the study.

7.2. What the study investigates

The goal in conducting this study was to examine how different places (e.g. public, private, work) afford sharing photos on camera phones. The broader understanding of affordances of camera phones and social affordances, which shape the experience of sharing photos, was also investigated to understand what makes the sharing experience on camera phones different from digital cameras.

In the context of this study, affordances of camera phones relates to the opportunity of actions that are afforded by it; social affordances relates to activities allowed and performed by different groups of people, and place affordances relates to activities that are afforded by a specific place.

The Third Study explored sets of factors that relate to different issues. The first was connected to different dimensions of place that create the experience during photo sharing activities. The Ciolfi et al. (2005) dimensions of place were used to analyse the findings. The authors identified four dimensions, which exist in relation to each other: physical/structural, personal, social, and cultural. All these dimensions show how the personal traits and preferences, social interaction, cultural influences and the physical environment affect the notion of place.

The second issue was connected to the co-located photo sharing activities occurring within different places (e.g. public, private, work) using camera phones.

The third issue was concerned with the features of camera phones that support co-located sharing and how digital cameras can also support co-located sharing.

The forth issue pertained to who people share their photos with and how the relationship between them influences the experience of photo sharing.

The fifth issue investigated the relationship between a place in which sharing activity occurs, social interaction and the experience of sharing photos using camera phones.

For the purpose of this investigation a set of primary questions were developed:

Question 3.1: What are the dimensions that create the experience of place while sharing photos?

Question 3.2: What are the affordances of camera phones used for social interaction?

Question 3.3: What are the affordances of different places in which people share photos?

Question 3.4: What are the social affordances that influence the experience of sharing photos?

Question 3.5: What is the relationship between place, social interaction, social issues and experience when sharing photos?

Question 3.6: What are the differences between sharing on camera phones and digital cameras?

7.3. Description of the study

As this study is of a qualitative nature and its aim was to obtain an insight into the relationship between a place and sharing photos practices, semi-structured in-depth interviews with 'photo probes' were employed to investigate these issues (see section 3.3.2 for detail).

The next sections provide information about participants, the interview procedures and questions asked.

7.3.1. Participants

Interviews were conducted with 11 people, adults, who have regularly used camera phones for taking and sharing their photos for at least one year; they were recruited using personal and group interest networking. Participants included PhD students, and IT workers and other professionals (e.g. engineering, photography, and business) age between 22 and 60 (see Appendix 5 for details).

7.3.2. Interview procedure

Following on from the Second Study (Chapter 6, interviews using 'photo probes), the technique of asking participants to talk about a selection of their photos (5 – 7 items) taken at different locations (places) and talking about circumstances for taking them as well as providing an account for the characteristics of those individual places was employed. Utilizing this type of technique helped in stimulating participants' memories of events, places and situations that were captured by a particular photo or a video (Kindberg et al., 2005a,b).

The interview format allowed participants to introduce relevant new issues to the discussion. Interviews lasted between 35 and 55 minutes and were recorded with the users' permission and then transcribed and analysed.

During the interviews, brief notes were taken to record users comments and issues that were relevant and needed to be pursued further.

7.3.3. Interview questions

A set of three groups of questions was designed to provide answers for this study. The first group focused on issues related to the affordances of camera phones used for social interactions. Participants were asked to discuss what features of camera phones they used and the reasons for that. In addition, questions related to what kind of social interaction camera phones can support, when participants shared their photos (just after taking them or at the later time) and what they experienced during the sharing activities, how they felt when using camera phones for sharing purposes, why they used camera phones for sharing and what the difference is between sharing photos on camera phones and digital cameras?

The second group explored the issues related to the affordances of different places where people share their photos. Participants were asked to talk about different places (their characteristics and functionality) where the activities occurred and how the environment (different places) influenced the experience of sharing.

The final group investigated social affordances that influenced the photo sharing experience. Participants were asked to converse about the relationship

between people taking part in sharing activities, what photos (e.g. private vs. public) they shared with different people and how this influenced the experience, who had access to photo collections, who had control over the camera phone during the sharing, what were the social agreements when the sharing of photos were concerned.

Participants were asked to show a set of photos from their collections and provide answers to these questions:

- What a particular photo shows, where was it taken and why?
- Who was the photo shared with, and how the sharing took place (e.g. via Bluetooth or on the camera phone screen)?
- What ways the photo was shared (e.g. by holding the camera phone in front of the viewer or passing the camera phone to the viewer)?
- Was the photo shared with others at the time of taking it or later?
- How the place (physical, social, and functional characteristics of it) influenced the experience of sharing?
- What was the experience of sharing the photos like?

7.4. Results of the study

The results from this study were used to corroborate factors identified in the Second Study while identifying issues specific to this study.

The interview data identified three main factors that shaped the behaviour of people when photo sharing using camera phones. Those were: groups of people (relationship between people involved in sharing activities: friends, family, and others), place where sharing occurs and the value of photos. The value of photos (e.g. social, personal, or temporal) determine with whom the photo are shared, as well as how and where the sharing take place (e.g. pub or house). Another important issue emerging from the data related to the triggers for sharing that determine when and with whom it occurs.

In addition, the differences between sharing experience with camera phones and digital cameras were discussed as well as the relevant design issues that affected the co-located sharing experience.

Since the data was analysed using the Grounded Theory approach the structure of this chapter follows the open and axial coding developed during the study, which are represented in the headings of the “Results of study’ section (see Appendix 1 for examples of coding).

7.4.1. Triggers for sharing

It was reported by participants that people share photos during different activities: eating out, clubbing, social gatherings with either family or friends, or just when they see each other. Three different triggers for sharing were identified: pre-planned, contextual and ad hoc sharing.

7.4.1.1. Pre-planned sharing

The intention to share is motivated when taking a particular photo. A friend who appreciates cars will be interested in a photo of a Batman car or a group of football fans will appreciate a photo of a new stadium. So when a situation happen people take a shot thinking ‘I saw this and thought you might like it’. Such photos would be shared as soon as the opportunity arose.

> *‘That’s just a friendly cat. I haven’t shared it with anyone yet but there is a person that I will be seeing later in a year or so err… I’ll show it to her because I know that she likes this cat and it will please her to see the photo. (Ron) (Figure 7.1)*

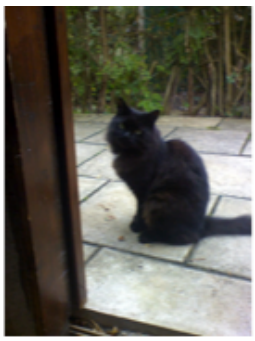

FIGURE 7.1 CAT SITTING ON THE PAVEMENT

7.4.1.2. Contextual sharing

Very often the photo sharing activity is driven by the topic of a conversation. People take the opportunity to share photos (taken during holidays, loved ones, funny situations or just something that they are proud of) when a situation arises

just like the photo of a classic car shown by George during one of his meetings with his friends (Figure 7.2)

FIGURE 7.2 PHOTO OF A CLASSIC CAR

'…If you are with a group of friends err… unless the conversation arises you wouldn't say: 'Let's look at photos'. (Ron)

'It's just err… people … it's a visual conversation and if anyone says: How is your little boy? And I'd be like: Oh, I just took a photo of him last week and then I'd show the photo.' (Bob)

7.4.1.3. Ad hoc sharing

However, photo sharing is not always triggered by the context of a conversation or a pre-planned activity as in the case of pre-planned sharing. It was reported that sometimes people share funny or silly photos they had received from others or downloaded from the Internet without being prompted by others to do so, just because they think the photos will bring a smile to people's faces or will make them laugh (Figure 7.3).

'Unless there is something, you specifically want to show to someone. Sometime you have a funny photo and you see someone and the first thing is: Have you seen this?' (Ron)

FIGURE 7.3 FUNNY PHOTO SHARED BY THE OWNER'S INITIATIVE

7.4.2. Factors Influencing Sharing Experiences

The sharing takes a different form depending on where it occurs; the sharing in the restaurant will differ from the one happening in the garden. This is dictated by the functionality of the place, physical arrangements (e.g. in the restaurant people sit at the table restricting their movements and interaction with others) and social norms and regulations (e.g. no sharing in the church) that people follow.

> *'…It depends on the setting … in the restaurant you are sitting at the table, not kind of walking around the place … it might be more difficult for me to be involved in sharing because if I give my phone around, I wont be able to do the kind of: 'Oh, look at this' … So you feel like a little bit outside … instead of being at the centre of attention'. (Sami)*

However, the main factors that change the nature of the sharing behaviour is the content of shared photos and who they are shared with. The consecutive sections explore these phenomena in detail.

7.4.2.1. Groups of people

Most of the time, when discussing what influenced the photo sharing experience participants commented that it is people who create the experience. Participants behave differently when sharing photos with friends, family and others.

7.4.2.1.1. Sharing with family

People employed different kinds of sharing behaviour when showing photos to members of family. The sharing happens using media other than camera phones; these are computers (e.g. desktops or laptops), TV-screens or digital tablets. In addition, sharing is more formal and often takes place at home during family gatherings, parties or after dinner as a part of the day's reminiscing.

> *'… with family usually we take a lot of photos and then at the end of the day when we come back home or even at home just before we go to bed we put them on TV or on the computer and then all of us gather around and watch what photos we've taken.' (Nadia)*

One of the important issues raised related to the suitability of photos shared with family. Usually, these contained family members, family events or holidays rather then photos taken with friends during their outings together.

'…The kind of photos that come out [laughing] [referring to photos taken when with friends], no family. Unless it's family then I'll show it to them.' (Nadia)

All photos containing family members, family events, or holidays were viewed regardless of their quantity even though some photos could be duplicated or cover the same theme extensively.

'… Family members … they can see all of these photos. I think other people would be bored with those family photos.' (Nadia)

When sharing photos on camera phones people are more reserved. The common behaviour was to give the camera phone to a member of family and show one photo at a time. Even though the relationship is very close members of family feel respect towards their love ones and do not want to cross the border of their privacy. They will just view the one selected by the photo owner and return the phone waiting for the next photo to be shown.

'I'd show them the photo on the phone ... yeah. They would hold my phone but then they give my phone back after every photo.' (Juliet)

Another common practice was to hold the phone in front of the viewer and flip through the collection.

'…when we got back home only my son was there and he asked me if I have any photos from the holiday and I showed them to him… I was holding the phone and went through the photos and he asked me about where they were taken and … I was flipping through them.' (Nadia)

In addition, the data showed that when sharing occurs between partners one way of sharing photos is swapping memory cards between phones and transferring photos to each other's phone. However, this kind of sharing very much depends on the compatibility between camera phones and the proficiency of their users.

'… say I'm with Christina if I take a photo on this [pointing at his camera phone] then I can swap the memory card over into her phone, just copy it … with identical phones it's much easier then sending through Bluetooth and it's a lot quicker' (Bob).

7.4.2.1.2. Sharing with friends

When it comes to sharing photos with friends, unlike when sharing with family, the sharing is more informal and can happen anywhere. When asked 'Where do you share photos?'

> *'…It doesn't matter, wherever we are. If we are at the rugby game, pub, restaurant … regardless where … restaurants, bars or even when we are meeting up in a house ... It would be there'. (Gitta)*

It emerged that the common practice is to share them 'on the spot' (immediately after taking photos) or share later during social gatherings. However, what is interesting is not when people share the photos but rather the way that the sharing occurs.

People do not mind giving their camera phones to friends and letting them view the whole collection of photos. With close friends there is a trust and agreement that allow them to view freely whatever is stored on the phone.

As reported by some participants the photos are usually divided into two collections: public and private. The former refers to the set of photos that can be openly shared with friends. The latter that are 'for my eyes' only' (for the owner of the photos, or for the eyes of selected people). The common practice for protecting private photos was to transfer them from the camera phones to a computer and then delete them from the phones. By doing so the issue of privacy no longer existed and the sharing experience was not hindered by the worries of photos being seen by unwanted people.

> *' … I did have a lot of photos that I didn't want anybody else to see but the problem with this phone is that I can't put them in separate folders. Even if I put photos in separate folders there is a place that all the photos are available so I can't restrict access to some photos. So what I started doing is to transfer them to my laptop and delete them from my phone so now I can show photos to anyone. It doesn't matter who uses my phone'. (Nadia)*

Others take extreme actions to protect their privacy and delete their private photos from the camera phone without transferring them to a different media (e.g. PC, laptop).

'I used to have it [refers to a private photo] but every time I'd give a friend the phone I was thinking about that particular photo of my boyfriend that I had on my phone so I decided I don't want to think about it and deleted it. Now all my friends can flick through my photos, no problem. I trust them as they trust me to flick through their photos'. (Alex)

Often shared 'on the spot' photos are Bluetooth or MMS to others who are present and wish to have them on their camera phones.

' …I am quite used to Bluetooth-ing it to other people … that's the main way we share… it's a very immediate thing. So like you take a photo, you look at it and then someone says: 'Can I have it?' and you Bluetooth it. So it's kind of done very quickly. Yeah, I would say that that would be the main way of sharing.' (Stan)

'I'd give them [referring to friends] the phone so they can flick through. I don't have any private photos on the phone so it's OK'. (Alex)

'If there isn't anything that I don't want to share on the phone then I just give the phone and if they want to flick through it doesn't make any difference to me'. (Ron)

However, sharing photos via Bluetooth or MMS also happens during social gatherings in the comfort of peoples' homes when they feel more relaxed and have more time to socialize with friends.

'…usually when you are at the person's house having a BBQ and … you say: 'Do you still have those photos?', Oh yeah. And then you share them via Bluetooth because you are more relaxed … again sitting at the fire and people had all kinds of nice movie clips, ring tones, photos, you know, different kinds of stuff … we just switch on the Bluetooth and this guy sends to me and I send to him'. (Lee)

This kind of sharing behaviour, showing photos to your friends during social gatherings, which were taken previously and stored in a photo collection, was also described by Okabe (2004) as a common practice.

Friends trust each other and one way to show it is to give camera phones to each other without having boundaries as to what they can and cannot view. The kind of photos shared would include the ones of family, themselves and other

common friends with those not present at a specific event just to share the experience with them. However, when sharing family photos the selection would be limited to only a few best shots and avoid being bored with too many of them very often of the same theme.

7.4.2.1.3. Sharing with others

A different kind of sharing behaviour was reported when showing photos to others: acquaintances, friends of friends, family friends or strangers. People tend to guard their phones illustrated by the way they held camera phones in front of others. The trust present between friends, allowing them to view photos freely on each other's phones, disappeared when sharing with acquaintances. Participants reported being more reserved and would only show one photo at a time without taking any chances of people viewing the whole collection.

> *'… Others would just see the photos that I show them. So it's like: 'Look at this picture … and they don't go through photos'. (Sami)*

Whereas different participant (Nadia) reported being upset when a person she showed one photo to took a liberty and explored the whole collection without seeking her permission. This incident changed her sharing behaviour.

> *'… you tend to be more careful what you have on your phone. It wasn't like that before but then people started looking at the photos that I didn't want them to look at'. (Nadia)*

Sharing with strangers occurs very rarely or not at all. Most of the participants claimed that they would not share their photos with a total stranger and avoid situations that photos even accidentally could be viewed by strangers.

> *'I think I might not share … where there are people that I wouldn't want to share photos with them … If there is a party and there are lots of people around and there are people sitting with us [referring to friends] that I might not want then to see my personal photos … I kind of prefer not to start the experience right from the beginning.' (Sami)*

However, in circumstances like social events where they know some people but not necessarily all of them they would not mind sharing photos with those not known as they belong to the same crowd and those 'strangers' would be accepted for sharing, though not photos from a private collection.

'I wouldn't show photographs to people that I don't know… OK if they are in a crowd [group of people that he knows]… and I happen to be there then, yeah I wouldn't have a problem.' (George)

7.4.2.1.4. Sharing with small group vs. large group

Sharing photos was discussed as a way people interact with each other that evoked the experience of joy and fun.

'…we have a laugh. You show photos to people …it's fun. '(Nadia).

'…if I'm not going to have fun, I wouldn't share it…the point of sharing is, it has to be enjoyable' (Gitta).

Although, it is important for people to have fun and enjoy viewing photo, the sharing experience changes in relation to the size of the group of people involved.

The data illustrated that people prefer to share photos with a smaller rather than a larger group. The participants claimed that the sharing activity is easier, more intimate and creates a richer experience within a small group as oppose to the 'delayed' sharing experience when a large number of people are concerned.

'If there are only three or four of us err… it's OK because one person is in control of the phone and the rest just gather around that person … I told them what happened before that photo was taken and after so they could get the whole atmosphere of the party err… when there are many of us then it's different …we'd have like parallel sharing going on … you are not sure what's going on when everybody is looking at something different.' (Alex)

'… with a small group you have more intimate moments. So you can show specific photos you want to show'. (Nadia)

' …With fewer people … it's very easy to get around a small group in a shorter length of time.'(Stan).

7.4.2.2. Place for sharing photos

Even though participants reported that sharing photo experience depends on who they share photos with, the data shows that sharing behaviour differs in relation to where sharing takes place. When sharing occurs in a pub, which is crowded, people tend to hold the phone in front of their friends whereas when at home where people feel more relaxed they use Bluetooth facilities to transfer photos, video clips and other files and happily will give their phone for others to view the photos.

It can be anticipated that the reason behind changing sharing behaviour depends on the affordances and functionality of a place and is also dictated by commonly acceptable norms and regulations assigned to those places as well as the inherent properties of place. Being surrounded by a crowd of people generally means that the level of noise would be high, which would limit the narration of the photos and the lack of privacy could be jeopardised by the presence of strangers in near proximity.

> *'We were having a good time, we just came back from our holiday, almost the whole club went diving and we were showing each other's photos …we were laughing a lot … and one guy from the pub just came to us and started poking his nose in to see the photos and wanting to join our group. I didn't like that. I didn't want any strangers to see me err… wearing a bikini or other photos that were a bit silly'. (Alex)*

Another factor was low lighting levels. If people cannot see a photo clearly their experience will be poor.

> *'… because my camera phone is not that good I really need the place to be lit up. So usually, I use it better if I'm in someone's house or flat. So, you know, it's more lit up than the bar is'. (Gitta)*

People divided places into three groups: public, private and work environment. The following section discusses them in detail.

7.4.2.2.1. Public places

Public places were described as places where different social activities and social life are organized, and which are accessible to the general public (e.g. pubs, bars, clubs, restaurants, cafes, underground, museums, galleries, exhibitions, temples, churches, or social clubs).

People share photos differently in different public places (e.g. pubs, bars, restaurants) and the physical attributes of those places play an important role in their sharing activities.

When people are co-located, their ability to collaborate is afforded by the unconscious use of the inherent properties of place, body presence, movement, and sensory mechanism (Kraut et al. 2002), which has been confirmed by this study. However, even though pubs, bars and restaurants are social places that promote sharing, the sharing strategy applied in those places is different depending on physical attributes of a particular place as well as its functionality. For instance: a seating arrangement in a restaurant creates a more private environment and the ambience makes people more at ease to share their photos. The physical structure of the place (e.g. set up of tables and distance between them) where people sit waiting for a meal to be served creates a more private environment, which promotes sharing.

> *'…you sit at your table and can talk to others and it's OK. It's more private than in a pub … people sit and don't walk around that much. It's a place where you eat not socialize much and drink. Well, you do with people sitting at your table so then you can show them photos and have a good laugh.' (Nadia)*

> *'In a restaurant it's different … eating is a distraction in a sense and if people are eating you don't want to start moving around and showing photos. It's all right before or after, you know, when you are not eating. Eating is in itself a distraction'. (Ron)*

Although a restaurant environment allows people to engage in sharing activity by passing their phone around, the narrative part of sharing is limited.

> *'… In the restaurant you are sitting at the table not kind of walking around the place, you know, it affects err… the whole experience … it might be more difficult for me to be involved in sharing. Because if I give my phone around I wont be able to do kind of 'oh, look at this' and show people the photos, yeah. I'll be like more passive because you can't really walk around the table err... it's not that convenient. (Sami)*

'… pubs ... hum. Sometimes is just too noisy, you can't talk to people around you so if you show them a photo and you want to tell them story about it it's errr.... not always easy ... too noisy and crowded. So there might be a lot going on around and you can't have a good conversation.' (Nina)

'…sometimes there is an intrusion from the outside err … if you want to tell a story behind this photo, you know, people might not be able to hear you if the place is noisy'. (Stan)

People adopt different sharing behaviour in places like pubs and bars following the social and cultural characteristics of a place (e.g. bars are for socializing with people, talking and drinking). In pubs or bars during busy evening hours when the light is poor and the level of noise is high, people tend to share photos with people who are in close proximity so they can talk about particular photos as well as show them. However, if there are many people involved in sharing, people adapt their sharing behaviour to the physical attributes of a place (e.g. in bars there is less seating space, it is noisy, crowded, and people tend to move around so passing the camera phone around is a more common behaviour). In this case the experience is different, less personal and it lacks the intimacy that is a significant component of the character of the sharing experience, which strengthens the relationship between people.

'…if you are sitting next to the person it's fun, you can share it but if there are many people sitting at the table you just … send the phone across and ask people to take a look at it.' (Nadia)

7.4.2.2.1.1. Norms and regulations

It was reported in the literature that some public spaces are regulated by signage, announcements and by more informal regulations (Ito, 2003,2004; Okabe & Ito, 2005). The former suggest that these regulations are mostly applied in public transport. Okabe & Ito (2005) claim that people use email rather then voice calls when on trains and subways following 'sharing the same public space' regulations.

However, even though participant claimed that they would share photos anywhere, the data indicates that peoples' photo sharing behaviour is also regulated by the different norms and regulations. In some places (e.g.

museums, churches, temples, theatres unless the sharing happened during an interval and was triggered by a conversation) people follow unwritten rules as to what is acceptable or not.

> *'…Probably in a museum where they are not expecting too much noise I'd take a photo and then later share it with other people when we are sitting at the café and taking a break or something … in a temple you are not expected to take photos so you take whatever you can but you don't share them immediately. You don't want to show people that you are taking photos' (Nadia).*

> *…In the Church of England you do not get people taking photos at funerals. In weddings, yes. In a birth, yes. … so it's an unwritten rule and it is a cultural norm that there are some places that you don't use mobile phones' (Stan)*

Participants also mentioned that the photo sharing related not only to the place it might occur in but also the occasion. The sensitivity of the occasion would be a determinant for sharing to take place or not.

> *'I think is not the place, it's rather the occasion … at the funeral that would be an occasion that I wouldn't show the photographs. These are like unwritten rules, if you like. Err… we took some photographs at Nicolas Baptist ceremony but sharing, no. I showed them later at home during the party'. (George)*

7.4.2.2.1.2. Privacy issue

When sharing photos in public places, people are also concerned about their privacy. The level of privacy was an important factor in determining where, how and with whom to share photos.

People talked about two different kinds of privacy; one related to the content (subject) of photos. The decision about who can and cannot view a particular photo was based on the relationship between a viewer and a photo owner. The other concerned the sharing of photos in public places such as: pubs, bars, or restaurants. As seen in participants' comments they feel apprehensive when the content (subject) of photos is of a private nature and there are possibilities that others (strangers) can view them.

'…If there is a party and there are lots of people around and there are people sitting with us that I don't really know err…I might not want them to see my personal photos … because if I start with my friends, they [referring to strangers] might say: 'I want to see it' or something like that so instead of saying no, I prefer not to start the experience right from the beginning.' (Sami)

In bars or pubs, people tend to share photos on their handsets rather then using Bluetooth to transfer photos to their friends' phones. The physical layout of bars (e.g. more standing than sitting areas, closeness to other people moving around) does not promote a private environment and Blue-jacking is a matter of concern.

'You need to switch on to Bluetooth, … you don't want it all the time because of Blue-jacking and things like that'. (Lee)

7.4.2.2.2. Private places

Private places were described as places owned, used and accessed by individuals (e.g. houses, flats, and gardens).

Although participants described the home environment as a private place, within that they identified private and public areas in relation to sharing. The former includes bedrooms and bathrooms whereas the later includes living rooms, kitchens and gardens. Places like bedrooms and bathrooms are more private and people are hesitant to be involved in sharing there. Although sometimes sharing was reported to take place in the bedrooms, especially between partners, bathrooms were identified as a 'no share, private zone' area.

'They [referring to friends] wouldn't necessarily go to the bathroom or to the bedroom to share the photos. No, these are places where I wouldn't usually invite people to share my photos. These are more private.' (Juliet)

The mobile handset and Bluetooth are not the only media used to share photos in the comfort of one's home. Routinely, external devices such as a TV, computer, or laptop are used to display photos. However, depending on the specific technology utilized and its affordances, the photo sharing activity would happen in different areas (spaces) within a house. Participants reported using laptops in a kitchen or living room just because they are so portable whereas

sharing photos on TV was limited to its location, which commonly was in a living room.

> *'…Usually we sit in the living room and I'll bring my laptop and start showing the photos … if there are only a few friends and we sit in the kitchen, yeah … but it's usually in the living room. It's a bigger place so we can sit comfortably around the laptop. … In the kitchen I don't have that much space and living room is more social, I think, yeah.' (Sami)*

People feel more relaxed and comfortable sharing photos in a home environment, in part because the physical attributes of home (e.g. comfortable seating arrangement, space to move around freely, good lighting, low level of noise) promotes a more relaxed kind of sharing. There is no time pressure (e.g. closing hours in public places), fewer constraints (e.g. where to sit), and no strangers to intrude in sharing activity, which in turn makes people more at ease and enriches their sharing experience. People are less hesitant to share photos via Bluetooth or pass the phone around as they feel more secure and do not have to protect their privacy the way they do in public places. They have more time to view different photos from each other's collections, listen to stories behind them and finally Bluetooth the photos they would like to have on their phones.

> *'… If you are just in a pub or somewhere crowded and just want to share a photo, you know, … you just give the phone and the person will look at it but then usually, two or three weeks later when you are at the person's house having a barbeque, then you remember: 'oh, do you still have these photos?' and then you share them via Bluetooth because you are more relaxed'. (Lee)*

> *'You can display your photos on the computer or you can pass your phone around without thinking that some stranger might look at your photos without getting your permission. I don't like that, no.' (Nadia)*

7.4.2.2.3. Work environment

The workplace is seen as a professional environment and hence leisure-related sharing is limited to sporadic occasions (e.g. after company Christmas party). At the same time, sharing at work may be limited because often the relationship between people is on a professional, rather than private or social, basis.

'I'd only take photos of work if I was going to send them to people at work. I wouldn't ever let anybody at work see my photos of anything else ... it's strictly professional.'(Juliet)

When sharing photos in a work environment, the physical properties of the work area are far less significant than the cultural and social dimension. Participants reported treating work environment as formal and if any sharing takes place it would be outside the office to avoid disturbances of co-workers (e.g. in a kitchen, in a corridors, or in a designated communal area) and the owner of the photo usually holds the phone in front of a viewer.

'… Now is more formal. People watch you and it's not that friendly so we do it very rarely and rather outside the office in order not to disturb others … I hold the phone in front of her.' (Alex)

However, in some less formal work environment (e.g. leisure centre) people share photos with their colleagues, who are often their friends. Since the sharing happens between friends, the phone is passed from the owner of the phone to the viewer allowing photos to be freely viewed.

'It depends what kind of work you do. I can do it at work ... when we finish [work] we show each other photos that we took before [photos stored on their camera phones] … it's between trainers and colleagues, yeah'. (Nadia)

7.4.2.3. Value of photos

It transpired from the data that photos have different values and they rely on the photo owners' judgements of the sensitivity levels of the photo content before sharing. Those values are socially or personally oriented, or they relate to the time of sharing. The value assigned to a particular photo determines the life span of it and with whom it is shared.

7.4.2.3.1. Social value

Creating and maintaining social relationships was reported as being a reason for people sharing photos with friends, however, not all photos are shared with all friends. Some had been taken in order to share later (this links to the temporal value – see section 7.4.2.3.3) with friends who have common interests and belong to the same social interest group.

'… I was at Leicester Square … there was a premier of the Batman film and I took a photo of the car …I saw the car and it was like, a cool car and I came to the office and I showed it to Simon … I know that he is into this kind of guy stuff…' (Sami)

A photo from a concert shown to a person not interested in this kind of performance or music will not have the same impact on the experience as a person who is a great fan of an artist.

'…Some of my friends are artists and maybe I'll show them the photo of the 'Gremlin' but at the same time I'll show the photo when I was at the concert … beautiful colours … maybe artists can be inspired by these photos'. (Nadia)

Often people share photos not necessarily because of similar interest but they know people who will appreciate a specific photo so when a situation arises they take a shot thinking 'I saw this and thought about you'.

' … My friend, he's crazy about motorbikes so when I did the exhibition in Alexandra Palace [place in London], I just took this photo of a Harley Davidson … I showed it to him later. (Nina) (Figure 7.4)

FIGURE 7.4 HARLEY DAVIDSON – PHOTO SHARED WITH HARLEY DAVIDSON FAN

7.4.2.3.2. Personal value

Another value, this time more of a personal and sentimental value, can be added to a photo when there is a strong connection between the subject of the photo and the photo owner. The personal value dictates the life span of the photo (this links to the temporal value of photos, 7.4.2.3.3), its final destination (e.g. an album, a folder on a computer, or a canvas on a wall), and its accessibility to others; that means that this type of photo is usually shared with very close friends or loved ones. However, depending on the content of these

photos, they are shared with a different group of people; for example photos from a funeral wake are shared with people who attended the ceremony and knew the deceased.

> *'Some photos I don't want to show probably err... a few of my friends had been to my Mum's funeral so I do have those photos and I don't want to share them with other people just with those close to me.' (Nina)*

Other photos display the loved ones (e.g. grandmother, child, girlfriend or boyfriend) and are shared with them or friends. They are very valuable for their owners and even when their change camera phones the photos are always transferred across so they can be viewed and shared when an occasion arises.

> *'This is the photo ... of my grandmother with my son. So I cherish this photo. … This was like last year at her place ...err ... I took the photo ... I showed it to my husband, my cousins, my Mum err ... and now I'm thinking that perhaps I should store it on my computer because it's err... an important photo, I mean for me. It brings some memory ... err... and it's close to my heart.' (Sami)*

People also like to preserve the feelings associated with special occasions, events or precious moments that are captured on photos taken at the time. When shared they strengthen the relationship between friends and share not only the event but also, and more so, the experience encapsulated in them.

> *'A couple of years ago I took some photos of the Christmas trees when I went home and I still have them on my phone… and I showed them to my friends many times and when I think about Christmas I just look at them again, and again and I know that I will never delete them. They bring back beautiful memories and the feeling of home and family and that's great and err…I just want to show my friends how it's like at home. I want to keep them.' (Alex)*

> *'… they've [photos] got some memories, because she is miles and miles away and I've got this red hat [she was wearing it at the time of this photo being taken] under my pillow [laughing] that ... if I see that ... I look at that red hat ... I really miss her and I look at the photo as well. So I have something real and then have the photo on the phone as well… it takes me back to that situation that I was at … and it makes me cry. No, not*

really but you know what I mean. I just like looking at it and showing it to my friends'. (Bob)

These kinds of photos usually remain in the owners' collection for a long time and they are often transferred between phones (e.g. from the old phone to the new one) or they are kept on the memory card or other media to preserve them and share them with others for a long time.

7.4.2.3.3. Temporal value

It emerged from the data that there are two important issues when the temporal value of photos is concerned: one relates to the life span of the photo and one relates to whether a photo is shared at the time that it is taken or later.

7.4.2.3.3.1. Life span of photos

The life span of photos can be divided into two categories depending on how long the photos are stored on the camera phone: short or long life.

The 'short life' of photos is relevant for a limited time only and afterwards they lose their value and are no longer the 'punch line' of the conversation. As explained by Stan a photo of a new Emirates stadium (Figure 7.5) has its special value until all friends, fans of Arsenal, visit the place. Then the value of the photo is changed and it no longer gives its owner a sense of pride from 'been there, seen it'.

'…The one of the pitch [photo] was only actually valid until all your friends have been there and see it … then the photograph no longer had that: 'hey, have you see that? Yes, I have. Oh, oh …' (Stan)

FIGURE 7.5 PHOTO TO SHARE WITH ARSENAL FAN GROUP

When asked whether pictures are only valid for a certain period of time or have a much longer life span, participants commonly reported that some photos are

not only for a moment to appreciate but also they capture nice memories that are kept for a long time and reviewed from time to time when friends are around.

The long life of photos depends on its content, which could relate to an interest of the owner or something important (e.g. a photo of the holiday house abroad), unusual (e.g. Halloween party dress) or beautiful (e.g. Wembley stadium at night) that is worth keeping and sharing with others over and over again.

> *'The Wembley stadium that's a gorgeous photo … and I had to take it. … I saw this and I said 'Oh, God. I have to take a photo'. I'm just glad I had the phone with me so I could capture the moment. … a year later and I'm still showing it to people.' (Juliet) (Figure 7.6)*

FIGURE 7.6 THE WEMBLEY STADIUM AT NIGHT

Like photos that have social value assigned to them this kind of photos is often shared on the camera phones without transferring them across. However, in the case of photos capturing funny things or situations (Figure 7.1 - Cat), they are often Bluetooth-ed to the viewers' phone collections so they can be shared with others not present. This kind of photo usually 'travels' (moves) from one person to another as a line for conversation or just to bring a smile to people's faces. The life span of these photos is usually as long as there is no one left within the circle of friends and family that the owner of the photo would like to share it with.

7.4.2.3.3.2. Photos shared 'now' or 'later'

Sharing activity is structured and planned in time but the plans for sharing are often formulated at the time of taking photos. There are different reasons for taking pictures: one is to share them with friends who have a common interest (link to a social value, 7.4.2.3.1), another is to share them with our loved ones with an intention to show them something that they are interested in (link to a

social value, 7.4.2.3.1), or yet another is to share photos that capture something special (e.g. a place, an event) that the owner of the photo would like to share with friends or family (link to a personal value, 7.4.2.3.2).

Sharing photos is usually accompanied with a narrative story behind the photos, which conjures memories, feelings and emotions and evokes senses associated with the event or places that were photographed. It does not stop here; they allow the viewer to 'travel' to the place and space captured on these photos.

> *'I mean if you just show a photo there is only a photo but I like to say where it was taken and what happened, etc. and I love doing it because every time I say something I go back to that very place and share those precious memories from all these places err… yeah. And whoever I share them with, can just imagine what it was like up there. It's like teleportation [laughing]. I like telling stories, yeah'. (Alex)*

The temporal value of the photos is strongly linked to other values (i.e. social, personal) and cannot be viewed as a totally separate entity.

7.4.3. Differences in sharing experience between camera phones and digital cameras

It is a common practice that people share photos using both technologies: camera phones and digital cameras. However, although digital cameras have been around for much longer than camera phones and they are perceived by their users as more professionally oriented photographic equipment, the sharing experience on camera phones is leveraged by the immediacy of sharing and the way that it occurs. In addition, the uses and motivation behind using both technologies differ. Digital cameras are used for more formal or special occasions and planned events where photos are required (and expected) to be of a higher quality and very often they are printed and expand an album collection, whereas camera phones are used in a rather ad hoc manner to capture a moment or funny situation that otherwise might be lost.

In the case of camera phone photos, the quality is not of paramount importance but the content of the photo matters. People reported being able to catch a moment on their camera phone that otherwise would be missed. Although both pieces of technology feature functions to support this type of activity, there are

distinctive differences when it comes to the photo sharing experience. The following sections explain these differences in detail.

7.4.3.1. Portability and accessibility

It emerged from the data that one of the key points that makes sharing on camera phones different from digital cameras is that camera phones are portable and the photo collections are accessible at any time. People carry camera phones with them all the time, which makes the sharing possible should an opportunity arise.

There are two types of digital cameras, the miniature pocket size and the large form SLR type, which has dictated the changes in sharing behaviour.

The pocket size digital cameras are small and can be easily carried in people's pockets and present no problem when sharing is concerned. However, as commented by participants it is something else they need to remember to carry, which in the case of a camera phone is an automatic action, not an effort.

> *' The thing with a digital camera is that it is yet another thing to carry with you and I often forget to take it anyway … camera phone I have with me almost 24/7, yeah.' (Alex)*

The SLR cameras are large and heavy and are used mainly to take formal photos. Hence, the sharing occurs on the spot or later but in a form of paper prints.

> *' ... because it's an SLR camera is not exactly portable … there is not a lot of element of sharing because of the size of the camera. You don't carry it to the pub … and share them [photos] on your SLR screen. Sharing comes when you print them … so the sharing element of that tends to be on paper rather than showing them something on the camera'. (George)*

7.4.3.2. Time of sharing

Participants reported that most of the time the sharing with digital cameras (pocket size) occurred 'on the spot' just after taking a set of photos or not long afterwards. The former usually happens in order not only to show the photos that were just taken but also to eliminate the ones that are not accepted by any of the people involved.

'… we went to the British Museum and she [referring to her friend] asked me to take photos of different Buddha's and then what I did after taking each photo I showed it to her and then she decided to keep it or to delete it and take another one'. (Alex)

Sharing photos on digital cameras at a later time mostly occurs at people's homes; after the deletion process of unwanted photos is completed, the remaining photos are transferred onto a computer and shared with others using a slide show. In addition, a common practice is to burn a CD containing photos either from one theme or occasion (e.g. holiday) or a set of photos taken at a different time and location as a means of archiving them or sending to loved ones in order to share the experience captured on the photos.

Although people share photos on digital cameras not only in the comfort of their homes but in places like pubs or restaurants, this behaviour happens rarely and one has to remember to take the digital camera with them.

'… If you want to share photos with someone on your digital camera, you have to make a point of taking your camera with you … is not so bad now because the modern cameras are so small … it's not a major problem … but you have to remember to take it and it's sometimes a problem for me.' (Ron)

7.4.3.3. Ways of sharing

The most important difference found between sharing photos 'on the spot' on camera phones and digital cameras is that photos cannot be transferred to viewers with digital cameras whereas the common practice with camera phones is to transfer photos either by using Bluetooth, infrared, or MMS technology.

' … I'm quite used to Bluetooth-ing to other people err… because that's the main way we share … and it's very immediate thing. So like you take the photo, you look at it and then you go: 'That's great' and someone says: 'Can I have it' … you Bluetooth it and it's all kind of done very, very quickly.' (Stan)

This kind of sharing is not supported in digital cameras and although they are equipped with larger screens than camera phones and the quality of photos is superior, the sharing 'on the spot' is only available on the screen of the camera.

Many of the very small digital cameras have no viewing screen and can only be viewed when downloaded onto a computer.

Some of the modern digital cameras support Bluetooth transfer of photos, however they can only be transferred to a compatible device (e.g. computer or PDA) equipped with the specific software, which limits sharing photos 'on the spot' to selective devices (excluding other digital cameras or camera phones) and places (e.g. if transferred to a computer it would usually happen in a private place like home).

There are different means of sharing photos, which are largely exercised by the photo owners; these involve transferring photos to computers and distributing them amongst friends and family via email. This kind of sharing does not happen 'on the spot' but in a remote location and it is outside the scope of this study.

7.4.4. Design issues

There are four design issues in the study that may be used to improve the design of camera phones or other technology supporting photo sharing activity: level of privacy attached to a private against a public collection of photos, lack of facilities to support transfer of photos to multiple users at the same time, organisation of photos, and supporting a bigger surface display when sharing with a large group of people.

7.4.4.1. Privacy

The ability to restrict private photos from the view of others was an important factor when sharing experience is concerned.

However, the limitations of camera phones (not having facilities to create directory structure allowing to view only selected folders and keep private collections locked), detracts from the experience. People need to know that photos from their private collections are safe otherwise their experience is compromised.

An alternative way of protecting their privacy is to transfer private photos from the camera phone onto a computer and delete them from the phone after the transfer (see section 6.4.3.1).

A more refined way of granting access to collections of photographs would mitigate some of this concern. For instance, the phone owner could 'open' a folder, allowing photos in the folder to be available for browsing, while other folders remain hidden and well protected.

7.4.4.2. Transfer of photos

Another relevant issue of sharing was the lack of facilities to support transfer of photos to multiple users at the same time. This was most important when sharing within a large group of people. The common practice was to transfer photos via Bluetooth, MMS or infrared. Although, the most popular way of transfer is via Bluetooth it does not have the facilities to transfer photos to multiple receivers; only single receivers, one photo at a time. However, this is a time consuming process when a large number of people is involved and affects the whole experience of sharing.

> *'… if there is a group of 100 then err… OK, maybe I picked too larger number but you can see what I mean. By the time the 100th person has got it … everybody else has moved on and they would be probably sharing something else … you need to sort of bring everybody together into that particular moment and when the moment is gone, the moment is gone.' (Stan)*

A way to solve this problem could be a shared Bluetooth network connection that the owner of the photo could access and send a specific photo to every person within this group simultaneously.

7.4.4.3. Organisation of photos

Participants reported having large selections of photos stored on their phones, which required organisation to reduce the time when looking for a specific photo. However, not all of the participants archived their photos all of the time. Archiving depends on different factors: how many photos were taken at a time (if many then the archiving process is too long and participants might not proceed with it), how much time people have to archive even an individual photo (e.g. they might take a snap of something while waiting for a bus or train and there is no time to make any notes of that photo), also the place where a photo was taken (e.g. taking photos during a Baptism ceremony or in a museum

where people want to capture a moment but due to different norms and regulations they do not want to archive them at the time).

Although, modern camera phones tag photos with the date it only partially solved the problem with organising photos. With a larger collection of photos it relied on the taker's ability to remember which photos where taken, when and where. A better organisation of folders that would automatically put photos taken at the same date in separate folders might be a step forward in solving this problem. However, the owner of the camera phone would still have to organise and name these folders.

Another solution might be a use of pre-defined folders where a set of different folders (e.g. my last holiday, funny photos, private collection) could be created at any time and when a photo is taken a set of those pre-defined folders will prompt the person to store them in the appropriate folder.

7.4.4.4. Screen size of camera phone

A small camera phone screen only allows photos to be viewed simultaneously by a small number of people, which often diminished the sharing experience.

> *'… we can't really look at something as a group. Generally, you can't. You've got a small screen like this err… you can't show. Once you've turned it you've lost it. So there are only two or three people who gather around to watch it and it's not a reflection but the size … because it's a small screen people like it closer up so they can see the details'. (Ron)*

Novel uses of display technology could alleviate the problem for larger groups, for instance by having a smoother transition to a large display surface, or by allowing simultaneous viewing of the same photos on several handsets (this links to the shared Bluetooth network idea discussed in the previous section).

7.5. Discussion and conclusion

When discussing camera phones as technology supporting the photo sharing activity in co-located settings it is important to understand what the role of the place that sharing occurs in is, how and when people share photos and what influences their sharing experience.

The study results corroborated previous research findings detailing the different places that sharing photos took place in (private, public, and work environment).

However, the interviews identified that people adapt different attributes of place to facilitate the sharing activity, which changes depending on who the photos are shared with. Sharing photos with members of family usually took place later, not at the time of taking photos, during the family gatherings, or after dinner and was more formal. The suitability of photos shared was one of the important issues raised by participants, which meant that all the photos of family were viewed regardless of the quantity (often with duplications of themes) whereas photos of friends were usually pre-selected by the owner sharing only a small selection.

People who share photos with friends were found not only to be giving their camera phones away, but also allowing friends to view freely their photo collections. Sharing photos with others (e.g. acquaintances, friends of friends, family friends or strangers) took a stricter form with people holding their phones in front of a viewer for each individual photo.

In addition, the data revealed that the size of the group influenced people's sharing behaviour. They preferred to share photos with a smaller group promoting easier, more intimate and richer behaviour as opposed to a larger group creating the 'delayed' experience and hindering the control over the photos.

The issues relating to the places in which sharing occurs and the relationships between the people involved were discussed providing an outline of the photo sharing behaviour. The findings highlighted the importance of different attributes of place as well as norms and regulations followed by people and shaped their sharing experience. Some public places (e.g. churches, temples, museums, galleries, or theatres) are perceived by people as sensitive, 'no sharing zone' places and even though people might take photos the sharing would occur at a different time and location.

In other public places such as pubs, bars, or restaurants, which are perceived as social places promoting the sharing experience, the strategy depended on physical attributes and functionality of a particular place. Privacy issues of individual's photo collections were found to be important when sharing in public places was concerned.

People sharing photos at home were found to be less hesitant of using Bluetooth to transfer photos or pass the phone around, as they felt more secure

than in public places. Also, the privacy of photos greatly increased when sharing took place in a private environment. Finally, with regard to sharing photos in a work environment people perceived it as a professional environment, hence leisure-related sharing was limited to sporadic occasions and usually happened outside the office (e.g. in a kitchen, in a corridors, or in a designated communal area) to avoid disturbing co-workers.

The values of photos were noted as important factors determining when and with whom they were shared, and how long they were kept in the photo collections. In the case of the social value of photos the decision of a sharing circle was made at the time of taking and the value was lost after everybody from the circle had viewed them. Photos with a personal value were very evocative and meaningful to their owners and usually only shared with a selected circle of friends or loved ones. The study revealed that this type of photo is very precious; they are transferred when phones are replaced and their life span is unlimited.

The study highlighted three distinctive differences between camera phones and digital cameras that play a key role when co-located sharing is concerned: the portability and accessibility of camera phones, the immediacy of sharing and the immediacy of transferring photos across using Bluetooth, infrared, and MMS technology.

Finally, there are four design issues that are drawn from the study that may be used to improve the design of camera phones or other technologies supporting the photo sharing activity. The first relates to providing a level of privacy attached to a private against public collection of photos. The lack of facilities to support transfer of photos to multiple users at the same time was also highlighted. This was of the most importance when sharing within a large group of people. The lack of tagging, annotating and organising photos in separate folders was raised to support an easy and fast way when looking for specific photos. Since the size of camera phone screens limits the sharing to viewing photos by one person at the time or just a small group, some means of supporting a bigger surface display would improve the sharing experience when a larger group of people is concerned.

This study has provided a better understanding of different photo sharing behaviours, which depend on: social affordances, the affordances of place, the

affordances of camera phones and the value of shared photos. In addition, it contributed to the development of the Photo Sharing Components Model to better discuss and communicate sharing experience and be used as a fundamental source for creating various sharing scenarios, which are presented in detail in the next chapter.

Chapter 8. Photo Sharing Components Model: Theorizing sharing experience

8.1. Introduction

The previous chapters outlined and discussed important issues in relation to co-located photo sharing experience as well as identifying factors influencing it. It emerged from the data that there are three main factors of importance: where the sharing occurs (i.e. physical location with its affordances and constraints), who the photo is shared with (people and the relationships between them, social affordances and constraints), and the value of photos shared (relates to the content of a photo and the user autonomy and freedom when sharing photos).

The data from the First Study provided detailed information of people's perception and understanding of hedonic experience and factors influencing such experience in the context of technology.

Following these findings the Second Study continued exploring issues related to the social element of experience and functionality of technology supporting its social use.

The Third Study explored the role of place where social interactions occur when sharing photos on camera phones.

Applying findings from all three studies, this chapter theorizes the sharing experience and discusses the Photo Sharing Components Model (PSCM), which has been developed from the analysis of the empirical data gathered within this research. The model can help in a better understanding of the photo sharing activity using camera phones or other technology that supports photo sharing.

The development of the model can be seen through the contribution from the studies carried out and the next section provides a review of the contributions.

8.2. Contributions of studies to conceptualising sharing experience

As discussed in previous chapters, this research explores users' experience in the context of technology i.e. camera phones. Three studies were designed and conducted in order to provide the key to understanding the photo sharing experience as a dynamic and changing whole. Each of the studies provided relevant information that finally contributed to the development of the Photo Sharing Components Model.

The First Study focused on people's perception and understanding of hedonic experience and factors influencing it in the context of personal technology (see Chapter 4). The contribution of the study is:

The First Study contribution
Key elements to create and influence hedonic experience in the context of technology (see section 4.4.1): - Interactivity/social element - Usability/functionality of technology

The Second Study explored people's experiences when using camera phones for social interaction in co-present settings, circumstances and contexts in which social practices occur (see Chapter 6). The contribution of the study is:

The Second Study contribution
Different social uses of camera phones (see sections 6.4.1 and 6.4.2.2) - Sharing with different groups of people (e.g. friends, family, strangers) - Time of sharing (e.g. now, later) - Place of sharing (e.g. public, private) - Methods of sharing (e.g. Bluetooth, MMS, or computer) Social implications for sharing photos (see section 6.4.3): - Privacy - Trust - Control over the camera phone Barriers (constraints) for sharing (see section 6.4.5): - Archiving/organising photos - Size of the camera phone screens

The Third Study investigated the role of place where social interactions occur while sharing photos on camera phones in different co-located settings. In addition, it examined how different places afford sharing photos and how affordances of camera phones support sharing in those places (see Chapter 7). The contribution of the study is:

The Third Study contribution

People share photos when different triggers are activated; with whom photos are shared is determined by different sharing triggers (see section 7.4.1)

- Pre-planned
- Contextual
- Ad-hoc

Photo sharing behaviour changes depending on:

Who it is shared with (e.g. friends, family, others)? (see section 7.4.2.1)

Where the photo is shared (e.g. public, private, work environment)?
(see section 7.4.2.2)

What is the value of shared photos (e.g. social, personal, temporal)?
(see section 7.4.2.3)

Affordances of technology dictate different sharing behaviour
(see section 7.4.3)

A theory emerged from the data gathered and analysed applying the Grounded Theory approach. The analysis was elaborated upon and integrated in the selective coding stage. The core categories, which were central phenomena around which all the categories were integrated, are defined in the Photo Sharing Components Model described in detail within the next sections.

8.3. Photo Sharing Components Model

A model (see Figure 8.1) of sharing experience using camera phones' photos has been developed based on the findings from the studies conducted during this research, which identified relevant issues related to the phenomena. This model is an abstract representation of important factors (high level components) that together with its lower level components contribute to the overall sharing experience.

The following sections provide descriptions of both levels of the model components.

8.3.1. A High Level of Description

The high-level components include: Value of Photos (see section 8.3.2.2), Place Affordances (see section 8.3.2.3), Technology Affordance (see section 8.3.2.4) and the Social Affordances (see section 8.3.2.5) that are key to users' sharing experience.

However, the Triggers for Sharing are important elements that determine when and with whom photos are shared. Each of the sharing factors interacts with each other to form the users' experience of sharing. Different scenarios put emphasis on different factors; however all of the factors affect the overall experience.

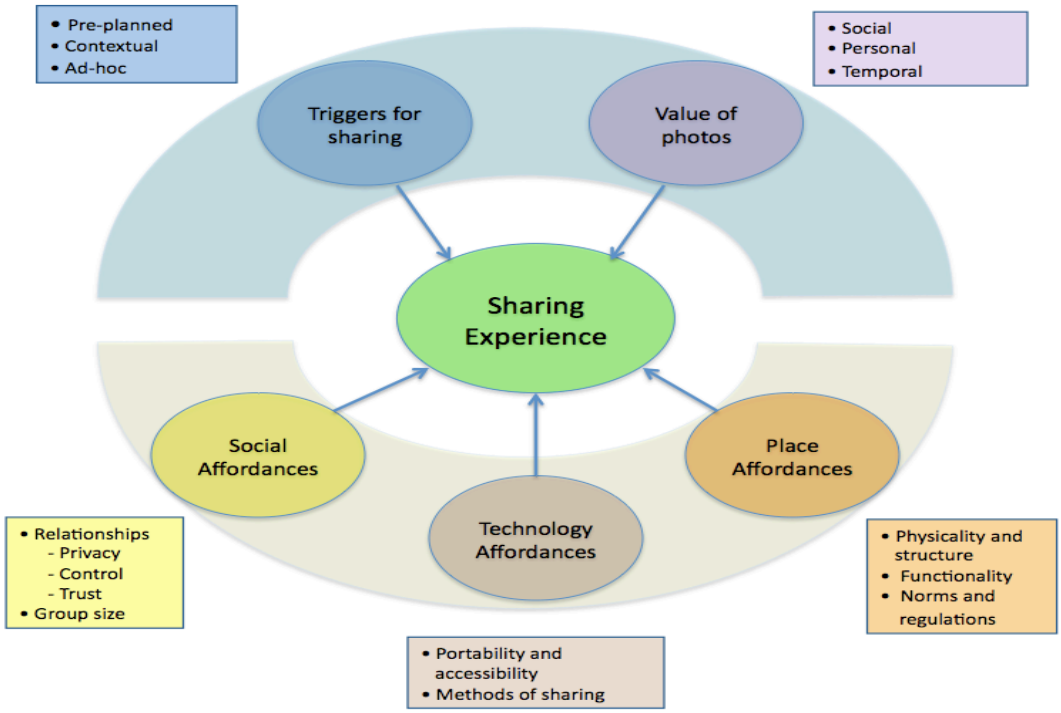

FIGURE 8.1 PHOTO SHARING COMPONENTS MODEL OF CO-LOCATED SHARING PHOTOS ON CAMERA PHONES

The primary sharing experience factor in this model is Value of Photos and the effect that it has on who the photo will be shared with when an appropriate triggered mechanism is in action. It is important to understand that the Value of Photos relates on the photo owner's perception of it and it relies on the owner's

judgements of the value assigned to each photo that can be shared and determines who it can be shared with.

The Place Affordances relate to the dimensions and attributes of different places that allow sharing to happen and will shape the experience. It is important to understand that Place Affordances are perceived not only by their physical and structural dimensions but also by the norms, regulations as well as the functionality (or cultural dimension) of it. It also relies on the owner's judgement of where, how and what can be shared and the sharing behaviour is adapted to the place that it happens.

The Technology Affordances relate to the attributes of camera phones that support different types of sharing. However, Technology Affordances discussed here deal with sharing occurring in co-located settings (the same time, the same location).

Finally, Social Affordances relate to the relationships between the photo owner and a photo viewer(s). There are different levels of relationships that determine who and how photos are shared. A range of issues will influence the photo owner's assessment of the Social Affordances; however, trust privacy and control are important issues in this context.

8.3.2. A Low Level of Description

Sharing activity is always triggered by motivations for sharing and the owner of the photo is the one who perceives those triggers. The triggers for sharing determine when the photo is shared and who with. It is important though to understand that all the sharing experience activity occur within a context.

8.3.2.1. Sharing Experience Factors: Triggers for Sharing

The photo owner decides which photos are shared with whom based on the content of photos and the motivations behind the intentions to share.

8.3.2.1.1. Pre-planned Sharing

The intention to share is motivated when taking a particular photo. When a situation happen the owner of the photo takes a shot thinking about a person

who this photo will be shared with. Such photos would be shared as soon as an opportunity arises.

8.3.2.1.2. Contextual Sharing

The photo sharing activity is driven by the topic of a conversation. The owner of the photos will decide which photos from his/her collection to share depending on the context of the discussion.

8.3.2.1.3. Ad-hoc sharing

This type of sharing is not pre-planned or conversation driven but it happens spontaneously when the photo owner has a photo (e.g. funny content) that he wants to share with others. The intention for sharing in this case is to bring a smile to the viewers' faces or share an experience.

8.3.2.2. Sharing Experience Factor: Value of Photos

People assign values to their photos because it is fundamental to determine the life span of it and who is shared with.

8.3.2.2.1. Social Value

The photo owner will share a photo of social value with those who have common interests and belong to the same social interest group.

8.3.2.2.2. Personal Value

Personal value can be added to the photo when there is a strong connection between the subject of the photo and the photo owner. The personal value dictates the life span of the photo, its final destination (e.g. an album, a folder on a computer or a canvas on the wall) and its accessibility to others. Usually, these types of photos are shared with very close friends or loved ones.

8.3.2.2.3. Temporal Value

The value of photo relates to: the life span of a particular photo (short vs. long) depending on its content and whether a photo is shared at the time that it is taken or later. The latter is linked to the Triggers for Sharing as well as to the Value of Photos that determines which photos are shared with whom.

8.3.2.3. Sharing Experience Factor: Place Affordances

Sharing experience always occurs in a context; this section discuses the context of place. Place is a physical space experienced by people through its different dimensions, that exist in connection with each other. These dimensions relate to the physicality and structure of a place, its functionality as well as the norms and regulations that are applicable to that place. The study revealed three types of place; namely public (e.g. restaurants, bars, pubs), private (e.g. home, garden), and work environment (e.g. office) (see sections 6.4.1 and 7.4.2.2). In each of these places sharing behaviour changes in relation to where it occurs, who with and what values are assigned to shared photos by their owners. Each place can be characterised by its physicality and structural arrangement, functionality (or cultural dimension), as well as norms and regulations that people follow.

8.3.2.3.1. Physical dimension of place

When sharing occurs important issues evolve around the physical and structural attributes of the place. People adapt their sharing behaviour in relation to where they are.

In restaurants, described as social places, social interaction is different in comparison to vibrant pubs or bars atmosphere. The ambience of a restaurant makes people feel more at ease to share their photos. The physical structure of a restaurant (e.g. set up tables) where people sit waiting for a meal to be served creates a more private environment. Although a restaurant environment allows people to engage in sharing activities by passing their phone around, the narrative part of sharing is limited (see section 7.4.2.2.1).

Bars and pubs are for socialising with people, talking and drinking but their physical structure does not support the same kind of sharing. During busy evening hours when the light is poor and the level of noise is high, people tend to share photos with those who are in close proximity so they can talk about particular photos as well as show them. Where many people are involved they adapt their sharing behaviour to the physical attributes of a place (e.g. in bars there is less seating space, it is noisy, crowded, and people tend to move around so passing the camera phone around is a more common behaviour). In such cases the experience is different, less personal and it lacks the intimacy

that is a significant component of the character of the sharing experience, which strengthens the relationship between people.

Sharing in a home environment is more relaxed and comfortable. The physical attributes of home (e.g. comfortable sitting arrangement, space to move around freely, good lighting, low level of noise) promote a more relaxed kind of sharing. There is no time limit (e.g. closing hours) nor boundaries (e.g. were to sit), no strangers that might intrude in the sharing activity, which in turn makes people more at ease and enriches the sharing experience (see section 7.4.2.2.2).

Since the work environment is treated as formal, the physical properties of the work area are far less significant than the norms and regulations followed by people. Sharing would happen away from the workstation to avoid disturbances of co-workers (e.g. in a kitchen, in a corridors, or in a designated communal area) and the owner of the picture usually holds the phone in front of the viewer.

8.3.2.3.2. Functionality of place

Each place has specific functionality assigned to it that is directly linked to the physical and structural properties of a place as well as the way people behave there following norms and regulations. There are places for socializing (e.g. bars), places for eating (e.g. restaurants), or places for rituals (e.g. churches) and each of them has characteristic arrangements (e.g. seating arrangement in bars or restaurants) that can support or hinder sharing experience.

8.3.2.3.3. Norms and regulations

The sharing experience is often shaped by norms and regulations assigned to different places that are widely followed by society. People do not share photos in museums, temples, or churches. They might take photos there but sharing will happen at a later more convenient, less restricted area such as restaurants or pubs.

People share in the work environment, though sporadically, as the place is considered a professional environment and not one of fun and enjoyment.

8.3.2.4. Sharing Experience Factor: Technology Affordances

The sharing experience is facilitated by different technologies (in this research it is with camera phones) and its attributes determine the way that sharing takes place. It is important to understand that the affordances of technology need to be considered in the context of where the sharing happens (including physicality of place and norms and regulations applied there) as well as the relationships between the people involved. People make decisions about the way they share photos based on what the technology can support.

8.3.2.4.1. Portability and accessibility

The key point is that the technology is portable and the photo collections are accessible at any time. People carry camera phones with them most of the time, which makes the sharing possible should an opportunity arise. This allows sharing 'on the spot' (at the time of taking a photo) or later.

8.3.2.4.2. Methods of sharing

There are many ways of sharing photos, however, the instant sharing is one of the most important issues when photo sharing is concerned; that sharing can happen immediately after taking photos creates a unique experience that cannot be replicated at a later time. However, there are a number of ways people can share photos in co-located settings. The common practice is to transfer photos across phones either by using Bluetooth, infrared, or MMS technology (see section 6.4.4). Another popular way is viewing photos on the phone screens but viewed head on. The small screen characteristic reduces the ways that a large group of viewers can arrange themselves to view during photo sharing.

8.3.2.5. Sharing Experience Factor: Social Affordances

Social Affordances are defined in this research as the relationship between different social groups that enable a particular way of sharing among members of that group based on the level of trust between them. The approach taken in this thesis extends the general perspective of the subject which views social affordances as properties of an object or environment that allows social actions

to take place (Gaver, 1991). Social Affordances defined in this study introduces other properties, which are dependent on different groups of people that afford different sharing behaviour, which are more in line with social affordances as discussed by Still & Good (cited in Gaver, 1996). The authors focus on the two issues: one is the possibility for action that people offer to one another; the other is the role of other people in presenting new affordances (e.g. to babies) (ibid).

8.3.2.5.1. Relationships (friends, family, and others)

There are different levels of relationships between the photo owner and the viewer(s) that determine which photos are shared with who and the way that they are shared.

If the content of a photo is of a personal value to its owner the sharing occurs with someone from a close relationship circle. Photos from the private collection are shared with close friends whereas those from the public collection are shared with friends, family or others (e.g. acquaintances, friends of friends, or strangers). The sharing method is based on what is perceived by the photo owner's social closeness with the viewer(s). When photos are shared with members of family two ways of sharing are common: one is to give the camera phone to a member of family and show one picture at a time (when children share photos with their parents), another is to hold the phone in front of the viewer(s) and flip through the collection (when parents share photos with their children). When sharing photos with friends, the common practice is to give the phone away whereas when sharing with others the photo owner holds the phone in front of the viewer(s).

8.3.2.5.2. Group size (small vs. large)

The sharing experience changes in relation to the size of the group of people involved. Sharing with a small group (2 – 4 people) is easier, more intimate and creates a richer experience; one person is in control of the phone and the viewer(s) gather around that person allowing the owner to synchronise the conversation with the presentation of each photo, thus involving all viewers. With a larger group (> 4) the phone is passed around which takes much longer for the whole group to view the photo and consequently it loses the

synchronicity that is so important with sharing and creates a 'delayed' experience.

8.3.2.5.3. Privacy

The most common social reason for people sharing or not sharing their pictures with others is the level of privacy involved. It is important to understand that the level of privacy is an important factor in determining where, how and with whom to share photos.

There are two different kinds of privacy; one is related to the content (subject) of photos. The decision about who can and cannot view a particular photo is based on the relationship between the viewer(s) and the photo owner. People are more inclined to share images on their camera phones with close friends whereas some collections will always remain private available only to a close circuit of people (e.g. people on the photo, loved ones). The other kind of privacy is concerned with sharing photos in public places such as: pubs, bars, or restaurants. People feel apprehensive when the content (subject) of photos is of a private matter and there are possibilities that others (strangers) can view them (see section 6.4.3.1).

8.3.2.5.1. Control

It is important to retain control of who views the photos from different collections (e.g. private and public). People do not mind giving their camera phones to friends and letting them view the whole collection of pictures. With close friends there is trust and an agreement that allows them to view freely whatever is stored on the phone whereas when sharing with others the content of photos that can be viewed is limited (photos from public collection only).

8.3.2.5.2. Trust

This research has identified that trust is an important factor of photo sharing. The level of trust has a direct effect on with whom photos are shared and how the sharing occurs. If a viewer is trusted, the phone is given to him/her, otherwise the photo owner holds the photo in front of the viewer(s). People are reluctant to part with their camera phones and let others be in control when they suspect abuse of their trust.

8.4. Summary

This chapter discusses the Photo Sharing Components Model providing a detailed account for each of the components: Triggers for Sharing, Value of Photos, Place Affordances, Technology Affordances and Social Affordances.

It is important to understand that the Photo Sharing Components Model presented here is a representation of the photo sharing activity performed by a professional adult group of camera phone users in co-located settings. The model is based on the data gathered during the empirical studies and it captures the photo sharing practices experienced and discussed by participants. The model might be use as a guide to help in the understanding of what is important in creating sharing experiences within different photo sharing groups in various places using technology supporting it.

The photo sharing behaviour changes in relation to with whom and where the photo is shared as well as the value assigned to it. In some situations the owner of the photo passes the camera phone to the viewer(s), in others the sharing is restricted to holding the phone in front of the viewer(s). Within different scenarios the emphasis will be made on different factors (components of the Photo Sharing Components Model). The relationship between those individual components creates a specific behaviour, which can be represented in a form of notation, in order to simplify the representation of different sharing scenarios.

The next chapter discuses emerging scenarios of photo sharing in detail through the use of their graphical representations as well as discusses the similarities and differences between scenarios. In addition, it provides an account of the key factors within each group of scenarios that dictate the specific sharing behaviour.

Chapter 9. Photo sharing scenarios

9.1. Introduction

As identified in Chapter 8 the photo sharing consists of five components that create a specific outcome in a form of sharing behaviour. The sharing behaviour can be represented as a set of scenarios that are instantiation of the Photo Sharing Components Model and they are characteristic for a particular situation. In addition, these scenarios can be used to analyse and categorise the photo sharing behaviour. Although the list of possible sharing scenarios discussed in this chapter is not complete, the set presented here is taken directly from the data gathered during the Second and Third Study (see Chapter 6 and 7).

It was apparent from the data that there are some similarities between different scenarios of sharing even though the components of those scenarios are different. In some cases, the difference is within the Social Affordances, Place Affordances, Technology Affordances or other components that create a sharing scenario. However, there are also scenarios where participants reported the sharing to be opportunistic and the absence of sharing depended on the place that sharing occurred and people involved.

Each of the scenarios can be represented in a form of notation in order to simplify the way to discuss and communicate sharing behaviour. The next sections discuss in detail the scenarios of sharing including similarities and differences between them as well as scenarios where sharing was absent.

9.2. Sharing behaviour organisation

Sharing behaviour happens within a specific situation and it is a combination of high-level components; namely Triggers for Sharing, Value of Photos, Place Affordances, Technology Affordances and Social Affordances (see Chapter 8); consisting of low-level components influencing the way the sharing takes place. The components from both levels were given unique symbols to identify which group they represent or belong to in order to simplify their representation (see table 9.1). This symbolic representation of high and low-level sharing components has been used to create a notation to represent the photo sharing scenarios that emerged from the data.

Sharing High-level Components	Sharing Low- level Components
(TS) Triggers for Sharing	TS1 = Pre-planned Trigger TS2 = Contextual Trigger TS3 = Ad Hoc Trigger
(VP) Values of Photo	VP1= Social Value VP2 = Personal Value VP3 = Temporal Value VP3.1 = Life span of photos VP3.2 = Share 'now' or 'later'
(PA) Place Affordances	PA1 = Private PA1.1 = Living Room PA1.2 = Kitchen PA1.3 = Study room PA1.4 = Garden PA1.5 = Bedroom PA1.6 = Bathroom PA2 = Public PA2.1 = Restaurant PA2.2 = Pub PA2.3 = Bar PA2.4 = Museum PA2.5 = Place of worship (church, temple) PA2.6 = Gallery PA3 = Work environment PA3.1 = Office PA3.2 = Public space (kitchen, corridors, focus area)
(SA) Social Affordances	SA1= Friends SA1.1 = Close Friends SA1.2 = Not Close Friends SA2 = Family SA2.1 = Parent⇒Child SA2.2 = Child⇒Parent SA2.3 = Partners SA2.4 = Distant Family SA3 = Others (acquaintances, colleagues or strangers) SA4 = Small group SA5 = Large group
(TA) Technology Affordances	TA1 = view photos on the phone screen TA2 = Bluetooth photos TA3 = infrared photos TA4 = MMS photos TA5 = transfer memory card

TABLE 9.1 THE SYMBOLIC REPRESENTATION OF HIGH AND LOW-LEVEL COMPONENTS OF PHOTO SHARING COMPONENTS MODEL

Similarly to high and low-level components' symbolic representation, (table 9.1) each of the sharing behaviours is given a unique symbol that will be used for representing different sharing scenarios at the later stage (table 9.2).

Category	Type of Sharing Behaviours
(SB) Sharing Behaviour	SB1 = pass the phone to a viewer SB2 = hold the phone SB3 = hold the phone in front of a viewer(s) and gather around the phone (one person in control) SB4 = pass the phone around the group of viewers (many people in control) SB5 = show one picture at the time SB6 = show the collection of photos SB7 = no sharing

TABLE 9.2 THE SYMBOLIC REPRESENTATION OF DIFFERENT SHARING BEHAVIOURS

As stated previously, each sharing scenario consists of a combination of low-level components from each high-level components group with the sharing behaviour outcome. These components are represented symbolically using corresponding values from the table 9.1 and 9.2. For each of the photo sharing scenarios the combination of low-level components can be different and is symbolically represented characterising a particular variation of low-level components within each given scenario. For instance: a particular combination of different Place Affordances such as living room (PA1.1), kitchen (PA1.2), study room (PA1.3), and a garden (PA1.4) is represented as PAA. The same applies to the representation of different Sharing Behaviour displayed in table 9.2. In order to be consistent with the symbolic representation of sharing components, where alphabetic values were used, Sharing Behaviours had been represented accordingly: 'pass the phone to a viewer' (SB1) is represented as SBA, 'hold the phone' (SB2) and 'show the collection of photos' (SB6) is represented as SBD. This kind of representation simplifies the complexity of representing the photo sharing scenarios. The full symbolic representation of sharing scenarios is included in the Appendix 6 (table A6.3).

The table 9.3 presents a set of emerging photo sharing scenarios that occur in co-located settings, using the symbolic representation of each variation of the low-level components which results in one or more sharing behaviours.

The additional column 'Frequency' provides information about how often participants of the Second and Third Study (16 participants) reported the occurrence of specific photo sharing scenarios. There are three values of 'Frequency': Frequently, Occasionally, and Rarely. 'Frequently' refers to the sharing situation that was discussed by more than 70% of participants;

‘Occasionally’ refers to the sharing situation that was discussed by 40 - 70% of participants; and ‘Rarely’ was reported by less than 40% of participants.

It can be suggested that the value of Frequency represents the situations that people experience during the photo sharing activity. The table 9.3 represents the sharing situations that people discussed during their interviews. However, there might be other situations that have not been included in the table. The reason for this is that the participants did not discuss those sharing scenarios and one can assume that they either did not experience them by their choice or they did not have the opportunity to share photos in those discussed scenarios.

Having identified emerging scenarios for photo sharing behaviour (table 9.3) they were compared manually and analysed taking into account the similarity and differences between each of the groups of scenario components. For some scenarios the Technology Affordances, Value of Photos and Triggers for Sharing are represented as ‘nil’, meaning there is no evidence in the data of these values.

A similar group of scenarios has been marked in the same colour for easier recognition.

No.	Social Affordances	Place Affordances	Technology Affordances	Value of Photos	Triggers for Sharing	Sharing Behaviour	Frequency
	SA	PA	TA	VP	TS	SB	F
1	SAA	PAA	TAA	VPA	TSA	SBA	F1
2	SAA	PAB	TAA	VPA	TSA	SBA	F1
3	SAA	PAA	TAB	VPA	TSA	SBA	F3
4	SAA	PAB	TAB	VPA	TSA	SBA	F3
5	SAB	PAA	TAA	VPB	TSB	SBA	F2
6	SAB	PAB	TAA	VPB	TSB	SBA	F1
7	SAA	PAC	TAA	VPA	TSA	SBA	F2
8	SAB	PAO	TAA	VPB	TSA	SBA	F2
9	SAC	PAE	TAA	VPA	TSA	SBA	F1
10	SAC	PAE	TAF	VPA	TSA	SBA	F3
11	SAC	PAB	TAA	VPA	TSA	SBA	F3
12	SAE	PAA	TAE	VPB	TSB	SBD	F3
13	SAD	PAA	TAE	VPB	TSB	SBB	F3
14	SAF	PAB	TAE	VPB	TSD	SBC	F2
15	SAF	PAF	TAE	VPB	TSD	SBC	F3
16	SAG	PAB	TAA	VPB	TSE	SBE	F1
17	SAM	PAB	TAA	VPB	TSE	SBG	F2
18	SAH	PAA	TAE	VPC	TSD	SBC	F3
19	SAN	PAG	NIL	NIL	NIL	SBH	F1
20	SAO	PAH	NIL	NIL	NIL	SBH	F1
21	SAD	PAH	NIL	NIL	NIL	SBH	F3
22	SAE	PAH	NIL	NIL	NIL	SBH	F3

TABLE 9.3 THE EMERGING PHOTO SHARING SCENARIOS (FOR FULL SYMBOLIC REPRESENTATION SEE APPENDIX 6, TABLE A6.3)

9.3. Sharing behaviour scenarios

Some of the presented scenarios are similar; they share the value of many components (e.g. Social Affordances, Place Affordances, Technology Affordances, Value of Photos, or Triggers for Sharing) and have the same sharing behaviour (e.g. 'pass the phone to a viewer', 'hold the phone in front of a viewer' or others as detailed in table 9.2). However, there are other situations where even with the same values of components the sharing behaviour differs. What is interesting here is that within presented sharing scenarios there are different key determinants that create a specific sharing behaviour. The next section discusses them in detail and provides an account for the similarities and differences between the groups of sharing scenarios. Each of the sharing groups of scenarios is represented in a form of notation that captures each of the sharing components and allows a straightforward way of discussing and comparing them.

In addition, these scenarios are represented graphically and use a colour scheme to illustrate the differences in the Frequency between scenario occurrences. The Frequency 'Frequently' is represented in red, 'Occasionally' in green, and 'Rarely' in blue. In some situations the comparing groups of scenarios share the same value of Frequency and in those cases the dotted line in the graph is introduced to differentiate between them.

Before discussing the similarities and differences between various sharing scenarios the next section provides the summary of the most common sharing practices reported by the participants.

9.3.1. Common sharing behaviours

The most common behaviours when sharing photos are: 'pass the phone to a viewer' (SBA), 'hold the phone in front of a viewer' (SBC), 'hold the phone in front of viewers and gather around' (SBE) (in the case of a small group of viewers, up to four) and 'pass the phone around a group of viewers' (SBG) (in the case of a large group of viewers, more then four). Each of these behaviours happen in a variety of situations and table 9.4 displays them in detail.

Social Affordances (SA)	Place Affordances (PA)	Technology Affordances (TA)	Value of Photos (VP)	Triggers for Sharing (TS)
Pass the phone to a viewer (SBA)				
SAA	PAA	TAA	VPA	TSA
Close friend	<u>Private environment:</u> Living room Kitchen Study room Garden PAB <u>Public environment:</u> Restaurant Pub Bar PAC <u>Work environment:</u> Office Kitchen Corridors Communal areas	View on the phone Bluetooth	Social Personal Temporal	Pre-planned Contextual Ad hoc
SAB	PAB	TAA	VPB	TSB
Not close friends	<u>Public environment:</u> Restaurant Pub Bar PAA <u>Private environment:</u> Living room Kitchen Study room Garden	View on the phone Bluetooth	Social Temporal	Pre-planned Contextual
SAC	PAE	TAA	VPA	TSA
Partners	<u>Private environment:</u> Living room Kitchen Study room Garden Bedroom	View on the phone Bluetooth	Social Personal Temporal	Pre-planned Contextual Ad hoc

Hold the phone in front of a viewer (SBC)				
SAH	PAA	TAE	VPC	TSD
Distant family	Private environment: Living room Kitchen Study room Garden	View on the phone	Social Temporal	Contextual
Hold the phone in front of viewers and gather around it (SBE)				
SAG	PAB	TAA	VPB	TSE
Close friends & small group	Public environment: Restaurant Pub Bar	View on the phone Bluetooth	Social Temporal	Contextual Ad hoc
Pass the phone around the group of viewers (SBG)				
SAM	PAB	TAA	VPB	TSE
Close friends & large group	Public environment: Restaurant Pub Bar	View on the phone Bluetooth	Social Temporal	Contextual Ad hoc

TABLE 9.4 SUMMARY OF THE MOST COMMON PHOTO SHARING BEHAVIOURS

The following sections explain in detail all instances of similarities and differences between sharing scenarios.

9.3.2. Sharing scenarios 1&2: Similarities between Social and Technology Affordances, Value of Photos, and Triggers for Sharing

For both groups of scenarios (table 9.5) the sharing behaviour is 'pass the phone to a viewer' (SBA), which was found to be the most frequently reported method by participants. It is determined by the relationship between people involved and in both scenarios it occurs between 'close friends' (SAA). The sharing is triggered by: pre-planning to share a particular photo with a particular friend, context of a conversation or an ad hoc sharing (TSA). People view their photos on the phone or transfer them using Bluetooth technology (TAA).

No	Social Affordances (SA)	Place Affordances (PA)	Technology Affordances (TA)	Value of Photos (VP)	Triggers for Sharing (TS)	Sharing Behaviour (SB)	Frequency (F)
1	SAA	PAA	TAA	VPA	TSA	SBA	F1
	Close friend	Private: Living room Kitchen Study room Garden	View on the phone Bluetooth	Social Personal Temporal	Pre-planned Contextual Ad hoc	Pass the phone to a viewer	Frequently
2	SAA	PAB	TAA	VPA	TSA	SBA	F1
	Close friend	Public: Restaurant Pub Bar	View on the phone Bluetooth	Social Personal Temporal	Pre-planned Contextual Ad hoc	Pass the phone to a viewer	Frequently

TABLE 9.5 GROUP OF SCENARIOS 1 & 2

The Value of Photos for both groups of scenarios is threefold: social, personal and temporal (VPA). The difference between scenario 1 & 2 is the place of sharing (Place Affordances); for group 1 scenarios PAA is a private environment (living room, kitchen, study room and garden) whereas for group 2 scenarios PAB is a public environment (restaurant, pub or bar). People reported feeling more at ease when sharing photos with close friends. Since the relationship is built on trust, people allow their friends to view freely whatever is stored on their phones (see section 7.4.2.1.2). In these scenarios, the most important component is the relationship between people; sharing photos with close friends can happen in different places (public and private) and it will not affect the way that sharing takes place. The Frequency of both scenario occurrences is 'Frequently' (F1).

The scenarios 1&2 can be represented in a graphical format (figure 9.1), which illustrate that within the set of conditions that produce SBA behaviour ('pass the phone to a viewer'), there are two possible scenarios that differ in the nature of the place affordances.

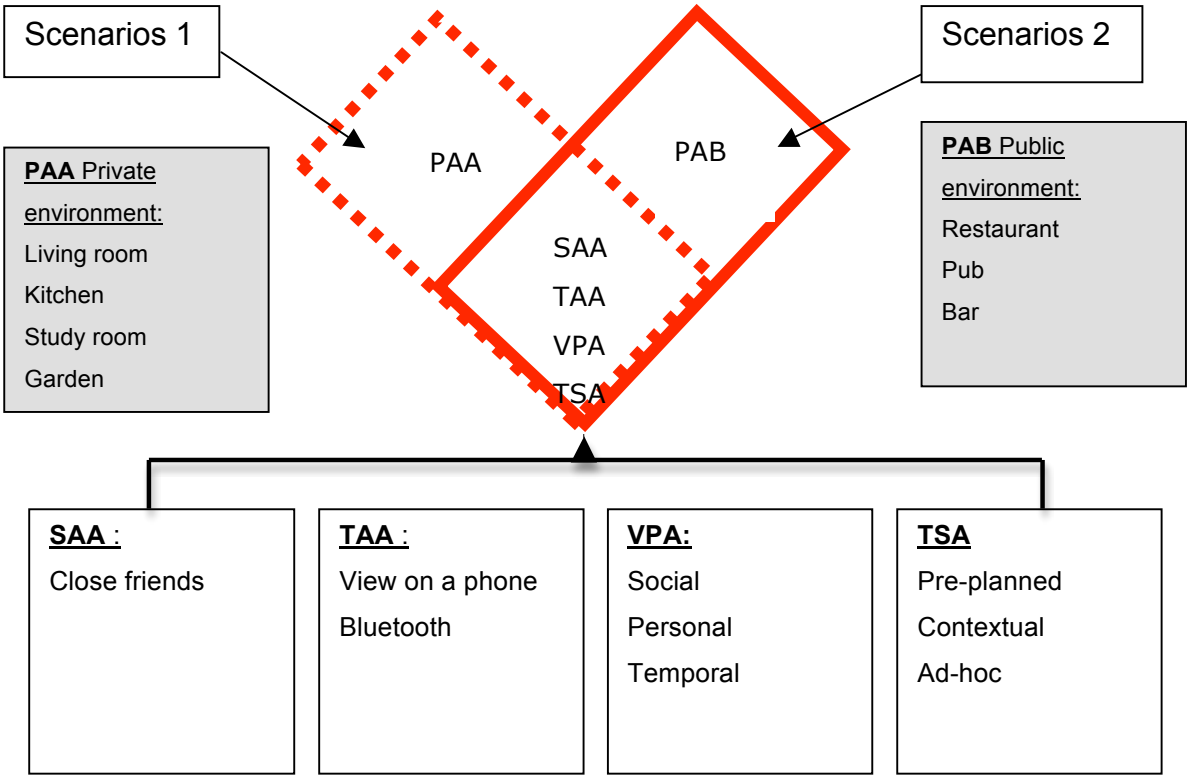

FIGURE 9.1 GROUP OF SCENARIOS 1 & 2

There are, however, situations where Place Affordances plays an important role as people take into consideration the norms and regulations that apply to the environment where the sharing takes place and behave accordingly (see section 9.3.3).

9.3.3. Sharing scenarios 3&4: similarities between Social and Technology Affordances, Value of Photos, and Triggers for Sharing

Another group of scenarios where Social Affordances play a key role in shaping the sharing behaviour is represented in table 9.6. In both scenarios (3&4) the value of Social Affordances, Value of Photos and Triggers for Sharing is the same. The difference between these groups lies in the Place and Technology Affordances.

In these scenarios the sharing happens between close friends (SAA), which involves transferring photos using infrared and MMS technology (TAB). Infrared ability is less frequently found on phones, or if it is available is difficult to use. On the other hand, using MMS technology the concern is the cost of the transfer. It was found that this technology was only used when it was absolutely necessary (e.g. the recipient did not have Bluetooth or infrared features). The Value of Photos are: social, personal, and temporal (VPA) and sharing is triggered by: pre-planning, contextual or ad-hoc triggers (TSA). The Frequency of both scenarios is 'Rarely' (F3).

No	Social Affordances (SA)	Place Affordances (PA)	Technology Affordances (TA)	Value of Photos (VP)	Triggers for Sharing (TS)	Sharing Behaviour (SB)	Frequency (F)
3	SAA	PAA	TAB	VPA	TSA	SBA	F3
	Close friend	Private: Living room Kitchen Study room Garden	Infrared MMS	Social Personal Temporal	Pre-planned Contextual Ad hoc	Pass the phone to a viewer	Rarely
4	SAA	PAB	TAB	VPA	TSA	SBA	F3
	Close friend	Public: Restaurant Pub Bar	Infrared MMS	Social Personal Temporal	Pre-planned Contextual Ad hoc	Pass the phone to a viewer	Rarely

TABLE 9.6 GROUP OF SCENARIOS 3 & 4

The diagram (figure 9.2) shows that for scenarios 3&4 there are two possible scenarios with the same sharing behaviour SBA ('pass the phone to a viewer) but they differ in the nature of the technology affordances.

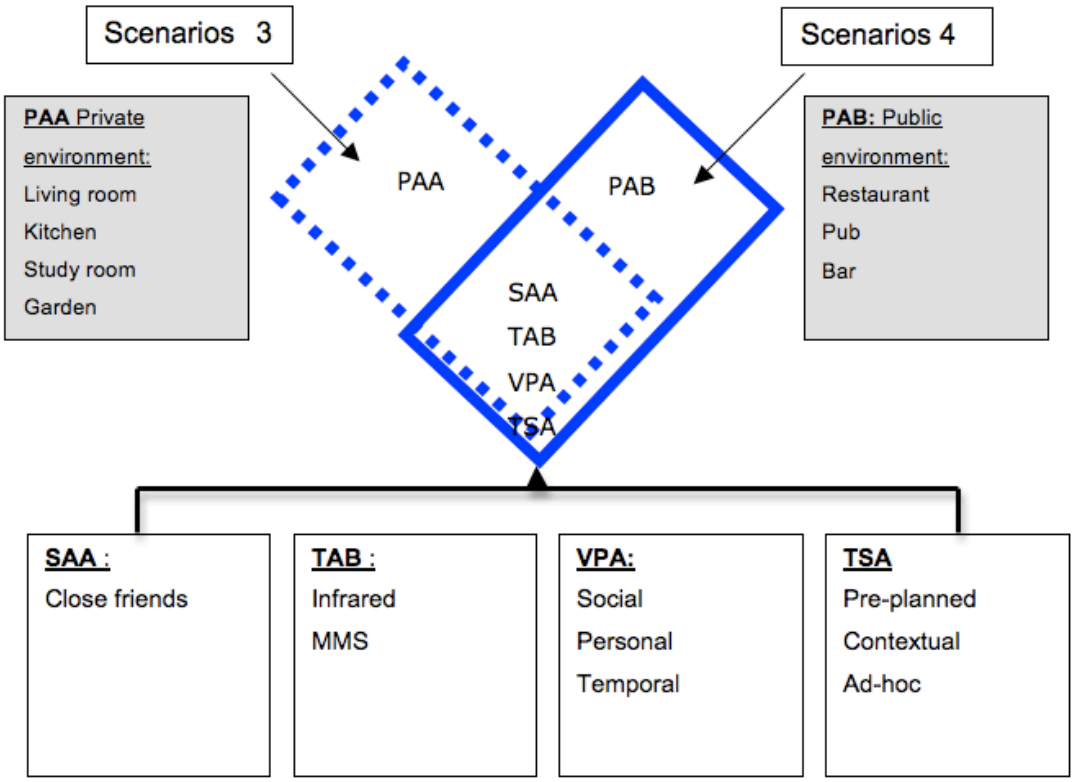

FIGURE 9.2 GROUP OF SCENARIOS 3 & 4

Similarly, to the group 1 and 2 scenarios (table 9.5), the key element is the relationship between people involved in sharing (Social Affordances); sharing with 'close friends' can not only happen in different places (public and private) but also people will employ different technologies such as infrared or MMS, even though it is sometimes difficult or uneconomical to use.

As stated in section 9.3.2 there are situations that Place Affordances is the key factor in the shaping of the sharing experience. The next section explores this issue further.

9.3.4. Sharing scenarios 5&6: similarities between Social and Technology Affordances, Value of Photos and the Triggers for Sharing

In the group of scenarios 5 and 6 (table 9.7), the sharing behaviour is 'pass the phone to a viewer' (SBA). People involved in sharing are 'not close friends'

(SAB) and their sharing activity is triggered by two factors: the need to share a specific photo with a particular friend (pre-planned) and the context of conversation (TSB). The photos are viewed on the screen or transferred between phones using Bluetooth technology (TAA). The Value of Photos for both groups of scenarios is social or temporal (VPB). What differs between them is the Place Affordances, which for group 5 is a private environment (living room, kitchen, study room and garden) (PAA) and for group 6, is a public environment (restaurant, pub or bar) (PAB). The reason being that people spend less time with their 'not close friends' in a home environment; they are less likely to be invited to people's home, which is generally open for family and 'close friends'. One might argue that sharing with 'not close friends' in a home environment is more opportunistic and it happens Occasionally due to their infrequent visits at home. However, people are likely to see 'not close friends' more often in public places (restaurants, bars or pubs) and share their photos as the occasion arises.

No	Social Affordances	Place Affordances (PA)	Technology Affordances (TA)	Value of Photos (VP)	Triggers for Sharing (TS)	Sharing Behaviour (SB)	Frequency (F)
5	SAB	PAA	TAA	VPB	TSB	SBA	F2
	Not close friend	Private: Living room Kitchen Study room Garden	View on the phone Bluetooth	Social Personal Temporal	Pre-planned Contextual	Pass the phone to a viewer	Occasionally
6	SAB	PAB	TAA	VPB	TSB	SBA	F1
	Not close friend	Public: Restaurant Pub Bar	View on the phone Bluetooth	Social Personal Temporal	Pre-planned Contextual	Pass the phone to a viewer	Frequently

TABLE 9.7 GROUP OF SCENARIOS 5 & 6

For group 5 scenarios participants occasionally reported (F2) this kind of sharing whereas for group 6 scenarios they frequently reported (F1) this kind of sharing.

The scenarios 5&6 can be represented in a graphical format (figure 9.3), which shows that within the set of conditions that produce SBA behaviour ('pass the phone to a viewer'), there are two possible scenarios that differ in the nature of the place affordances.

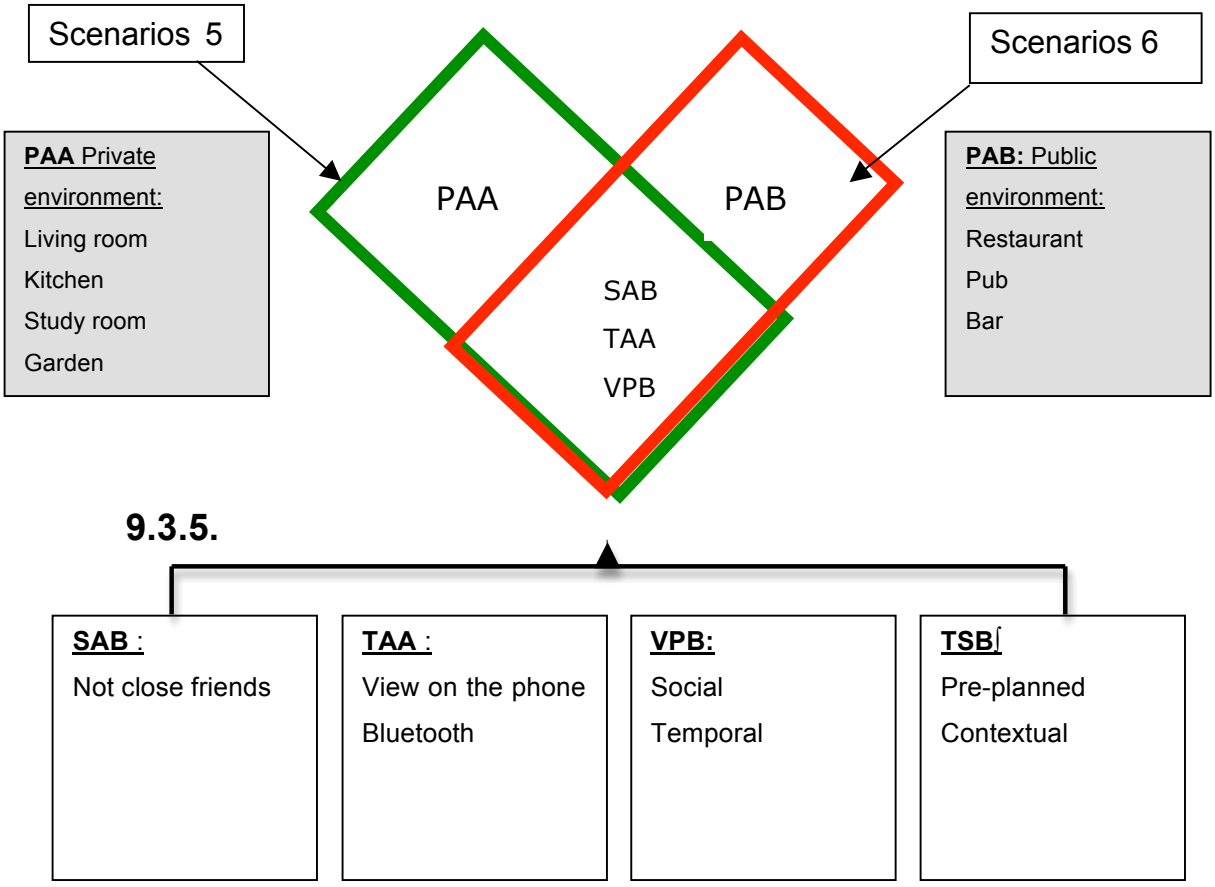

FIGURE 9.3 GROUP OF SCENARIOS 5 & 6

Again, it was found that Social Affordances is an important factor for shaping the sharing experience. Although, 'not close friends' visit people's homes only occasionally when they are together the sharing behaviour is similar to when 'close friends' are involved.

9.3.6. Sharing scenarios 7&8: differences between Social and Place Affordances and the Value of Photos

For groups 7 and 8 scenarios (table 9.8) the sharing behaviour is ‘pass the phone to a viewer’ (SBA).

For scenario 7, the sharing takes place between ‘close friends’ (SAA) whereas in the case of scenario 8, it is between ‘not close friends’ (SAB). In both groups, people use the phone screen or Bluetooth exchanging photos (TAA) and the sharing is triggered by three factors: the need to share a particular photo with a particular friend (pre-planned), the context of conversation or an ad-hoc sharing (TSA). However, the Value of Photos changes depending upon who the photos are shared with; in the case of ‘close friends’ (SAA) the value is social, personal and temporal (VPA) whereas in the case of ‘not close friends’ (SAB) the value is social and temporal (VPB).

In addition, the Place Affordances for discussed scenarios differ between groups: for scenario 7, sharing happens in the work environment (office or public spaces like kitchen, corridors or communal areas, (PAC)) whereas for scenario 8, where people involved in sharing are ‘not close friends’, the sharing is limited to the kitchen, corridors or communal areas within the work environment (PAO). Although sharing with friends (close and ‘not close friends’) occurs in a work environment people do it only occasionally and are more selective as to where they share their photos.

Participants occasionally reported (F2) the scenario 7 kind of sharing and rarely (F3) mentioned scenario 8 sharing.

No	Social Affordances (SA)	Place Affordances (PA)	Technology Affordances (TA)	Value of Photos (VP)	Triggers for Sharing (TS)	Sharing Behaviour (SB)	Frequency (F)
7	SAA	PAC	TAA	VPA	TSA	SBA	F2
	Close friend	Work: Office Kitchen Corridors Communal area	View on the phone Bluetooth	Social Personal Temporal	Pre-planned Contextual Ad hoc	Pass the phone to a viewer	Occasionally
8	SAB	PAO	TAA	VPB	TSA	SBA	F3
	Not close friend	Work: Kitchen Corridors Communal area	View on the phone Bluetooth	Social Temporal	Pre-planned Contextual Ad hoc	Pass the phone to a viewer	Rarely

TABLE 9.8 GROUP OF SCENARIOS 7 & 8

The scenarios 7&8 can be represented in a graphical format (figure 9.4) where for the same sharing behaviour SBA ('pass the phone to a viewer') there are two possible scenarios that differ in the nature of the place affordances, social affordances and the value of photos.

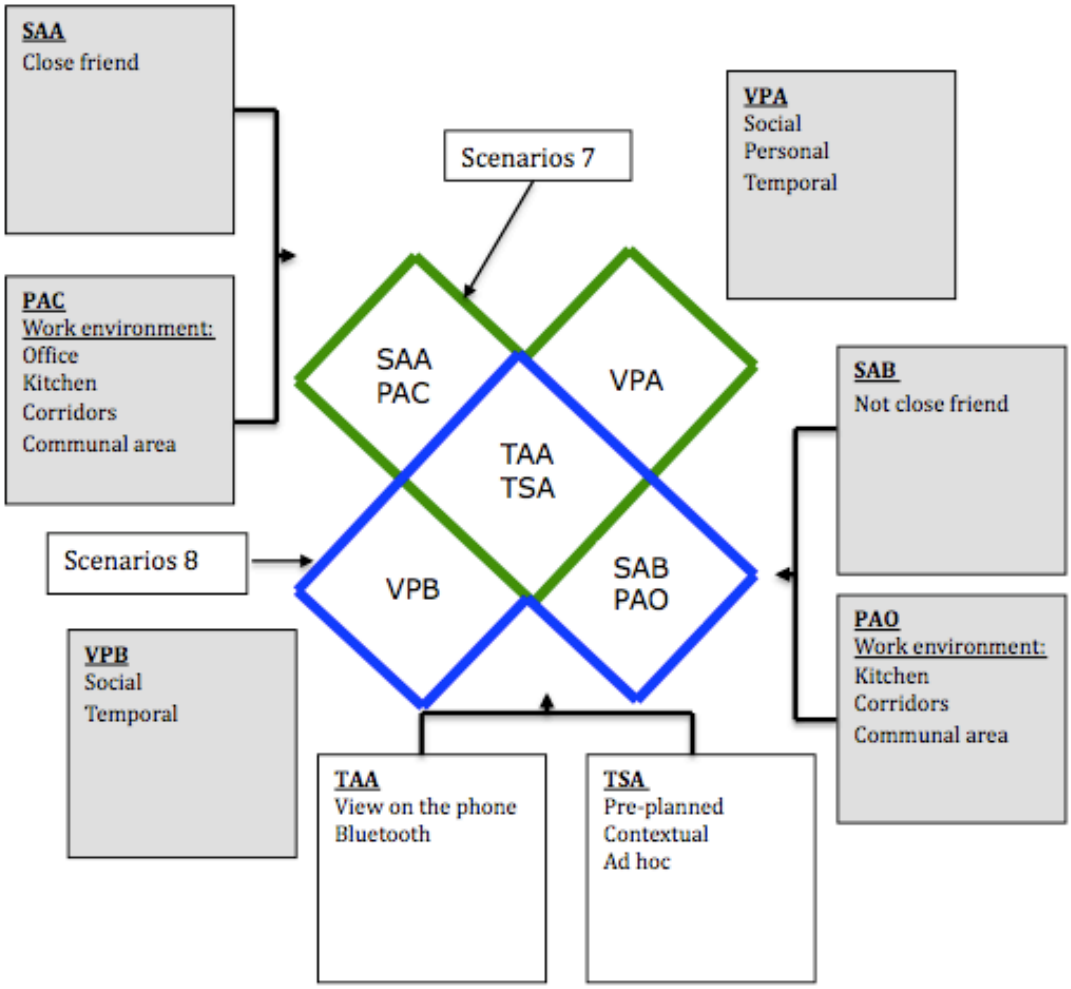

FIGURE 9.4 GROUP OF SCENARIOS 7 & 8

In such scenarios, the important element is the relationship between people (Social Affordances); sharing with 'close friends' who are also colleagues can happen in the work environment and will not affect their sharing behaviour; that is they will 'pass the phone to a viewer'. However, when the relationship between people involved is not very close (i.e. 'not close friends') people will restrict their behaviour when in an office and be more likely to follow the norms and regulations that apply to their work environment; which means no sharing in the office. Since sharing is fun and an enjoyable activity, it is not appropriate to a serious professional work environment. However, the data on this matter is limited and would require further studies.

9.3.7. Sharing scenarios 9-11: differences between Place and Technology Affordances

The outcome for all three groups of scenarios (table 9.9) is 'pass the phone to a viewer' (SBA). The sharing happens between partners (SAC) triggered by a pre-planning to share a particular photo taken with the partner in mind, the topic of a conversation or an ad-hoc sharing (TSA).

No	Social Affordances (SA)	Place Affordances (PA)	Technology Affordances (TA)	Value of Photos (VP)	Triggers for Sharing (TS)	Sharing Behaviour (SB)	Frequency (F)
9	SAC	PAE	TAA	VPA	TSA	SBA	F1
	Partners	<u>Private:</u> Living room Kitchen Study room Garden Bedroom	View on the phone Memory card	Social Personal Temporal	Pre-planned Contextual Ad hoc	Pass the phone to a viewer	Frequently
10	SAC	PAE	TAF	VPA	TSA	SBA	F3
	Partners	<u>Private:</u> Living room Kitchen Study room Garden Bedroom	View on the phone Memory card	Social Personal Temporal	Pre-planned Contextual Ad hoc	Pass the phone to a viewer	Rarely
11	SAC	PAB	TAA	VPA	TSA	SBA	F3
	Partners	<u>Public:</u> Restaurant Bar Pub	View on the phone Bluetooth	Social Personal Temporal	Pre-planned Contextual Ad hoc	Pass the phone to a viewer	Rarely

TABLE 9.9 GROUP OF SCENARIOS 9, 10 & 11

For group 9 and 10 scenarios the sharing occurs in a private environment (living room, kitchen, study room, garden and bedroom) (PAE) whereas in scenario 11 it takes place in a public environment (restaurants, bars or pubs) (PAB). The Value of Photos for all discussed groups is: social, personal and temporal (VPA). What differs between these groups is the Technology Affordances. In the case of scenarios 9 and 11 people view the photos on the camera phone screen or transfer them between phones using Bluetooth technology (TAA); while for scenario 10 partners swap the memory cards between phones and then view photos on the screen (TAF).

In the case of scenario 9, participants frequently (F1) reported its occurrence whereas in case of scenarios 10 and 11 they rarely (F3) talked about this kind of sharing.

The figure 9.5 shows that for the scenarios 9,10&11 where the sharing behaviour is SBA (‘pass the phone to a viewer’) the difference between them is in the nature of place and technology affordances.

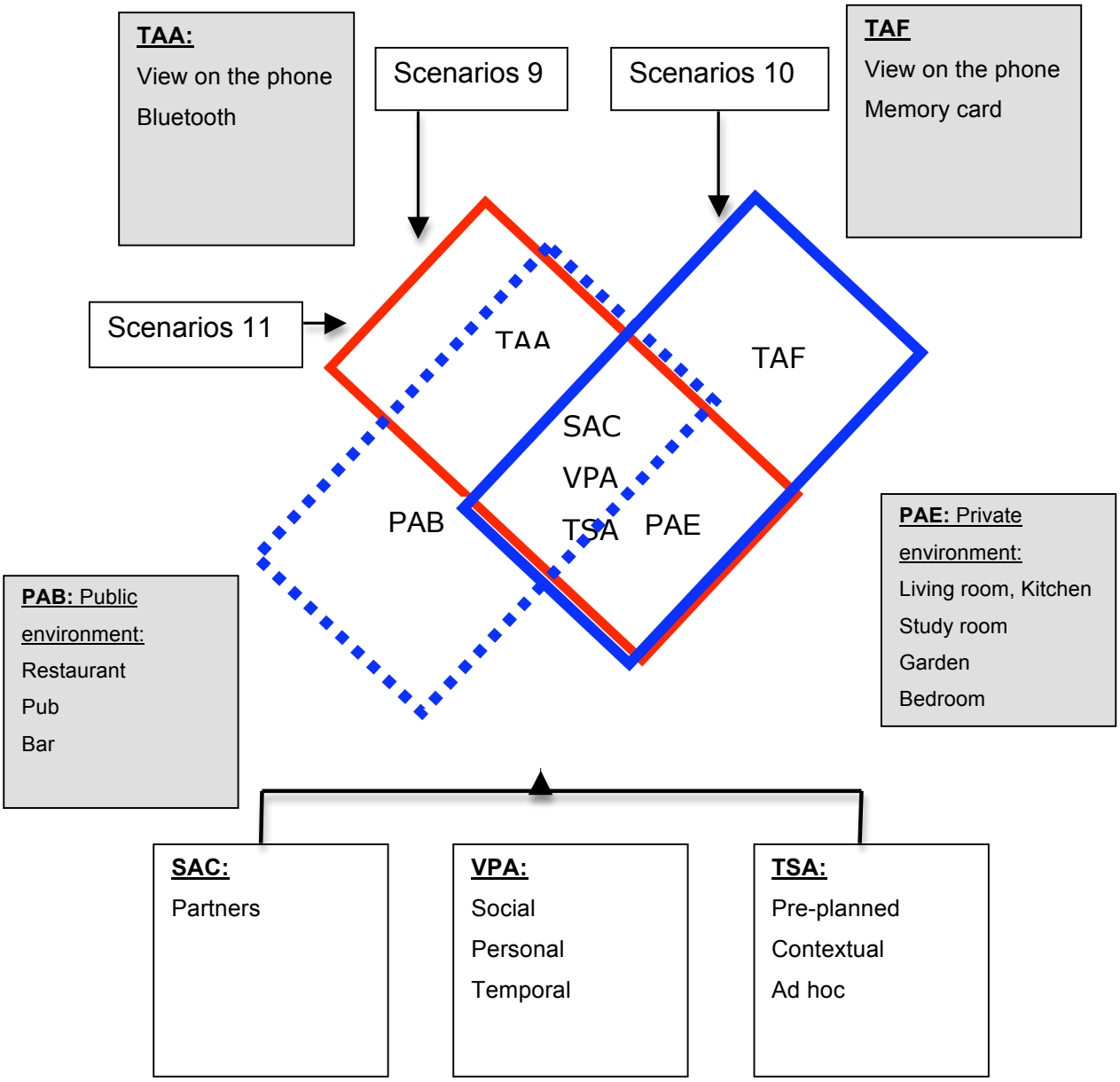

FIGURE 9. 5 GROUP OF SCENARIOS 9, 10 & 11

When sharing takes place between partners, the important factors are: the use of the attributes of technology and the place of sharing, which reflects on the frequency of scenario occurrences. When technology is concerned the more advanced uses depend on the level of expertise of using it as well as on the compatibility between camera phones. Since memory cards can only be used on compatible phones, it limits this kind of phone uses for sharing purposes (see section 7.4.2.1.1).

Where partners are concerned, the most common place to share photos is their home environment and the sharing in public places was mentioned rarely and only when they are out and want to share photos recently taken or they are on holiday and spending most of their time outdoors or in places such as restaurants, bars or pubs.

9.3.8. Sharing scenarios 12,13 & 18: differences between Social Affordances and Sharing Behaviours

For group 12 scenarios (table 9.10) the sharing happens between ‘parent and child’ (SAE) by ‘holding the phone in front of a viewer and showing the collection of photos’ (SBD) whereas in scenario 13 it occurs between ‘child and parent’ by ‘passing the phone to a viewer and showing one photo at the time’ (SBB). The photos with their assigned value to social or temporal (VPB) are viewed on the phone screen (TAE) and they are triggered by: pre-planned, contextual or ad-hoc triggers (TSA). The sharing for both scenarios (12&13), occur in a home environment such as kitchen, living room, study room or a garden (PAA).

No	Social Affordances (SA)	Place Affordances (PA)	Technology Affordances (TA)	Value of Photos (VP)	Triggers for Sharing (TS)	Sharing Behaviour (SB)	Frequency (F)
12	SAE	PAA	TAE	VPB	TSA	SBD	F3
	Parent & child	Private: Living room Kitchen Study room Garden Bedroom	View on the phone	Social Temporal	Pre-planned Contextual Ad hoc	Hold the phone in front of a viewer & show the whole collection	Rarely
13	SAD	PAA	TAE	VPB	TSA	SBB	F3
	Child & parent	Private: Living room Kitchen Study room Garden Bedroom	View on the phone	Social Temporal	Pre-planned Contextual Ad hoc	Pass the phone to a viewer & show one photo at the time	Rarely

TABLE 9.10 GROUP OF SCENARIOS 12 &13

The participants rarely (F3) discussed those sharing scenarios.

The scenarios 12&13 can be represented graphically (figure 9.6), which shows that in the case of sharing behaviour SBD ('hold the phone in front of a viewer and showing the whole collection') and SBB ('pass the phone to a viewer and showing one photo at a time') the difference between them lays in the nature of social affordances.

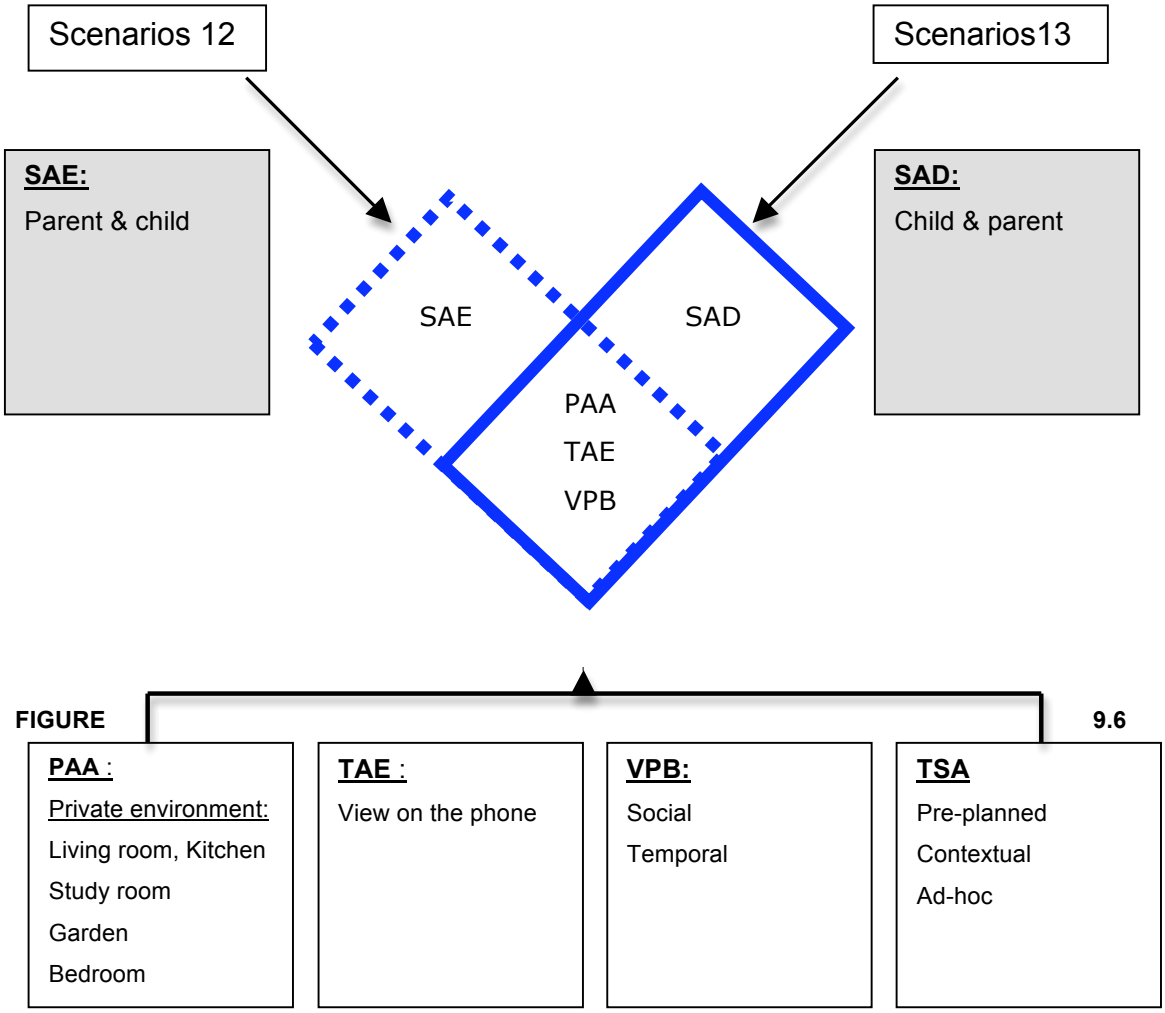

FIGURE 9.6

GROUP OF SCENARIOS 12 & 13

In these scenarios, the relationship between people involved (Social Affordances) is important and it determines the way of sharing and the content of photos shared (see section 7.4.2.1.1).

A similar situation with regard to the content of photos can be observed when sharing with 'distant family' (SAH) (see table 9.11 below).

The sharing can take place in the home environment (kitchen, living room, study room, or a garden) (PAA). Although people are quite happy to pass their phone (SBC), the photos shared are the ones that hold the social or share 'now' or 'later' value (VPC) and are triggered by the context of a conversation TSD.

No	Social Affordances (SA)	Place Affordances (PA)	Technology Affordances (TA)	Value of Photos (VP)	Triggers for Sharing (TS)	Sharing Behaviour (SB)	Frequency (F)
18	SAH	PAA	TAE	VPC	TSD	SBC	F3
	Distant family	Private: Living room Kitchen Study room Garden	View on the phone Bluetooth	Social Temporal	Contextual	Pass the phone to a viewer	Rarely

TABLE 9.11 GROUP OF SCENARIOS 18

However, this scenario was rarely (F3) mentioned and further study could reveal more information about it.

9.3.9. Sharing scenarios 16&17: differences between Social Affordances and Sharing Behaviour

In this case the sharing behaviour changes depending on the size of the group (table 9.12). For scenario 16, the sharing happens between a small group of 'close friends' (SAG) in a public environment (restaurants, pubs or bars) (PAB). People gather around the phone while one person holds it (SBE); participants frequently (F1) reported this scenario. However, in the same public environment, if the group of 'close friends' is large (SAM), the sharing takes a different format; the phone is passed around the group of viewers (SBG). This group of scenario (17) was occasionally discussed by participants (F2). For both groups of scenarios the Value of Photos is social and temporal (VPB) with the Triggers for Sharing being contextual or ad-hoc (TSE).

No	Social Affordances (SA)	Place Affordances (PA)	Technology Affordances (TA)	Value of Photos (VP)	Triggers for Sharing (TS)	Sharing Behaviour (SB)	Frequency (F)
16	SAG	PAB	TAA	VPB	TSE	SBE	F1
	Close friends & small group	Public: Restaurant Pub Bar	View on the phone	Social Temporal	Contextual Ad hoc	Hold the phone in front of a viewer (s) & gather around the phone	Frequently
17	SAM	PAB	TAA	VPB	TSE	SBG	F2
	Close friends & large group	Public: Restaurant Pub Bar	View on the phone	Social Temporal	Contextual Ad hoc	Pass the phone around a group of viewers	Occasionally

TABLE 9.12 GROUP OF SCENARIOS 16 & 17

The figure 9.7 represents the scenarios 16&17 for two different sharing behaviours; SBE ('hold the phone in front of viewers and gather around it') and SBG ('pass the phone around the group of viewers'). The difference between these scenarios is in the nature of social affordances.

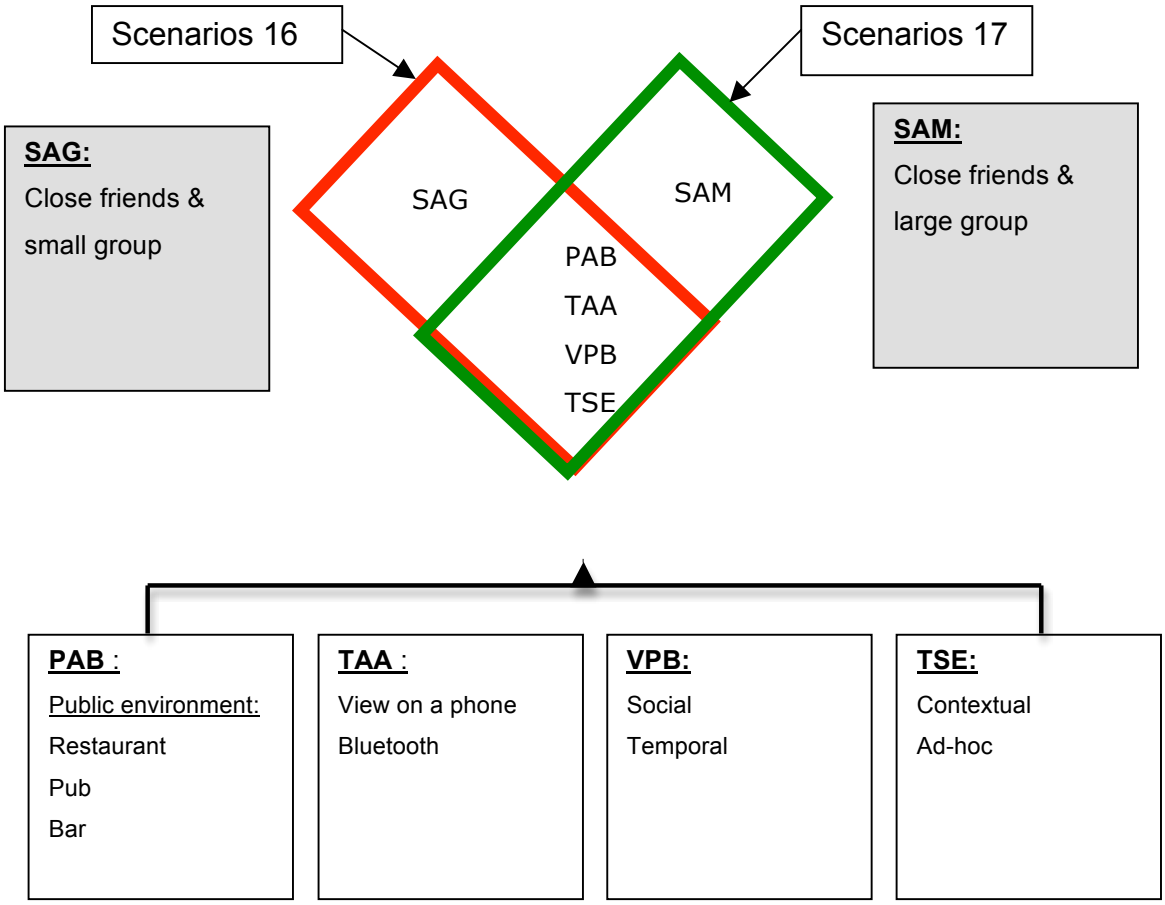

FIGURE 9.7 GROUP OF SCENARIOS 16 &17

Even though in both discussed groups the sharing is between 'close friends' people are still reluctant to have their private photos shown in public places to a group. They prefer to do this on a one-to-one basis or in a home environment where the level of privacy is higher and they do not need to be concerned about other people looking at their private photos (see section 7.4.2.1.2).

In those scenarios, the most important element is the size of the group, which determines how the photos are shared. As camera phones have small screens viewing by many at a time is not possible or at least difficult (see section 7.4.2.1.4). When the sharing occurs between 'close friends' people are willing to pass the phone around the group and allow everyone to view the photos and Bluetooth them if requested.

9.3.10. Sharing scenarios 14&15: differences between Place Affordances

The sharing behaviour in this case is 'hold the phone in front of a viewer' (SBC) (table 9.13). People involved are 'others', which include acquaintances, colleagues or strangers (SAF) and they view the photos on the phone screen (TAE). The Value of Photos is social or temporal (VPB) and the sharing is triggered by the context of a conversation (TSD).

What differs in both groups is the place of sharing; in the case of scenario 14, it occurs in a public environment (PAB) (restaurants, bars, or pubs) whereas in scenario 15, it takes place in public spaces within a work environment (PAF) (kitchen, corridors or communal area). Since the sharing is between people who do not have much attachment to each other they are reluctant to share photos especially in a work environment where sharing is not appropriate (following the norms and regulations that apply to a work environment) (see section 7.4.2.2.3), which reflects on the rarity of these scenario occurrences (F3). Although there are occasions that people share their photos with 'others' in a public environment during formal gatherings, this kind of situation was only reported occasionally (F2).

No	Social Affordances (SA)	Place Affordances (PA)	Technology Affordances (TA)	Value of Photos (VP)	Triggers for Sharing (TS)	Sharing Behaviour (SB)	Frequency (F)
14	SAF	PAB	TAE	VPB	TSD	SBC	F2
	Others: Acquaintance Colleague Stranger	<u>Public:</u> Restaurant Pub Bar	View on the phone	Social Temporal	Contextual	Hold the phone in front of a viewer	Occasionally
15	SAF	PAF	TAE	VPB	TSD	SBC	F3
	Others: Acquaintance Colleague Stranger	<u>Work:</u> Kitchen Corridor Communal area	View on the phone	Social Temporal	Contextual	Hold the phone in front of a viewer	Rarely

TABLE 9.13 GROUP OF SCENARIOS 14 & 15

The scenarios 14&15 can be represented graphically (figure 9.8). It shows that for the sharing behaviour SBC ('hold the phone in front of a viewer') these scenarios differ in the nature of place affordances.

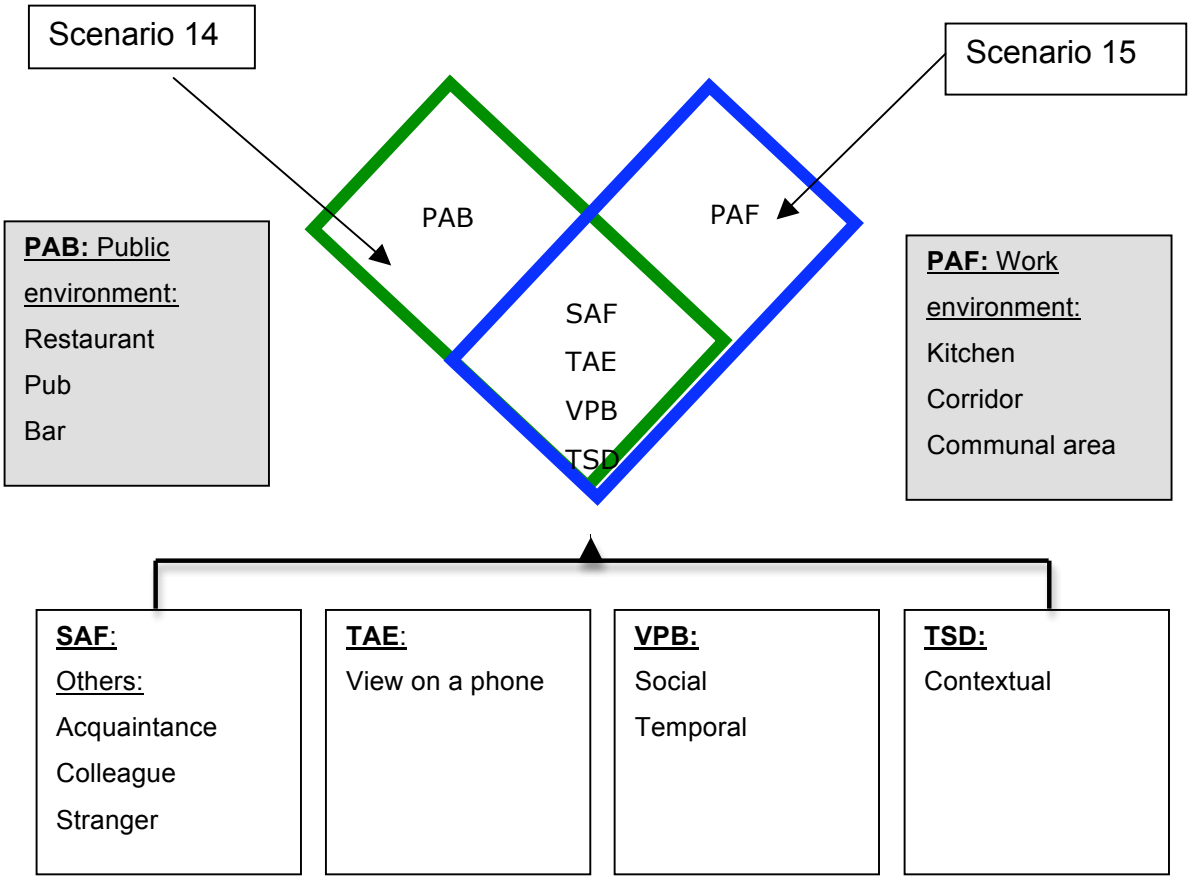

FIGURE 9.8 GROUP OF SCENARIOS 14 & 15

An important element in these scenarios is the relationship between people (Social Affordances), which will affect the way they share photos. People are not eager to show their photos to 'others' unless a situation arises that provokes it regardless of if it happens in the public or work environment. When 'others' are concerned the lack of trust between the owner of the photo and viewer is illustrated by the way they hold the phone in front of them.

9.3.11. Sharing scenarios 19-22: absence of sharing

In this case, the similarities between the groups of scenarios (table 9.14) lay within the Sharing Behaviour, which means 'no sharing'.

Unlike previously discussed scenarios, here the important determinant of sharing is the Place Affordances. The data illustrates that in places such as museums or galleries where visiting is usually a planned event people tend to take pictures on their digital cameras simply to obtain a higher quality of photos, hence camera phones are not usually used (see section 6.4.1.1). Moreover, people follow the norms and regulations that apply to those places where sharing is less or not appropriate (e.g. work environment, museums, galleries, churches, temples or private space within a home environment (e.g. bathrooms) (see section 7.4.2.2.1.1). The table 9.5 represents the group of sharing scenarios where participants reported the absence of sharing. The 'nil' value for Technology Affordances, Value of Photos and Triggers for Sharing means that participants did not provide any data to discuss the value of those components.

No	Social Affordances (SA)	Place Affordances (PA)	Technology Affordances (TA)	Value of Photos (VP)	Triggers for Sharing (TS)	Sharing Behaviour (SB)	Frequency (F)
19	SAN	PAG	NIL	NIL	NIL	SBH	F1
	Friends Family Others	<u>Public:</u> Museums Galleries Places of warships	No data	No data	No data	No sharing	Frequently
20	SAO	PAH	NIL	NIL	NIL	SBH	F1
	Friends Family	<u>Private:</u> Bathrooms	No data	No data	No data	No sharing	Frequently
21	SAD	PAJ	NIL	NIL	NIL	SBH	F3
	Child & parent	<u>Private:</u> Bedroom	No data	No data	No data	No sharing	Rarely
22	SAE	PAJ	NIL	NIL	NIL	SBH	F3
	Parent & child	Private: Bedroom	No data	No data	No data	No sharing	Rarely

TABLE 9.14 GROUPS OF SCENARIOS FOR 'ABSENCE OF SHARING'

In the group 19 scenarios, it was frequently reported (F1) that in public places such as museums, galleries, or places of worships (PAG) participants did not share photos with friends, members of family, or others (e.g. acquaintances, colleagues or strangers) (SAN) (see section 6.4.1.1).

In the case of museums and galleries people reported not to share photos because their purpose was to explore the exhibits and view the art, sharing was not a part of the experience whereas in the case of a place of worship sharing was thought of as inappropriate behaviour, which could offend people.

In the group 20 scenarios, it was found that in private spaces in a home environment such as bathrooms (PAH) participants frequently reported the absence of sharing (FR1) between friends or family (SAO) (see section 7.4.2.2.2).

In addition, the study revealed that in other 'private spaces' in a home environment such as bedroom (PAJ) the sharing between parent/child (SAE), or child/parent (SAD) does not take place as this place is reserved for parents' sharing activity. These are represented in scenarios 21 and 22 accordingly.

However, there is little evidence in the data to support the absence of sharing in different situations and future research is needed to explore these issues further.

9.4. Summary

When discussing the photo sharing scenarios there are five components that create situations for sharing. These are Triggers for Sharing, Value of Photos Place Affordances, Technology Affordances and Social Affordances. A combination of these components creates a situation with various sharing behaviour outcomes such as 'holding the phone in front of a viewer(s)', 'passing the phone to a viewer(s), 'holding the phone and showing the whole collection of photos', or 'passing the photo to a viewer and showing one photo at the time'.

These sharing situations emerged from the data and were developed applying the Photo Sharing Components Model presented in Chapter 8. The sharing scenarios discussed in this chapter are the results of the Grounded Theory

being used to analyse the data and since this methodology helped in building a theory, not testing it, the credibility of the photo sharing scenarios is very high and linked directly to information provided by the participants of this study.

There are situations that sharing changes its format depending on: the relationship between people involved, the place, or the content of shared photos. In some places sharing will not happen either because the opportunity for sharing has not arisen or the place where sharing might occur is such that sharing is not appropriate following the norms and regulations that are commonly accepted.

In the discussed scenarios different components played a key role in determining how, where, who with, why, and when photos are shared.

The important factor in deciding when the photos are shared and with whom, is the Value of Photos, which is assigned by the individuals and has an impact on the way that photos are shared.

Another factor is the relationship between the people involved (Social Affordances). The stronger the relationship, the less it matters where it takes place. Where ‘close friends’ are concerned, sharing happens in different places: private, public or even the work environment and it does not have an effect on the way sharing occurs. The content of photos can be of a private nature, which can strengthen the relationship, which is unlikely when sharing with ‘not close friends’, ‘distant family’, children, or ‘others’. The sharing can happen on the phone screen or by transferring photos using Bluetooth, infrared, or MMS technology. The same sharing is typical when ‘partners’ are concerned, however, the difference is the place of sharing. Partners often share photos in a home environment since that is the prime location for meeting each other, including the bedroom, which is a ‘private space’ allocated just for them.

However, there are situations where Place Affordances are the key factors in sharing. This applies to public places (i.e. museums, galleries), or places of worships (i.e. churches or temples) where people do not engage in sharing activity due to commonly accepted and followed norms and regulations, which

certainly in the case of places of worship would be considered irreverent and unacceptable.

Although the table 9.1 represents various scenarios of photo sharing, undoubtedly the list is not completed. There are other situations that have not been discussed but could take place. For instance, places that people usually congregate such as parks, where sport events happen, shopping centres or other public places such as concert halls, theatres, hotels, streets; public transports (buses, trains, plains, boats) and many more. However, the discussed scenarios emerged from the data gathered and represent the most usual and popular sharing scenarios that the participants of this study had experienced.

Chapter 10. Discussion

10.1. Introduction

Chapters 2 and 5 of this thesis provided a review of literature on User Experience and Social Practices of Photo Sharing, which was intended to provide a perspective within which to locate the research questions and theoretical approach adopted in this thesis.

This chapter summarises the research that has been reported here with references to the research questions that were set out in Chapter 1. In addition, it reviews how the research has addressed those questions, outlines the contributions that have been made and discuses the photo sharing and user experience issues discovered during the study. It considers limitations of the work and discusses how future work might build on what has been reported.

10.2. Revisiting the research questions

The aim of this study was to answer the question: how people share photos in co-located settings using camera phones and what influences their sharing experience. These central research questions have four associated questions, which this section revisits.

10.2.1. Nature of hedonic experience: Research Question 1

The first Research Question was:

What is the nature of people's hedonic experience (i.e. pleasurable and similar experiences) and what factors influence these experiences?

The aim of this question was to establish how people perceive, understand and describe hedonic experience in the context of mobile interactive technology (digital cameras, PDA's, mobile phones) and what influences such experience.

Chapter 4 began to address research question 1 through a study in which participants were asked to describe any instances of hedonic experience (HE)

when using different mobile interactive technology and the feelings that they experienced as well as discuss what made their experience hedonic. The goal of the study was to acquire a better understanding of what it means to have hedonic experience, what factors contribute to it, providing vocabulary that can be commonly used for describing and communicating HE as well as identifying areas of focus for the subsequent study (i.e. theoretical sampling, Strauss & Corbin, 1990).

Semi-structured in depth interviews and focus groups were analysed for description and understanding of hedonic experience and what factors contributed to it. The analysis revealed various types of hedonic experience in the context of technology: pleasure, excitement, fun, and happiness. In relation to what influenced the experience, four factors were identified; these were functionality provided by technology used, the usability and functionality which are delivered, the interaction/social element in which use takes place, the element of *appealingness* to its users and the *novelty* of the device or its features.

From the study it was observed that one of the popular technologies used for social interaction was the mobile phone. The findings revealed that the social element plays a significant part of user experience with technology, which is linked to the functionality that supports social interaction. It was also found that the same features of technology could evoke different experiences when used for social interaction in co-located settings. Consequently, these issues were taken forward into the subsequent study (i.e. the Second Study: Use of camera phones for social interaction).

10.2.2. Social uses of camera phones: Research Question 2

The second Research Question was:

How does mobile interactive technology (e.g. camera phones) and context of use influence users' experience?

Chapter 6 contributed to this question and reported the Second Study in which camera phone users were interviewed about their experiences when using camera phones for social interaction in co-located settings. Participants were asked to describe their uses of camera phones in different places and talk about their experiences during the time of photo sharing. In addition, they discussed purposes and motivations behind using camera phones in different settings as well as different means of sharing photos or videos. This method obtained insights of people's feelings, experiences and practices when sharing photos and was used to confirm and support data collected during the observational study.

A field observational study was conducted to observe people's uses of camera phones in a variety of public places such as pubs, restaurants, leisure and entertainment places in London (e.g. Covent Gardens, Kenwood Park, Comedy Store), museums (Natural History Museum and Science Museum) as well as public transport (tube and buses). Using this methodology allowed the gathering of information about people's uses of camera phones, people involved, the activities they performed, and places where it happened.

The goal of the study was to obtain insights into the ways people use camera phones as a medium for social practices that occur in co-located settings as well as to gain a broader understanding of the circumstances and contexts in which social practices take place.

Semi-structured in depth interviews with 'photo probes' and field observational study were analysed for social practices using camera phone in different places. The analysis revealed that camera phones provide a new medium through which people carry out they social interaction through taking and sharing photos or videos. Some phenomena identified in the study were in line with Okabe's (2004) and Scifo's (2004) findings and demonstrated that social activities are inseparable from social relations and context.

It emerged from the data that people use their camera phones for photo sharing purposes in some public places (e.g. restaurants, pubs, or bars) whereas in others such as museums, galleries or public transport (buses and tubes) they do not. This was observed during the field study and then confirmed during the

interviews, which strengthened its validity. During the field study it was observed that the common places for sharing photos are places where people gather to eat, drink and socialise such as restaurants, pubs or bars. Also, it was observed that 'no sharing' happened in places such as museums or public transport. This was confirmed by participants during the interviews when asked about the places where they share and places where they do not share camera phone photos. In the case of restaurants, pubs or bars it was found that these places are 'social places' and promote social interaction. In museums and galleries people tend to use digital cameras to obtain higher quality pictures and sharing happens mostly afterwards. The data revealed that in public transport places (buses or tubes) people are more inclined to use their camera phone for individual reasons (e.g. reading and answering text messages, playing games, viewing and sorting out photos, playing music) to overcome the feeling of boredom or simply to 'kill time' during their journey.

Three groups of people were identified that influence the sharing activity: friends, family or strangers. The analysis also revealed that the time of photo sharing played an important role and this is linked to the motivation and purpose of sharing. People share photos at the time of taking them to augment the event as it happens with those who are present or at the later time in order to evoke or recreate an event or scene after the fact. The latter involves sharing with other people who were absent at the time of events, or creating and sharing a documentary of a friendship or family life. Another phenomenon identified in this study was that camera phones were used as a new channel and medium for initiating social interaction with strangers.

In addition, four social implications that influence sharing experience were recognized: privacy, trust, social agreement, and control over the phone. Although people perceive sharing as a fun and enjoyable experience it can only be sustained if the privacy of photos is protected, the trust between people involved is present and all involved parties share social common ground.

The data from this study also revealed that people use different means of sharing photos. These are: the phone screen or transferring photos across phones via Bluetooth, infrared or MMS technology. Even though these ways of

sharing are commonly used it appeared that sharing can be hindered or be impossible due to different barriers. These barriers can be grouped into three categories: usability, technical, and cost related barriers.

It was concluded that the relationship between people plays an important role when sharing is concerned but the sharing takes it a different format when occurs in different places. These were taken forward into the next study (i.e. the Third Study), which focused on the role of place where social interaction takes place while sharing photos on camera phones.

10.2.3. Photo sharing behaviour in co-located settings: Research Question 3

The third Research Question was:

How can mobile interactive technology (e.g. camera phones) mediate social interaction in co-located settings?

Chapter 6 contributed to some extent to research question 3 by providing a better understanding of people's social uses of camera phones in different places, which created a ground/foundation for the Third Study that examined how different places afford the photo sharing activity. In addition, the broader understanding of affordances of camera phones and social affordances, which shape the experience of sharing, were investigated as well as what makes the sharing experience on camera phones different from digital cameras.

In Chapter 7, the findings from the Third Study were reported, in which camera phone users were asked to share their photos taken at different places and talk about the circumstances for taking them and provide the characteristics of those places. The study was conducted in the light of Ciolfi's concept of place (Ciolfi et al. 2005). Some phenomena identified in the study demonstrated that people adapt different attributes of place to facilitate sharing activity, which changes depending who the photos are shared with. The participants commented that the physicality, structure, functionality as well as norms and regulations assigned to a specific place where sharing occurs and the relationship between people involved shape the photo sharing experience. This corresponded

broadly with Ciolfi's et al. (ibid) concept of place situated within humanistic geography, which highlighted different dimensions of human experience of place. It was concluded that Ciolfi's et al. (2005) notion of place provided a useful perspective from which to understand the findings from the Third Study.

However, the behaviour observed during the study contradicts the finding of Steinzor (1950) and Kalma (1992). The former claims that in circular discussion groups of ten people it is more likely that conversation will take place with those opposite them than those next to them because people in view are a stronger expressive stimulus. The latter suggests that the ease of passing the floor to someone in clear view may also have played a role in the dynamics of a conversation. The data from this study, however, shows that people tended to share photos with those next to them, especially when with a larger group of people, rather then those opposite (see section 7.4.2.1.4). People claimed that it is easier and more intimate to tell a story about a photo to those in close proximity; this enables the sharing to take place and also enriches their sharing behaviour.

The analysis also revealed that the photo sharing could be activated by different triggers, which determine who a photo is shared with. These triggers are: pre-planned, contextual and ad-hoc. However, before any photo can be shared people assign a value to it and decide when, who with and how long is it going to be kept in the photo collection. These values are: social, personal and temporal. It was observed that people shared their photos of personal value only with close friends and partners whereas social value photos were shared with a wider range of people (e.g. friends, family or acquaintances).

The study also demonstrated that there are three differences in sharing experience between camera phones and digital cameras: the portability and accessibility of camera phones, the immediacy of sharing, and the immediacy of transferring photos via Bluetooth, infrared or MMS technology, which confirm that the affordances of camera phones better support co-located sharing than digital cameras. It was concluded that the mobility of camera phones allows not only the instantaneous sharing and transfer of photos but also changes the way people use camera phones for social interaction.

Finally, four design issues were drawn from the study that might be used to improve the design of camera phones or other technologies supporting photo sharing: providing a level of privacy attached to a private against a public photo, supporting the transfer of photos to multiple users simultaneously, providing tagging, annotating and organising photos in separate folders, and supporting a bigger surface display to facilitate a large group sharing.

The point of departure for Chapter 8 was to summarise the results from all three studies in the form of a of Photo Sharing Components Model (see Figure 8.1) framed within camera phones used in a leisure (non-work related) context and also a translation of these findings into a theoretical formulation. This model forms an important contribution of this thesis. It extends beyond the traditional scope of user experience models, which focus on the experience of individuals whereas significantly this model introduces groups of people as well as the concept of place and space and different dimensions within which sharing activities are placed. It discusses the key elements for photo sharing experiences and what influences them. Also, whist being firmly grounded within the specifics of camera phones sharing, the components and the relationships between them have potential to be generalised beyond this and tested with other technologies supporting photo sharing. Testing the more general applicability of the model at this level of description represents an opportunity for future work.

The model emerged from the data and might be viewed as representative for discussing the photo sharing experience using camera phones in co-located settings. It provides a useful perspective for describing and communicating photo sharing behaviour taking into consideration different contexts. The social context relates to the relationship between people; the place context relates to different attributes of place that promote or hinder sharing; the technology context relates to attributes of technology that support co-located practices. In addition, it offers an effective narrative for different sharing scenarios.

However, some of the contexts might not account for all sharing situations. When the context of place is considered there might be places other than those discussed in this thesis that sharing occurs (e.g. public transport, shopping

areas, public waiting areas). Moreover, technology used for sharing has been limited to camera phones and the social context covers the most typical types of relationships between people within the professional adult population.

Testing the model within different technology supporting photo sharing in co-located and remote settings within a different user group population provides opportunity for future work examining the more general applicability of the model.

In Chapter 9, the components of the model were used to create the photo sharing scenarios that were represented in a form of graphical notation. The photo sharing notation offered situated explanatory scenarios for discussing different sharing behaviour ('hold the phone in front of a viewer', 'pass the phone to a viewer', 'hold a phone in front of a viewer(s) and gather around it', 'pass a phone around a group of viewers', or 'hold the phone in front of a viewer and show one photo at a time'), the relationship between different components of the sharing scenarios and the sharing behaviour outcomes.

Chapter 9 also identified and explored the similarities and differences existing between different groups of sharing scenarios, within which the key components were discussed that are important for a specific sharing behaviour to take place. In some scenarios the predominant element was Social Affordances (e.g. sharing with 'close friends' or 'number of people sharing') that dictated the way that sharing occurred whereas in others Place Affordances was a determinant factor (e.g. sharing in places of worship or work environment) for sharing to occur or not to occur.

10.3. Discussion on photo sharing and user experience

The focus of this thesis has been on the relationship between the photo sharing and the user experience that occurs during the sharing activities. Where co-located camera phones' photo sharing is concerned it is important to understand what factors shape the photo experience and what is the relationship between them.

It has been claimed that sharing photos is an integral part of social interaction, which evokes different positive experiences such as pleasure, joy, excitement or fun. Such experience depends on the content of a photo and whom it is shared with. Sharing not only photos but also the experiences that they evoke, people develop 'social bonding', which is an essential part of the whole sharing experience.

The study reported here discusses sharing experiences (e.g. pleasure, joy, excitement or fun) as a part of people's photo sharing. People feel excited when sharing photos and telling stories about events, trips or holidays. These stories can be funny or they can just bring memories associated with the event; all depending on the content of the photo.

Storytelling with photos was discussed by many researchers such as Balanovic et al. (2000), Frohlich et al. (2002) and Frohlich (2004). According to Frohlich (2004) the importance lay in the different classes of participants in photo sharing to the ensuing talk. He argues that reminiscing takes place between people who share the memory of an image, whereas storytelling takes place when at least one person does not share the memory. It is possible to have a mixture of both when several people do and several do not share the memories of an event captured on a photo.

These activities are often inspired by enjoyable or fun experiences when sharing photos especially if their content is of a funny nature. However, fun can also be triggered by a story behind the photo where people involved share their experience, feelings and emotions.

A different view to Frohlich's (2004) was presented by Kindberg et al. (2005a) when discussing a six-part taxonomy, which is based on functionality of sharing using the camera phone images. However, this thesis goes beyond this and claims that people want to have fun and a 'good laugh'. They want to enjoy sharing photos and feel excited while doing it. In some situations (e.g. ad-hoc sharing, refer to 7.4.1.3) this is the prime motivation for sharing of photos with a humorous or funny content. This kind of sharing creates the experience of 'social fun', which is unique to the group that shares such photos.

Although this study only touched on issues related to photo sharing and user experience it clearly demonstrated the importance between these two. It is important to understand that photo sharing is not only about photos, people, places and technologies supporting it, but also about what sharing gives to people in a sense of their experiences. Following Wright et al's (2003) view on experience that one can only design *for* experience, having a good understanding of what evokes specific experiences (e.g. fun, pleasure, excitement) the next step would be to design technology that supports it.

10.4. Validation of this thesis

Applied in this thesis the Grounded Theory approach allowed the development of the photo sharing theory based on the analysis of interviews, focus groups and field observational study data. The importance of using this method lies in the ability to build a theory from the data, which is accurate, powerful and represents a view of real users. As the themes emerged from the data they were explored, analysed and further tested by subsequent studies.

The constant comparative method was used as an internal validity check ensuring that the emerging themes are tested in the data (see section 3.6.1).

Various data gathering methods (interviews with and without probes, focus groups, field observational studies) were applied as a way of triangulation to show that similar claims are supported by different sources of data, which validate the findings (see section 3.5).

Although using various methods stated above to validate the findings was effective, applying different methods (e.g. photo diary and logs used by Frohlich et al., 2002 and Okabe, 2004) would provide more systematic data to complement information collected using the methods discussed above. Photo diary and logs would give detailed accounts of sharing practices including: sharing activities, time and places of sharing, ways of sharing, relationships of the participants, situations, occasions, photo shared, sharing experiences that otherwise might be lost (not remembered) especially if referring to sharing occurring a long time ago.

Although the model facilitates the creation of sharing scenarios, this thesis does not claim that the list is completed. There might be arguments for more scenarios and more or different components of photo sharing, which have not been identified in this research.

The value of the PSCModel and sharing scenarios is for researchers and practitioners of HCI and other related discipline whose works are within the photo sharing area. Both groups can use this model to better understand what contributes to and influences the photo sharing experience. For designers it provides a tool helping the collecting of appropriate photo sharing related information for the development of specific technologies supporting co-located sharing.

This thesis supports a view for building more theory of HCI in practice, by developing a more formalized understanding of photo sharing practices, allowing researchers and practitioners to reflect on, further develop and apply the theory in their work.

10.5. Summary of contributions to knowledge

This thesis explored how people share photos in co-located setting using camera phones and what influences their sharing experience; especially focussing on the roles of time, place, value, relationships, technology used and user experiences (such as pleasure, fun, joy, excitement) that are evoked during the co-located photo sharing.

The specific contributions of this thesis have been:

- An empirically based theoretical account of the photo sharing practices using camera phones.
- A photo Sharing Components Model in the context of co-located sharing using camera phones.
- The photo sharing scenarios, which account for different sharing behaviours phenomena.

More generally, though, this thesis has engaged with, and contributed to, a broader understanding of how people use camera phones for photo sharing

activities situated in different co-located settings and how technology (i.e. camera phones) is used to mediate social interaction.

Although, this thesis does not propose/deliver implications for design (e.g. requirements or guidelines) for technology that supports photo sharing it provides theoretical implications that extend our understanding of issues related to photo sharing, which is in line with Dourish (2006) and Rogers (2008). The former argues that 'implications for design may underestimate, misstate, or misconstrue the goals and mechanisms of ethnographic investigation' (pp. 542). The latter suggests that in the new era of HCI, the guidelines need to be replaced by the '*thinking tools'* that will allow designers and practitioners to better understand the users and their needs and consequently design products reflecting this.

The model developed in this thesis can be used as a 'thinking tool' by providing a platform for communicating and understanding the co-located photo sharing experience. The 'thinking tool' offers a holistic conceptual approach for discussing sharing scenarios and the key elements that shape them. It also provides a means of conceptualizing the relationship between different high-level components of the model and describes sharing in terms of technology used, places that sharing occurs, people involved and values that people assign to their photos. It is not a recipe that provides a checklist of key elements for sharing but a valuable aid to help understanding people's sharing behaviour.

The argument of the thesis is that theoretical implications may be used not only by HCI practitioners and other related disciplines but also by designers to inform them of how people use camera phones for social interaction and what is required to support this. A better understanding of people's sharing practices with camera phones captured in the Photo Sharing Components Model and sharing scenarios provide valuable information of different situations resulting in different sharing behaviour. Each sharing situation provides extensive information about where, who with, and how the photos are shared, which in turn can be used to inform designers of people's needs and requirements for supporting sharing behaviour. This knowledge provides a good starting point to prioritise user requirements for a photo sharing technology.

10.6. Limitations of the thesis

The Grounded Theory method adopted in this study, is for building theory, not for confirming it (see section 3.6). Grounded concepts are suggested, not proven and the theory that emerged from the data is an integrated set of propositions, not findings (Glaser 1978, p.134; Glaser & Strauss, 1967, p.103).

According to Glaser & Strauss the Grounded Theory method can be used to generate two kinds of theory: substantive and formal (1967, pp. 32-33). The former is developed for a substantive, or empirical area of inquiry, such as patient care, race relations, professional education whereas the latter is developed for a formal or conceptual area of inquiry such as deviant behaviour, formal organization, or socialization. Substantive theory can be generated by comparative analysis between or among groups within the same substantive area. The generation of formal theory requires comparative analysis to be made among different kinds of substantive cases that fall within the formal area of inquiry, without relating them to any one particular substantive area.

The theory that was developed during this study is a substantive theory, since it is grounded in research in one particular substantive area – the photo sharing experience in co-located settings of camera phone users. The participants selected in the study varied in terms of their gender, age, professional background, experience of using camera phone and nationality, which introduced diversity to the scope of the theory (see Appendix 2,3 and 5). All participants have been living in the UK for at least 3 years.

However, the generality of the theory is constrained by some factors. Firstly, only one technology supporting photo sharing was used (i.e. camera phone).

Secondly, although the list of places where photo sharing activity occurred was limited, it included all places discussed by participants It can be concluded that these places are representative and commonly used for photo sharing activity. Moreover, places not discussed in the Photo Sharing Components Model were not referenced by participants. It is possible that expanding the study on using different technology that supports photo sharing and including other places (not mentioned in the model) could result in a modified theory.

Thirdly, the context of sharing was different co-located settings not remote sharing. This provides avenues for future research.

10.7. Directions for future work

Although the study provided answers to the research questions set out in Chapter 1 and revised in this chapter, a number of issues have emerged that provide opportunity for further research.

Though this thesis was limited in testing only camera phones used for sharing practices it provided a basis for understanding people's sharing behaviour, which could be expanded into other technologies supporting co-located as well as remote sharing. This in turn could give further evidence to support and expand the Photo Sharing Components Model.

This thesis has identified places where people do not share photos. Further research into this area could identify places where people do not engage in photo sharing activities and for what reasons. Investigating the nature of sharing places that had not been specifically discussed (e.g. public waiting areas, shopping centres, public and private transport, streets, leisure and entertainment places just to name a few) would expand our understanding and knowledge of people's sharing practices. Future research is also required to identify, in more detail, the social norms of acceptable sharing behaviour within different environments and scenarios.

All sharing practices between different groups of people (e.g. family, friends, partners, acquaintances) have been mapped by this research. However, future research may detail sharing between different members of family (e.g. parent/child, child/parent, siblings) in a home environment. Future study would provide crucial evidence of sharing behaviour within this group of people and enrich our knowledge of it.

Finally, although the data provides evidence of sharing practices in a work environment the information about it is limited and further research is therefore required to expand such findings and explore the different relationships between people involved (e.g. colleagues, acquaintances, employer/employee, friends).

10.8. Summary

This thesis brings together relevant knowledge about photo sharing practices into HCI and related disciplines in a form of the Photo Sharing Components Model. However, insufficient empirical research has been conducted into the photo sharing practices using camera phones in co-located settings. Existing photo sharing knowledge (see Chapter 5), although providing some insights into the purposes of taking photos, the life cycle of photos, using photos to communicate with others (remotely or in co-located location) does not fully explain how, when, where, with whom and why people share photos on camera phones and what influences their experience. In addition, neither of the studies reported in Chapter 5 discusses users' positive experiences (e.g. pleasure, fun, joy and excitement) when sharing photos.

The theory developed during this study has comprehensively answered the research questions reviewed earlier in this chapter. The descriptions of all of the Photo Sharing Components Model together with the structural notations of different sharing scenarios, defined in detail in Chapters 8 and 9, formalised the theory and provided a concise outline of the rich narrative that has unfolded through this thesis.

An important distinction between this study and research conducted by others into the sharing practices and behaviour is the way this study propose descriptions of how, when, where, why, with whom photo sharing occurs, descriptions that are grounded in the data rather than deduced from the literature.

This study is the first of its type on this subject, and as such, provides invaluable information, which could help HCI researchers and practitioners and other discipline professionals to describe and communicate the photo sharing behaviour.

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Appendix 1: Examples of open, axial and selective coding from all three studies

The data from all three studies was analysed by applying open, axial and selective coding adopted from the Grounded Theory approach (Strauss & Corbin, 1998). The examples of coding are displayed below.

Open coding involves developing concepts and categories in order to provide the structure of the theory. The approach taken in the First Study was to focus on identifying dimensions and properties of categories. During the analysis of the data, in the open coding stage, several categories were developed. The table A1.1 represents the open coding from the First Study. The coding from the Second and Third Study are displayed in table A1.2 and A1.3 accordingly.

Category	**Sub-category or Properties**
Criteria for experiencing pleasure	Transparency of functionality Useful Usable Works well/efficiency Useful functions that help in your activity Easy to learn Sense of affiliation Aesthetic factors Physical factors Sense of discovery
Criteria for experiencing excitement	Interactivity with others Sense of surprise Novelty 'it's cool'
Criteria for experiencing fun	Novelty Functions that are used in social context Sense of discoveries Funny features within the piece of technology Sense of surprise
Criteria for experiencing happiness	Useful Usable
	Useful functions that help in your activity Works well/efficiency

TABLE A1.1 CATEGORIES FOR DIFFERENT TYPES OF HEDONIC EXPERIENCE

Category	Sub-category or properties
Context of camera phone uses	Private Social
Location of camera phone use	Remote Co-located
Settings of camera phone use	Friends Family Strangers
Environment of camera phone use	Public space Night clubs Pubs, bars Restaurants Public transport (bus, tube) Leisure environment (parks, bowling club) Entertainment environment (Covent Garden, Comedy Store) Museums Private space Home Cars Other space Office University
Purpose of using camera phone	Reading and answering text messages Playing games Viewing and sorting out images Playing music or ring tones Examining different functions Receiving calls and massages Making phone calls Texting to others Documentary of an event or social gathering Capturing funny situations/moments/faces etc. References (pictures of streets, maps, clothes, etc.) Memories of events, places Storytelling Taking pictures at 'spur of a moment' Social interaction with friends/family Social interaction with strangers Pictures as memories Personal improvements (videoing playing a game and learning from mistakes)
Life cycle of pictures/videos	Taking pictures/videos Viewing pictures/videos now (in co-located environment) Viewing pictures/videos the next day or later Selecting/deleting pictures/videos Storing/archiving Transferring (to another phone, computer, web, CD) Organise pictures into album using external media (computer, web sites)
Medium for transferring pictures/videos	Bluetooth MMS Infrared Features supporting sending pictures to a computer Sending them via email Internet facilities
Difficulties with transferring	Sending pictures expensive

pictures/videos	Difficulties to find relevant functions Difficulties to use relevant functions Lack of compatibility between camera phones
Important issues	Being in control of technology when taking pictures/videos Being in control of technology when deleting pictures/videos Being in control of technology when sharing pictures/videos Being in control of technology when activating the Bluetooth connection with strangers
Advantages of camera phones	Can be used anywhere Immediacy of use Immediacy of viewing pictures/video Capacity of taking and storing images Handy Portability Cam-phones are always carried Spontaneity of use
Criteria for experiencing fun	Camera phone use in social context Taking pictures/videos of funny situations Taking pictures/videos of friends behaving 'badly' Taking pictures/videos of strangers Sharing pictures/videos with friends/family Sharing pictures with strangers Novelty of using camera phone
Experience with camera phone (pictures/videos)	Pictures/videos as entertainment Video function – fun Pictures/videos of family brings memories Pictures/videos of funny moments with friends
Experience (fun) determinants	Relationship between people Settings important (social setting) Control of technology (taking/deleting pictures/videos) Novelty of technology No fun when privacy is invaded
Important social issues	Intrusion of privacy important Friends agreement about privacy Privacy issue important Privacy social agreement/social acceptability Trust Private vs. public picture/video collections Sharing phone with friends – depending on the level of friendship/relationship
Problems with camera phones	Poor quality of pictures (to print) Small screen display Sorting pictures important (difficult/time consuming to find archived pictures) Memory capacity as limitations Technological difficulties to find and use required features Transferring pictures not easy Lack of capability between phones Technical limitations to annotate pictures (number 007 instead of meaningful information– strain memory to remember what it was) Too much effort to use sending features (Bluetooth, Infrared, MMS) Lack of a quick and easy way to find archived pictures

TABLE A1.2 EXAMPLES OF OPEN CODING STAGE FROM THE SECOND STUDY

During the first stage of the open coding in the Third Study 223 codes were developed. The full list is presented in the table A1.3.

Code name
Bad previous experience affects use of camera phone
Bathroom as private space
Bedroom as private space
Bluetooth free - important
Bluetooth - immediate thing
Bluetooth - important
Bluetooth for transferring data
Bluetooth great experience
Bluetooth learning
Bluetooth-ing with strangers
Bluetooth-ing with strangers - bad experience
Camera phone - convenience
Camera phone - exciting experience
Camera phone - feel confident
Camera phone - good quality of pictures
Camera phone - great experience
Camera phone - important
Camera phone - improvement of technology
Camera phone - informal pictures
Camera phone - practical
Camera phone - quality of pictures not good
Camera phone - reason for not using it
Camera phone - remote social interaction
Camera phone - storage important
Camera phone - usable important
Camera phone - useful
Camera phone affordances
Camera phone always with you
Camera phone as event driven
Camera phone as quality of life
Camera phone as social experience - sharing
Camera phone features important
Camera phone limitations
Camera phone pictures - short life spam
Camera phone supporting face-to-face communication
Camera phone used for work purposes
Capture funny moment

Capture the moment
Club - not place to share
Computer affordances
Control over pictures
Control over technology
Date of pictures taken - important
Design implications
Difference between sharing with friends and others
Digital camera - features important
Digital camera - good quality of pictures
Digital camera - heavy
Digital camera - memory important
Digital camera - not allow to use
Digital camera - professional purposes
Digital camera - superior to camera phone
Digital camera affordances
Digital camera as formal
Digital camera for special occasions
Digital camera pictures - long life spam
Digital camera sharing limitations
Digital camera sharing on the computer
Digital camera sharing on TV
Digital camera sharing remotely
Digital camera vs. Camera phone
Digital frame for showing pictures
Digital vs. Analogue pictures
Experience by foreigner
Experience changes - picture content
Experience changes over time
Familiarity of place - do not influence sharing experience
Family - show all pictures
Family - show fewer pictures of friends etc
Family picture shared with friends
Family pictures shared with family
Features photography
Folder structure - important
Foreigner experience
Friends - select some pictures
Friends gatherings
Home - more space
Home - more time

Keep memories
Kitchen as social place
Kitchen not much space
Life spam of pictures
Living room as social place
Love taking pictures
Memories - important
Messages very personal no sharing
MMS - cost important
No Bluetooth
No transferring pictures from phone to computer
Norms and regulations
Not close friends different sharing behaviour
Not sharing with not friends
Paper pictures experience
Picture - member of family
Picture taken of your own picture
Pictures as social thing
Pictures as visual communication
Pictures not personal
Pictures on camera phone - socially accessible
Pictures to develop
Pictures to share later
Place – crowded
Place – functionality important
Place - light important
Place – noisy
Place - physical structure
Place - sitting area important
Place - space important
Place affordances
Place changes sharing behaviour
Places not to share photos
Places to share photos
Places to take pictures
Privacy issues - important
Private collection
Private pictures transferred onto computer
Problems with Bluetooth
Problems with technology
Public place

Quality of pictures - important
Quality of technology
Quality of video - important
Screen size - important
Security issues - important
Sensitivity of picture
Sensitivity of place
Services – cost important
Sharing - mood important
Sharing - activities important
Sharing – event driven
Sharing - in different countries
Sharing - people important
Sharing – place important
Sharing - time important
Sharing abroad - MMS
Sharing and narrating
Sharing as something to talk about
Sharing at home
Sharing at the entertainment place
Sharing at work
Sharing behaviour change over time
Sharing by holding the phone
Sharing by passing the phone
Sharing differ digital vs. Analogue
Sharing experience - enjoyable
Sharing experience - excitement
Sharing experience - fun
Sharing experience – laugh
Sharing experience - relaxed
Sharing for learning purposes
Sharing in a bar
Sharing in a bedroom
Sharing in a café
Sharing in a garden
Sharing in a park
Sharing in a pub
Sharing in a restaurant
Sharing in social environment
Sharing in the kitchen
Sharing in the living room

Sharing later
Sharing many pictures
Sharing memories - funny moments
Sharing on camera phone
Sharing on computer
Sharing on DVD
Sharing on laptop
Sharing on the spot
Sharing on the spot - inconvenience
Sharing on TV
Sharing one picture
Sharing one vs. Many pictures
Sharing remotely
Sharing via Bluetooth
Sharing via email
Sharing via MMS
Sharing via My Yahoo
Sharing whenever we are
Sharing with people present at the event
Sharing with acquaintances
Sharing with close friends
Sharing with family
Sharing with friends
Sharing with friends seeing occasionally
Sharing with friends seeing often
Sharing with large group
Sharing with others
Sharing with small group
Sharing with small vs. Large group
Sharing with strangers
Similarity of the phone – helpful
Small group more intimate
Social agreement between friends
Social events
Social interest group
Tagging pictures - important
Take picture - in museum
Take picture – park
Take picture – temple
Take picture anywhere unless prohibited
Take picture in a restaurant

Take pictures – church
Take pictures – clubs
Take pictures – party
Take pictures - photo studio
Take pictures – pub
Take pictures – shop
Take pictures - when with friends
Take pictures – work
Take to share
Taking picture - content important
Taking picture - surrounding important
Taking pictures – tube
Taking pictures for sharing later
Taking pictures of strangers
Technology affordance
Technology limitations
Transfer - cam-phone to new cam-phone
Transferring into computer
Trust – important
Trust – limited
Video clips as audio communication
Value of photos
Work as professional environment - no sharing

TABLE A1.3 CATEGORIES OF OPEN CODING STAGE FROM THE THIRD STUDY

The next stage involved *axial coding*, which put concepts and categories developed during the open coding back together in new ways by making connections between a category and its sub-categories (i.e. not between discrete categories as applied in selective coding). Thus, axial coding refers to the process of developing main categories and their sub-categories (Strauss & Corbin, 1990). Examples of axial coding from the First Study are displayed in the table A1.4, from the Second and Third Study are displayed in the table A1.5 and A1.6 accordingly.

Main categories	Sub-category or Properties
Usability/Functionality	Transparency of functionality Useful Usable Works well/efficiency Useful functions that help in your activity Easy to learn
Interactivity/Social element	Functions that are used in social context
	Interactivity with others
	Sense of affiliation
Appealingness	Aesthetic factors Physical factors
Novelty	Sense of surprise Novelty Sense of discoveries 'it's cool' Funny features within the piece of technology

TABLE A1.4 MAIN CATEGORIES FOR FACTORS EVOKING HEDONIC EXPERIENCE IN THE CONTEXT OF PERSONAL TECHNOLOGY

Category	Sub-category or properties
Context of camera phone uses	Private Social
Location of camera phone use	Remote Co-located
Settings of camera phone use	Friends Family Strangers
Environment of camera phone use	Public space Night clubs Pubs, bars Restaurants Public transport (bus, tube) Leisure environment (parks, bowling club) Entertainment environment (Covent Garden, Comedy Store) Museums Private space Home Cars Other space Office University
Purpose of using camera phone	Reading and answering text messages Playing games

	Viewing and sorting out images Playing music or ring tones Examining different functions Receiving calls and massages Making phone calls Texting to others Documentary of an event or social gathering Capturing funny situations/moments/faces etc. References (pictures of streets, maps, clothes, etc.) Memories of events, places Storytelling Taking pictures at 'spur of a moment' Social interaction with friends/family Social interaction with strangers Pictures as memories Personal improvements (videoing playing a game and learning from mistakes)
Life cycle of pictures/videos	Taking pictures/videos Viewing pictures/videos now (in co-located environment) Viewing pictures/videos the next day or later Selecting/deleting pictures/videos Storing/archiving Transferring (to another phone, computer, web, CD) Organise pictures into album using external media (computer, web sites)
Medium for transferring pictures/videos	Bluetooth MMS Infrared Features supporting sending pictures to a computer Sending them via email Internet facilities
Difficulties with transferring pictures/videos	Sending pictures expensive Difficulties to find relevant functions Difficulties to use relevant functions Lack of compatibility between camera phones
Important issues	Being in control of technology when taking pictures/videos Being in control of technology when deleting pictures/videos Being in control of technology when sharing pictures/videos Being in control of technology when activating the Bluetooth connection with strangers
Advantages of camera phones	Can be used anywhere Immediacy of use Immediacy of viewing pictures/video Capacity of taking and storing images Handy Portability Cam-phones are always carried Spontaneity of use
Criteria for experiencing fun	Camera phone use in social context Taking pictures/videos of funny situations Taking pictures/videos of friends behaving 'badly' Taking pictures/videos of strangers Sharing pictures/videos with friends/family Sharing pictures with strangers Novelty of using camera phone
Experience with camera phone	Pictures/videos as entertainment

(pictures/videos)	Video function – fun Pictures/videos of family brings memories Pictures/videos of funny moments with friends
Experience (fun) determinants	Relationship between people Settings important (social setting) Control of technology (taking/deleting pictures/videos) Novelty of technology No fun when privacy is invaded
Important social issues	Intrusion of privacy important Friends agreement about privacy Privacy issue important Privacy social agreement/social acceptability Trust Private vs. public picture/video collections Sharing phone with friends – depending on the level of friendship/relationship
Problems with camera phones	Poor quality of pictures (to print) Small screen display Sorting pictures important (difficult/time consuming to find archived pictures) Memory capacity as limitations Technological difficulties to find and use required features Transferring pictures not easy Lack of capability between phones Technical limitations to annotate pictures (number 007 instead of meaningful information– strain memory to remember what was it) Too much effort to use sending features (Bluetooth, Infrared, MMS) Lack of a quick and easy way to find archived pictures

TABLE A1.5 AXIAL CODING FROM THE SECOND STUDY

Axial coding from the Third Study: Photo sharing behaviour in co-located settings

Main category	**Sub-category or properties**
Classification of people	Sharing with different group of people
	Sharing with friends
	Sharing with close friends
	Sharing with no close friends
	Sharing with friends seeing occasionally
	Sharing with friends seeing often
	Sharing with others
	Sharing with others
	Sharing with acquaintances
	Sharing with strangers
	Sharing with family

	Sharing with family
	Sharing with distant family
	Sharing with different size groups of people
	Small group more intimate
	Sharing with large group
	Sharing with small group
	Sharing with small vs. Large group
Sharing in different places	Private place
	Kitchen as social place
	Living room as social place
	Sharing at home
	Sharing in a bedroom
	Sharing in a garden
	Sharing in the kitchen
	Sharing in the living room
	Sharing at home - study room
	Public place
	Sharing in a bar
	Sharing in a cafe
	Sharing in a park (leisure environment)
	Sharing in a pub
	Sharing in a restaurant
	Sharing in social environment
	Sharing at the entertainment place
	Sharing on the tube
	Work environment
	Sharing at work - corridors
	Sharing at work - kitchen
	Sharing at work - social area
	Places not to share
	Business dinner - place not to share
	Bathroom as private space
	Bedroom - place not to share
	Bedroom as private space
	Church - place not to share
	Club - place not to share

	Exhibition - place not to share
	Gallery - place not to share
	Museum - place not to share
	Supermarket - place not to share
	Serious meeting - place not to share
	Work as professional environment - no sharing
	Theatre - place not to share
Place features	Place physical /structural dimension
	Bars as dark place
	Entertainment place - less light
	Home - more light
	Home - more space
	Kitchen not much space
	Living room as comfortable sitting place
	Pub as standing around place
	Pubs as dark place
	Restaurant - less space to move around
	Study room - limited seating
	Study room - not enough space
	Place social dimension
	Bars - crowded place
	Bars - noisy place
	Bars as busy place
	Club as noisy place
	Clubs as crowded place
	Pub as crowded place
	Pub as noisy place
	Pubs as walking around place
	Restaurant as sitting at the table place
	Home - no interruption by other people
	Pub - conversational thing
	Pub (local) - more open environment
	Pub as social environment
	Restaurant - more friends place
	Restaurant as social environment
	Place functionality

	Bars as place to drink and talk
	Pub as drinking place
	Pub as social environment
	Restaurant - eating place
	Restaurant as social environment
	Salsa club - social entertainment place
	Sharing in social environment
	Other issues
	Home - feel more comfortable
	Home - more relaxing atmosphere
	Home - more time
	Home - safe territory
	Place - make one feeling comfortable
	Restaurant - more static environment
	Restaurant - more tactile atmosphere
	Pub - dynamic place
	Seating arrangement - cosy atmosphere
	Seating arrangement - more in control
	Sharing - seating arrangement important
	Sharing - own space as a group important
	Sharing - standing not an atmosphere to share
	Sharing - standing not conducive to share
	Sharing arrangement - sitting next to each other
	Study room - standing around computer
Sharing photo behaviour	Relationship between people
	Sharing with friends
	Family picture shared with friends
	Friends - select some pictures of family)
	Sharing with family
	Family - show all pictures
	Family - show fewer pictures of friends etc
	Family pictures shared with family
	Number of pictures to share
	Sharing many pictures
	Sharing one picture
	Sharing one vs. Many pictures

	Sharing one picture at the time
	Size of group to share
	Sharing with small group
	Sharing with small vs. Large group
	Small group more intimate
	Sharing with large group
	Sharing with large group - time important
	Sharing with large group - loose control
	Sharing with large group - security matter
	Sharing with large group - share with people next
	Sharing with large group - too much hassle
	Sharing with small - more control
	Sharing with small - pass phone around
Ways of sharing photos	On camera phone
	Sharing by holding the phone
	Sharing by passing the phone
	Give the phone away but watch them
Means of sharing photos using camera phones	On the spot
	Sharing via Bluetooth
	Sharing via MMS
	Sharing via infrared
	Sharing via memory card
	Sharing via memory card - quicker
	Remotely
	Sharing via email
	Sharing via My Yahoo
Time of sharing photos	Sharing on the spot
	Sharing on the spot - inconvenience
	Sharing remotely
	Sharing later
Medium used for sharing photos	On the spot
	Digital camera - sharing on the spot
	Sharing on camera phone
	Sharing later

	Sharing on TV
	Sharing on computer
	Sharing on laptop
	Digital frame for showing pictures
	Other means of sharing
	Transfer pictures to digital frame
	Transfer pictures to laptop
	Transfer pictures from camera to camera phone
	Transfer pictures from computer to camera phone
Motivation for sharing	Social interaction/communicating
	Pictures as social thing
	Pictures as visual communication
	Video clips as audio communication
	Pictures as reminiscence of event
	Pictures as pick me up thing
	Pictures bring people together
	Sharing as a visual tool
	Spatial aspect of picture
	Share stories/funny moments
	Sharing and narrating
	Sharing as something to talk about
	Sharing memories - funny moments
	Sharing with people present at the event
	Narrating as link to the past
	Pictures as things to remember
	Cameras phone - reinforcing a moment
	Other issues
	Sharing for learning purposes
	Picture as teaching tool
	Picture - helps describing things quicker
	Pictures as screen saver
	Pictures on canvas
Motivation for taking pictures	Share later
	Pictures to share later
	Pictures - good talking point
	Pictures as reference

	Social uses of pictures
	Capture the moment
	Keeping memories - important
	Picture - member of family
	Picture taken of your own picture
	Taking pictures of strangers
	Take pictures - when with friends
	Taking picture - remember event
	Taking picture - surrounding important
	Taking picture - content important
	Photos as memorabilia
Places to take pictures	Public places
	Taking pictures - tube
	Take picture - in museum
	Take picture - park
	Taking picture - bar
	Take picture in a restaurant
	Take pictures - clubs
	Take pictures - pub
	Take pictures - shop
	Private places
	Take pictures - party
	Sensitive places
	Take picture - temple
	Take pictures - church
	Other places
	Take pictures - work
	Take pictures - photo studio
	Take picture anywhere unless prohibited
Value of photos	Life spam of pictures
	Digital camera pictures - long life spam
	Camera phone pictures - short life spam
	Issues related to pictures
	Value of photos - share funny photos
	Sensitivity of picture (personal)

	Social interest group
	Other issues
	Photos on the phone - sentimental values
	Picture content - changes experience
	Sensitivity of occasion
Camera phone	Photographic attributes
Important features	Camera - important
	Camera phone - good quality of pictures
	Features photography
	Flush - important
	Video - important
	Camera phone as a viewer
	Scrolling feature - important
	Other attributes
	Camera phone - storage important
	Text messaging - important
	Screen size - important
	Mp3 player - important
	Scrolling feature - important
	Bluetooth - important
	Video important
	Bluetooth attributes
	Bluetooth free - important
	Bluetooth - immediate thing
	Bluetooth for transferring data
	Bluetooth great experience
	Bluetooth learning (process)
	Bluetooth experience
	Bluetooth-ing with strangers
	Bluetooth-ing with strangers - bad experience
Camera phone uses	Social interaction/sharing/communication
	Camera phone - informal pictures
	Camera phone - remote social interaction
	Camera phone as event driven
	Camera phone as social experience - sharing

	Camera phone supporting face-to-face communication
	Work related purposes
	Camera phone used for work purposes
	Camera phone use for marketing purposes
	Advances of technology
	Camera phone - improvement of technology
	Others
	Camera phone - reason for not using it
Motivations for using	Camera phone attributes
Camera phone	Camera phone - convenience
	Camera phone always with you
	Camera phone as quality of life
	Ability to transfer photos
	Photos easy to share
	Easy to use
	Photos are always available
	Most people have it
	Quick to take photo snaps
	Experience with camera phone
	Camera phone - great experience
	Camera phone - exciting experience
	Camera phone - feel confident
	Immediacy of sharing photos
	Immediacy of taking photos
	Supports different means of sharing
	Novelty experience
Camera phone limitations	Technical issues
	Camera phone - memory limitations
	Camera phone - not a proper camera
	Camera phone - problem sending pictures from
	Lack of compatibility between camera phones
	Lack of compatibility between old phone and computer
	No folder structure
	Poor quality of pictures with older models

	Small viewing facility
	Usability issues
	Camera phone - usable important
	Camera phone - useful
	Camera phone - practical
	Problems with Bluetooth
	Similarity of the phone - helpful
	Cost related issues
	MMS - cost important
Sharing experience issues	Technical issues
	Computer screen size - big - important
	Screen size - important(camera phone)
	Quality of pictures - important
	Quality of video - important
	Problems with MMS
	Size of the screen important
	Ways to share photos
	Hold it straight important
	Angle important
	People's positions important
	Distance from the viewer(s) important
	Give the phone away but watch the viewer(s)
	Sharing - everyone crouch out
	Transfer from computer to camera phone - problem
	Transfer phone - computer - cable - problems
	Transfer pictures from camera to camera phone
	Transfer pictures from computer to camera phone
	Bluetooth pictures - phone to laptop
	Contextual issues
	Sharing experience (at home) - more relaxed
	Sharing - activities important
	Sharing - event driven
	Sharing - place important
	Sensitivity of place
	Sharing - time important
	Picture content -important

	Narration as a link to the past
	Sharing - conversation driven
	Sharing - occasion driven
	Sharing during social events
	Sharing in familiar environment
	People related issues
	Sharing - people important
	Bad previous experience affects use of camera phone
	Sharing - mood important
	Positive sharing experience
	Sharing experience - enjoyable
	Sharing experience - excitement
	Sharing experience - fun
	Sharing experience - laugh
	Sharing experience - happy
	Other issues
	Experience changes over time
	Familiarity of place - do not influence sharing experience
	Place changes sharing behaviour
	Picture content - changes experience
	Sharing behaviour change over time
	Sharing - instantaneous experience
Issues related to technology	Technology attributes supporting photo sharing
	Laptop - allows to move around
	Digital camera - easy to connect to TV
	Computer screen size (big)- important
	Sharing on a computer - seating important
	Technology attributes not supporting photo sharing
	Pc - does not allow to move around
	Other issues- problems
	Transfer from computer to camera phone - problem
	Transfer phone - computer - cable - problems
Norms, regulations and constrains	Important social issues
	Control over pictures
	Control over technology

	Norms and regulations
	Privacy issues - important
	Security issues - important
	Social agreement between friends
	Trust - important
	Public collection
	Pictures not personal
	Pictures on camera phone - socially accessible
	Private collection
	Private collection - limited sharing
	Private pictures transferred onto computer
	Private pictures - delete from the phone
	Private pictures - lock in a folder
Digital camera important features	Digital camera - good quality of pictures
	Digital camera - heavy
	Digital camera - memory important
	Digital camera - size important
	Digital camera - zoom important
	Digital camera - more precious
	Digital camera screen size - important
	Digital camera - editing features important
Digital camera uses	Purpose of using digital camera
	Digital camera as formal
	Digital camera for special occasions
	Digital camera - professional purposes
	Digital camera used for planned events
	Digital camera as work tool
	Digital camera as serious photography
	Digital camera - ways of sharing
	Digital camera sharing on the computer
	Digital camera sharing on TV
	Digital camera sharing on digital frame (transfer to digital frame)
	Digital camera - burn a CD

	Digital camera - sharing on the viewer
	Digital camera - slide show important
	Digital camera - transfer photos to the laptop
	Sharing issues
	Small group arrangement
	Small group - rest the arm on the table
	Small group - gather around the camera
	Large group - taking turns
	Larger group - hold the camera higher up
	Hold it on the strap
	Instant sharing
	Instant viewing
	Passing the camera
	Sharing limitations
	No transferring on the spot
	Not always with you
	Not portable
	Poor visibility
	Time of sharing
	Digital camera sharing remotely
	Digital camera - sharing on the spot
	Digital camera - sharing later
	Place to share
	Sharing in public places
	Digital camera - sharing in a café
	Digital camera - sharing in a park
	Digital camera - sharing in a museum
	Sharing in private places
	Sharing at home
	Location of transferring photos
	Transfer pictures to a computer
	Transfer pictures to a laptop
	Transfer to digital frame
	Cards as picture storage
	Usability issues
	Digital camera - easy to connect to TV
	Other issues

	Digital camera photos'- intentions of printing
	Digital camera - sharing printed photos
	Digital camera photos' - print almost all
Digital camera limitations	Digital camera - not allow to use(in some places)
	Digital camera - battery problems
	Digital camera - memory limitations
	Digital camera - needs time to set it up
	Digital camera - transfer pictures limitations
Digital cameras - Design issues	Date of pictures taken - important
	Design implications
	Folder structure - important
	Tagging pictures - important
	Design implications - privacy

TABLE A1.6 AXIAL CODING FROM THE THIRD STUDY

Selective coding is used to elaborate and interpret the data further by producing a core category and a central storyline. The core category (the phenomenon) – the photo sharing experience and sharing behaviours were defined and the relationship between subcategories were identified so that high and low-categories of components and their relationships were integrated into the Photo Sharing Components Model (see table A1.7).

Core Categories	Sub-categories
Triggers for sharing	Pre-planned Contextual sharing Ad hoc sharing
Value of Photos	Social value Personal value Temporal value
Place Affordances	Physical dimension of place Functionality of place Norms and regulations
Social Affordances	Relationships (friends, family, others) Group size (small, large) Privacy Trust Control
Technology Affordances	Portability and accessibility Methods of sharing

TABLE A1.7 SELECTIVE CODING DEVELOPED DURING THE THEORY BUILDING

Appendix 2: Demographic data of participants from the First Study: Conceptualising hedonic experience

This study focused on people's perception and understanding of hedonic experience with an interactive technology. Users selected for the interviews were people who use interactive technology of any kind (e.g. mobile phones, digital cameras, PDAs). A diversity of users was spread across gender, age, education, occupation and experience of using interactive technology. The table below (A2.1) displays demographic data of the participants who were interviewed. Participants' real names were replaced by pseudonyms and used within the analysis of the data.

No	Pseudonym	Gender (F/M)	Age group	Professional Background	Experience with interactive technology (years)
1	Nora	F	18-20	Student (College)	3 - 4
2	Dorothy	F	21-25	Student (University)	3 - 4
3	Lily	F	26-30	Researcher	> 5
4	Peter	M	36-40	Lecturer	> 5
5	Carol	F	41-45	PA	3 - 4
6	Victor	M	41-45	Lecturer	> 5
7	Mira	F	36-40	Civil Servant	2 - 3
8	Annie	F	41-45	Lecturer	> 5
9	Moty	M	46-50	Researcher	> 5
10	Aline	F	46-50	Self-employed	> 5
11	Ted	M	51-55	Lecturer	> 5

TABLE A2.1 DEMOGRAPHIC DATA OF THE PARTICIPANTS INTERVIEWED

In addition, two focus groups were conducted. The table A2.2 and A2.3 provide a description of the participants from the first and second focus group accordingly.

No	Pseudonym	Gender (F/M)	Age group	Professional Background	Experience with interactive technology (years)
1	Christine	F	26-30	IT Professional	>5
2	Tony	M	26-30	PhD Student	>5
3	Jason	M	31-35	PhD Student	>5
4	Jenny	F	36-40	Lecturer	>5

TABLE A2.2 DEMOGRAPHIC DATA OF THE PARTICIPANTS FROM THE FIRST FOCUS GROUP

No	Pseudonym	Gender (F/M)	Age group	Professional Background	Experience with interactive technology (years)
1	Paola	F	26-30	PhD Student	>5
2	Garry	M	26-30	PhD Student	>5
3	Mark	M	26-30	Researcher	>5
4	Brian	M	31-35	PhD Student	>5
5	Angela	F	36-40	Researcher	>5
6	Olivio	M	36-40	Researcher	>5

TABLE A2.3 DEMOGRAPHIC DATA OF THE PARTICIPANTS FROM THE SECOND FOCUS GROUP

Appendix 3: Demographic data of participants from the Second Study: Use of camera phones for social interaction

The study investigated people's uses of camera phone for social interaction (Chapter 5). Participants selected for the interviews had used camera phones for taking and sharing photos for at least one year. The table below (A3.1) presents demographic data of the interviewed participants.

No.	Pseudonym	Age group	Professional background	Nationality	Camera phone experience (years)
1	Luisa	18-20	Student	UK	1
2	Lucy	18-20	Student	UK	1
3	Maria	21-25	Student	Japanese	>2
4	Adam	26-30	PhD Student	UK	>2
5	Steven	26-30	PhD Student	India	>2

TABLE A3.1 DEMOGRAPHIC DATA OF THE PARTICIPANTS INTERVIEWED DURING THE SECOND STUDY

Appendix 4: Examples of field observational notes

In this thesis naturalistic observation with unobtrusive methods were employed to gather extensive data on people's photo sharing behaviour in different public settings. The examples of field notes are presented below.

Observation 1:

Date: 16.08.2007

Time: evening

Location: Comedy Store (London)

Participants: 1 female age ~20; 1 male age ~20

A couple is sitting next to each other.

Male takes his phone out of his pocket and shows something to the female. He is holding the mobile between them as they watch some pictures. They both laugh.

Then the male puts his phone away.

Then the female takes her mobile phone from her bag and does something with it. Then she shows something to the male and they both laugh. The female holds her mobile between them.

Then the male takes his mobile from his pocket and asks the female to send it [I assume it is a picture)] to him.

They both do something with their phones.

Male:' Which one do you want?'

They both look at the male phone while he is doing something.

Female:' This one, and this one, and this'

The male does something on his phone.

Male: 'Press accept'

They both keep laughing.

The interval finishes and both of them put phones away.

Observation 2:

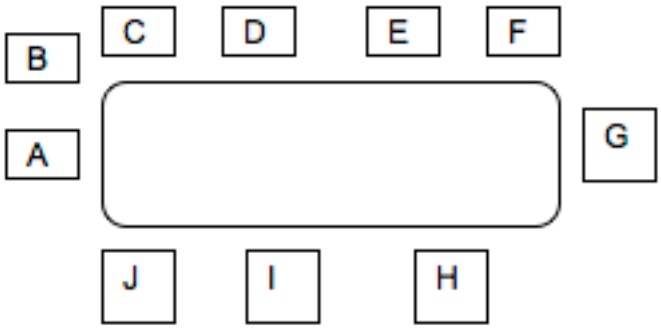
Date: 19.04.2006

Location: pub, North London.

Time: evening

Participants: a group of friends [10 divers] between 30 – 62 years old.

They sit at the table (the seating arrangement is displayed below).



Eight of them have been camera phone users and capturing photo images for at least 2 years.

H (male ~45) has a camera phone but not used for picture taking.

D (male ~40) has a phone with no camera function.

Everybody is talking, laughing and drinking.

B (male ~50) takes the camera phone out off his pocket and starts doing something with it.

B: where is it?! Err… shit … where is it? B goes through the files looking for a new video clip he wanted to share with the rest of the group. [it takes him a while to find it]

B takes his phone and shows it to A (male ~62). They start laughing.

J: what is it? Show me, show me … (female ~40)

B moves between A&J with his phone. Now all three watch the video and laugh. The video contains the footage from a private party that B went to. B took the recording of other people who were a bit drunk and did some silly things. The people on the video were not known by those at the table.

I: come on what is it? Don't keep it for yourself. Show us …

B gives the phone to I (male ~43) and asks him to press the play button. H moves closer to I to see the video clip. They start laughing as well. B stands behind I & H explaining what was happening during the party where he took the video.

F: come on, give it to me.

I passes the phone over to F. F plays the video and moves the phone towards E.

B goes behind F & E and stands there.

F: I want this one. Can you Bluetooth it?

B: yeah. B takes back the phone from F.

B: where is it? Shit … B looks for the Bluetooth on his phone.

F: what, what … F sets up the Bluetooth on his phone.

F: it's crap … your 's is crap. [referring to B's phone]

B: what?! Maybe yours [both starts laughing and swearing at each other].

B: Yeah … B finds the Bluetooth on his phone

B transfers the video clip over to F.

E (male, 41): I've got something really good. I'll show you …

E starts looking for something in his phone.

J: what's that? Another picture from your collection?

All starts laughing.

E: no, no. One of the guys from work gave it to me.

E keeps looking for the picture. After a while E shows it to F. F starts laughing.

F: see mine … F starts looking through his files in the phone.

F passes his phone to E. E views the picture and passes the phone to B.

B looks at the picture and takes the phone across the table. B stands between A & J holding the phone in front of them. [They all laugh]

B takes back the phone to F.

Then A takes his phone out and does something with it.

A: I've got something funny to listen to.

A looks through the files on his phone.

A: where did I put it? He keeps looking

A: I've got it. Listen to this.

A plays the music file and sings along. [it's a very funny song and everybody burst out laughing].

J: Oh … I want this song. It's so cool. Can you Bluetooth it?

B: oh man … yeah. Me too.

J takes her phone out of the bag and looks for the Bluetooth function.

J: yeap … I'm ready …

A sends the file across to J and then to B.

C (male 30): I have some picture from the last diving trip. The quality is not that good and it was quite dark but these two (pointing at E and F) were totally pissed and I thought you wouldn't like to miss this [laughing]. C looks through his phone for pictures. Then C passes his phone to J.

C: just scroll the side

J takes the phone and holds it in front of her and A.

B stands behind them looking at pictures. [they are all laughing]

J: it's gone … where is the light?

C comes near J and touches the screen.

C: you just touch the screen

J, A, B & C stand together watching the pictures. J holds the phone. They laugh.

C takes the phone from J.

C: I'll show you more. Remember … The first dive was really s…. it was sooo cold, remember, … and we didn't see much... The vis was absolutely s…. everybody had enough of it. Errrr…yeah and then oh gosh err… we had to get warmer ha, ha, ha …'

C looks through the files and passes the phone to J.

G (female ~48) moves toward J, A, B & C and starts talking.

E & F are engaged with their own conversation. Their phones are laying on the table.

H, I & D are talking. D & I are also talking.

J: pity I wasn't there. It looks like you had a golly good time ha, ha , ha .

J gives back the phone to C. They all laugh.

F: who is Boss?

A, J, & B [simultaneously] Boss??!!

F: yeah, someone wants me to activate the connection. It says here 'Boss'

J: Oh … probably there are some people in the pub using their Bluetooth …

A: ooooooh someone likes you …..

F: but what do I do?

J: do you want to get connected or … ermmm

F: f…k them. I don't want any Boss connecting to my phone.

J: what if this is a nice girl. You might be lucky [laughing]

F: of f…k what if they do something to my phone. …

F switches off his phone completely and switches on again.

A: is she still there lucky boy [laughing]

F looks at his phone.

F: no. what the f…k was it …

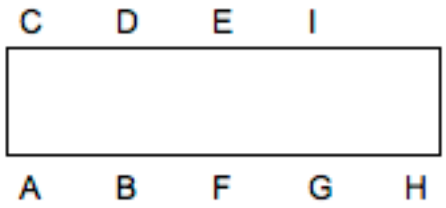
They all laugh.

Observation 3:

Date: 15.04.2006 evening

Location: Harvester (pub)

Participants: family: male ~40 (A), female ~ 35 (B), male ~ 75 (C), female ~70 (D), male ~35 (E), female ~30 (F), girl ~15 (G), boy ~13 (H), and a little girl ~5 (I). Seating arrangement is presented below.



They are sitting at the table waiting to be served. G takes her phone and starts doing something with it. Then G does the same. A few minutes later H & G take pictures of I who makes funny faces.

I talks continuously.

H says to G: look at this.

H shows G her phone and they both start laughing.

H holds his phone.

G says to H: this one is better [laughs].

Then G holds her phone in front of H and continues laughing.

A: what do you have there? Show me. Says A to H.

H does something on his phone, gets up and goes to A.

H: she is so funny. H gives A his phone. H looks at it and smiles then passes the phone to B.

B looks at it.

B says oh… and passes the phone to D.

D holds the phone between her and C and they look at it together. [at this point they all talk and laugh].

I gets up and goes between C & D.

H follows her phone and stands behind C & D. They all watch something.

H takes the phone back and does something.

H: see this grandma and passes the phone to D.

While C & D are watching something on the H's phone [I assume they view pictures] G gets up and takes pictures of other people sitting at the table.

D gives the phone to C.

C looks at something and gives the phone back to H.
F: show me, show me. Says F to G. G goes to F and gives her the phone. F holds the phone between her and E.

F passes the phone to D.

D: I can't see anything. It's gone.

E takes the phone, does something to it and passes back to D.

D: that's better. D looks at it and smiles and then passes the phone to C. G stands behind C & D while they watch something on the phone. C gives the phone back to G. G goes back to her seat.

The whole family is having a good time laughing. 'I' moves around the table while H tries to take more pictures of her.

The dinner is served so the whole family carries on eating.

After they finish the main course F asks G to show her the pictures again.

F: I don't like this one. Delete it.

G: but Mum … you look so funny.

F: I said delete it. F was upset because she didn't like some of the pictures G took of her earlier.

G takes the phone back and does something [I suppose she deletes the pictures]

F: show me again … did you delete it

G gives F the phone. F looks at it and gives it back to G.

H: I want them. Says to G.

H: do you want mine?

G: yeah. Some are soooooooo funny. [laughing]

H & G do something with their phones.

H: are you ready? Who goes first?

G: you go. [I assume they transfer the pictures across]

H: OK. Now you.

F: can I have some but I don't know how to do it.

F takes her phone out of the bag and passes to G.

G: which ones do you want?

F: just show me again and I'll tell you which ones.

G gets up and goes to F. G does something on her phone and shows F the phone.

F: this one and this one. F points at the screen.

G takes both phones and sits down. She does something to both phones [I assume she transfer the pictures]

G: ouch …what's this? You don't have anything here.

H leans over to G.

H: this is the old model. You can't transfer anything. It's crap …

G: it wont do it … but I can send them to you. What's your email address?

F: I don't remember … just leave it. It's too complicated

G & H [simultaneously]: no it's not

E: send it to me and I'll do it …

E gives his email address. G does something on her phone.

G: it's done.

A: who's paying for this [laughing]

G: oops … it's you Dad [laughing]

Everybody starts laughing.

Appendix 5: Demographic data on participants from the Third Study: Photo Sharing behaviour in co-located settings

The study explored the photo sharing behaviour of camera phones' users in co-located settings. Participants selected for the interviews regularly used camera phones for taking and sharing photos. The table below (A5.1) represents demographic data of the interviewed participants.

No.	Pseudonym	Age group	Professional background	Nationality	Camera phone experience (years)
1	Lee	21-25	IT Professional	South Africa	>2
2	Gitta	26-30	PhD Student	Saudi Arabia	1-2
3	Nadia	26-30	PhD Student	India	>2
4	Sami	26-30	PhD Student	Ecuador	>2
5	Bob	31-35	Other IT Professional	English	>2
6	Juliet	31-35	IT Professional	English	0.5-1
7	Alex	41-45	IT Professional	Russian	1-2
8	George	41-45	IT Professional	English	>2
9	Nina	46-50	Self-employed Professional	Russian	1-2
10	Stan	46-50	Lecturer	English	1-2
11	Ron	56-60	Self-employed Professional	English	>2

TABLE A5.1 DEMOGRAPHIC DATA OF THE PARTICIPANTS INTERVIEWED DURING THE THIRD STUDY

Appendix 6: Photo sharing scenarios

In order to develop sharing scenarios each of the Photo Sharing Components Model's high-level components have been represented by a set of low-level components that create the sharing scenario with a specific sharing behaviour outcome. The information captured in the components emerged from the data and the sharing scenarios represent only the situations of sharing that were described by participants.

Sharing behaviour happens within a specific situation, which is a combination of different components: Social Affordances, Place Affordances, Technology Affordances, Value of Photos and Triggers for Sharing (see Chapter 8). Each of these components consists of low-level components, which affect the way the sharing takes place. The components from both levels were given unique symbols to identify which group they represent or belong to in order to simplify their representation (see table A6.1). This symbolic representation of high and low-level sharing components has been used to create a structural notation to represent the photo sharing scenarios that emerged from the data.

Sharing High-level Components	Sharing Low- level Components
(TS) Triggers for Sharing	TS1 = Pre-planned Trigger TS2 = Contextual Trigger TS3 = Ad Hoc Trigger
(VP) Values of Photo	VP1= Social Value VP2 = Personal Value VP3 = Temporal Value VP3.1 = Life span of photos VP3.2 = Share 'now' or 'later'
(PA) Place Affordances	PA1 = Private PA1.1 = Living Room PA1.2 = Kitchen PA1.3 = Study room PA1.4 = Garden PA1.5 = Bedroom PA1.6 = Bathroom PA2 = Public PA2.1 = Restaurant PA2.2 = Pub PA2.3 = Bar PA2.4 = Museum PA2.5 = Place of worship (church, temple) PA2.6 = Gallery PA3 = Work environment PA3.1 = Office

	PA3.2 = Public space (kitchen, corridors, focus area)
(SA) Social Affordances	SA1= Friends SA1.1 = Close Friends SA1.2 = Not Close Friends SA2 = Family SA2.1 = Parent/Child SA2.2 = Child/Parent SA2.3 = Partners SA2.4 = Distant Family SA3 = Others (acquaintances, colleagues or strangers) SA4 = Small group SA5 = Large group
(TA) Technology Affordances	TA1 = view photos on the phone screen TA2 = Bluetooth photos TA3 = infrared photos TA4 = MMS photos TA5 = transfer memory card

TABLE A6.1 THE SYMBOLIC REPRESENTATION OF HI AND LOW-LEVEL COMPONENTS OF PHOTO SHARING COMPONENTS MODEL

Each of the sharing behaviours (see table A6.1) is given a unique symbol that will be used to represent different sharing scenarios (table A6.2).

Category	Type of Sharing Behaviours
(SB) Sharing Behaviour	SB1 = pass the phone to a viewer SB2 = hold the phone SB3 = hold the phone in front of a viewers and gather around the phone (one person in control) SB4 = pass the phone around the group of viewers many people in control) SB5 = show one picture at the time SB6 = show the collection of photos SB7 = no sharing

TABLE A6.2 THE SYMBOLIC REPRESENTATION OF DIFFERENT SHARING BEHAVIOURS

Each sharing scenario consists of a combination of low-level components from each high-level component group with the sharing behaviour outcome. These components are represented symbolically using corresponding values from the table A6.1 and A6.2. For each of the photo sharing scenarios the combination of low-level components can be different and is symbolically represented characterising a particular variation of low-level components within each given scenario.

The full symbolic representation of sharing scenarios is included in the table A6.3 displaying different combination of low-level components from each of the high-level components group.

No.	Social Affordances	SA	Place Affordances	PA	Technology Affordances	TA	Value of Photos	VP	Triggers for Sharing	TS	Sharing Behaviour	SB	Frequency	F
1	SA1.1	SAA	PA1.1 PA1.2 PA1.3 PA1.4	PAA	TA1 TA2	TAA	V1 V2 V3.1 V3.2	VPA	T1 T2 T3	TSA	SB1	SBA	Frequently	F1
2	SA1.1	SAA	PA2.1 PA2.2 PA2.3	PAB	TA1 TA2	TAA	V1 V2 V3.1 V3.2	VPA	T1 T2 T3	TSA	SB1	SBA	Frequently	F1
3	SA1.1	SAA	PA1.1 PA1.2 PA1.3 PA1.4	PAA	TA3 TA4	TAB	V1 V2 V3.1 V3.2	VPA	T1 T2 T3	TSA	SB1	SBA	Rarely	F3
4	SA1.1	SAA	PA2.1 PA2.2 PA2.3	PAB	TA3 TA4	TAB	V1 V2 V3.1 V3.2	VPA	T1 T2 T3	TSA	SB1	SBA	Rarely	F3
5	SA1.1	SAA	PA2.4	PAD	TA1	TAE	V1	VPD	T1	TSC	SB1	SBA	Rarely	F3
6	SA1.2	SAB	PA1.1 PA1.2 PA1.3 PA1.4	PAA	TA1 TA2	TAA	V1 V3.1 V3.2	VPB	T1 T2	TSB	SB1	SBA	Occasionally	F2

7	SA1.2	SAB	PA2.1 PA2.2 PA2.3	PAB	TA1 TA2	TAA	V1 V3.1 V3.2	VPB	T1 T2	TSB	SB1	SBA	Frequently	F1
8	SA1.1	SAA	PA3.1 PA3.2	PAC	TA1 TA2	TAA	V1 V2 V3.1 V3.2	VPA	T1 T2 T3	TSA	SB1	SBA	Occasionally	F2
9	SA1.2	SAB	PA3.1	PAM	TA1 TA2	TAA	V1 V3.1 V3.2	VPB	T1 T2 T3	TSA	SB1	SBA	Rarely	F3
10	SA1.2	SAB	PA3.2	PAO	TA1 TA2	TAA	V1 V3.1 V3.2	VPB	T1 T2 T3	TSA	SB1	SBA	Occasionally	F2
11	SA2.3	SAC	PA1.1 PA1.2 PA1.3 PA1.4 PA1.5	PAE	TA1 TA2	TAA	V1 V2 V3.1 V3.2	VPA	T1 T2 T3	TSA	SB1	SBA	Frequently	F1
12	SA2.3	SAC	PA1.1 PA1.2	PAE	TA5 TA1	TAF	V1 V2	VPA	T1 T2	TSA	SB1	SBA	Rarely	F3

			PA1.3 PA1.4 PA1.5				V3.1 V3.2		T3					
13	SA2.3	SAC	PA2.1 PA2.2 PA2.3	PAB	TA1 TA2	TAA	V1 V2 V3.1 V3.2	VPA	T1 T2 T3	TSA	SB1	SBA	Rarely	F3
14	SA2.1	SAE	PA1.1 PA1.2 PA1.3 PA1.4	PAA	TA1	TAE	V1 V2 V3.1 V3.2	VPA	T1 T2	TSB	SB2+SB6	SBD	Occasionally	F2
15	SA2.2	SAD	PA1.1 PA1.2 PA1.3 PA1.4	PAA	TA1	TAE	V1 V2 V3.1 V3.2	VPB	T1 T2	TSB	SB1+SB5	SBB	Occasionally	F2
16	SA2.1	SAE	PA2.1 PA2.2 PA2.3	PAB	TA1	TAE	V1 V2 V3.1 V3.2	VPA	T1 T2	TSB	SB2+SB6	SBD	Occasionally	F2
17	SA2.2	SAD	PA2.1 PA2.2 PA2.3	PAB	TA1	TAE	V1 V2 V3.1 V3.2	VPB	T1 T2	TSB	SB1+SB5	SBB	Occasionally	F2
18	SA3	SAF	PA2.1 PA2.2 PA2.3	PAB	TA1	TAE	V1 V3.1 V3.2	VPB	T2	TSD	SB2	SBC	Occasionally	F2

19	SA3	SAF	PA3.2	PAF	TA1	TAE	V1 V3.1 V3.2	VPB	T2	TSD	SB2	SBC	Rarely	F3
20	SA1.1	SAA	PA2.4	PAD	TA1	TAE	V1	VPD	T1	TSC	SB2+SB5	SBF	Rarely	F3
21	SA1.1 SA4	SAG	PA2.1 PA2.2 PA2.3	PAB	TA1 TA2 TA3 TA4	TAA	V1 V3.1 V3.2	VPB	T2 T3	TSE	SB2+SB3	SBE	Frequently	F1
22	SA1.1+SA5	SAM	PA2.1 PA2.2 PA2.3	PAB	TA1 TA2 TA3	TAB	V1 V3.1 V3.2	VPB	T2 T3	TSE	SB4	SBG	Occasionally	F2
23	SA2.4	SAH	PA1.1 PA1.2 PA1.3 PA1.4	PAA	TA1	TAE	V1 V3.2	VPC	T2	TSD	SB2	SBC	Occasionally	F2
24	SA1-5	SAN	PA2.4 PA2.5 PA2.6	PAG	NIL		NIL L		NIL		SB7	SBH	Frequently	F1
25	SA1-2	SAO	PA1.6	PAH	NIL		NIL		NIL		SB7	SBH	Frequently	F1
26	SA2.2	SAD	PA1.5	PAH	NIL		NIL		NIL		SB7	SBH	Frequently	F1
27	SA2.1	SAB	PA1.5	PAH	NIL		NIL		NIL		SB7	SBH	Frequently	F1

TABLE A6.3 FULL SYMBOLIC REPRESENTATION OF SHARING SCENARIOS