CO-EXPERIENCE

Katja Battarbee

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UNDERSTANDING USER EXPERIENCES IN SOCIAL INTERACTION

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SUM-MARY

This dissertation focuses on user experience, and in particular co-experience: user experiences in social interaction. User experience is a term that has become popular in user centred design in recent years. It offers a holistic approach to understanding the relationship between the user and product, and the experiences that result from their interaction.

However, a review of the current user experience literature reveals that the term user experience lacks a common definition. Instead, it is often used to embrace a broader context for design that relates to the needs, emotions and experiences of users and to the products that contribute to them. It then depends on the field of design how broad and inclusive the definition becomes. In concept design the focus is on the experiences that the future users find meaningful, useful and delightful, which are used instead of the more common problem-solving approach as the starting point for design. In the design of interactive content, the focus tends to be on the interface solution itself. However, there is also research that attempts to define user experience in a way that is theoretically informed. These recent approaches define user experience as both the "moment" of interaction and its different qualities between person and environment, as well as the meaning making activities that relate the past to the present and anticipate the future. It is the aspect of meaning and its relationship to time that is often lacking from the practice-oriented approaches.

In the design literature there is a clear bias towards treating experience as a private phenomenon and supporting ways to let people express what they have experienced to researchers and designers. However, the social interaction situation influences what is communicated and how. When deciding how to share

an experience, the recipient is used as a resource to determine what experiences are appropriate for sharing and how they need to be presented to offer desirable interpretations. Therefore, direct involvement with future users should be balanced with empathic observation of interactions between future users and the experiences they determine meaningful for each other.

However, despite understanding the current state of the users' life, it is difficult, if not impossible to predict changes in people's behaviours when a new technology or product is introduced into their lives. This thesis proposes that to study co-experience, experience prototyping should happen early and in the field, in the real social and physical contexts of the future users' lives. By observing how users lift up experiences for each other and how others interpret and respond to them, researchers can begin to develop an empathic understanding of the experiences that are relevant for users. At the same time, it is possible to study the interaction with the products and the emergence of meanings and purposes for technology. By focusing on co-experience, user experiences and the adoption and appropriation of products and technology are not artificially separated, but all three happen in context as they are studied over time.

ACKNOWL-EDGEMENTS

The birthplace of this dissertation is an academic community that is interested in current user centred design, best practices, method development and related theoretical and philosophical issues. As a member of this user centred design fan club I have also followed the latest articles and books and followed the activities of the key figures in the field. With fellow fans I have evaluated bits of information and debated identified problems and improvement suggestions. One of the topics this community has been writing and talking about in the past years is user experience. It has been rewarding and challenging to move up from being observer to become one that plays the field, this dissertation connecting many previous pitches into an actual game plan.

The running joke is that designers do not read, they look at the pictures. It is proven that designers can be taught to read and write as well, but at heart we still are make-doers, eager to apply, impatient with purpose and ready to snatch and run off with anything that looks like it might fit. Meanwhile, decades, if not centuries, worth of research elsewhere has been dedicated to pondering the light matters of experience and meaning. Negotiating a path that neither denies design what it needs, nor pretends the other research does not exist would be difficult without a knowledgeable guide. Thanks to my supervisor Ilpo Koskinen, who showed me how to turn my work into a thesis – a feat I still find amazing. Also, the comments from the evaluators Minna Isomursu and Kees Overbeeke greatly helped in the final stages of revision.

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Happy co-experiencing!

1 INTRO-DUCTION

1 INTRODUCTION

1.1 FOCUS AND AIMS OF THE STUDY

The seed for this thesis was found in a project for developing social communication concepts for children. More specifically, it was a field study with groups of children and Gameboys with the camera accessory. The first published article (Mäkelä & Battarbee 1999) described these findings in terms of fun. However, it became a more interesting challenge to try to understand the results from the point of view of user experience. The existing frameworks for explaining user experience were a poor fit with results from field studies on new product use. Why were children mainly trying out products together? Why did these theories and frameworks not seem to address this? What was missing from user experience literature, and how could these findings help to identify and construct the missing element? This led to a review of existing approaches and their strengths, weaknesses and mutual relationships. The aim of this dissertation is to introduce a social interaction approach to user experience to design to balance the bias favouring an individualistic view of experience. Design can be defined in a broad sense as the conception and planning of the artificial (Buchanan 1995), but more specifically this work deals with user research and concept design of products and interaction.

Meaning as a component of user experience has often been somewhat overlooked. In many cases meaning is seen as merely part of a general, unspecified

context, the setting in which a person has experiences. The concept of co-experience can help to alleviate this individualistic in design. The claim of this work is that although experience is in its essence most unique and subjective the way in which experiences "come to life" is a social phenomenon. Social interaction can be seen as the context of meaning making, and at the same time its prime motivator.

"Co-experiencing" means experiencing together, and it highlights the social quality of this activity. As this work suggests, user experiences – the experiences that people create for themselves and others with products – can also be seen as interaction. This work rests on a pragmatist philosophy that treats theories as tools and practical consequences as the measure of relevance (James 1995). The framework for co-experience is from symbolic interactionism, a school of sociological thought that focuses on the interpretation of meanings in social interaction (Blumer 1986). In co-experience, people are prompted to evaluate their experiences and offer them to the shared attention of others, and others are thus compelled to interpret these experiences and respond in some way. People can participate in this exchange in many ways, with or without technology and in a variety of settings. For example, as people were using new mobile multimedia phones to communicate with their friends, they simultaneously came to define the purpose for the technology as mutual entertainment and their relationships as mutual entertainers (Koskinen, 2003b). These were the relevant experiences that they found the technology could provide. In a different social or co-experience context the actions of the people and the purpose of the technology could have become quite different.

People have a desire to share experiences with their near and dear, wherever they may be and whether alone or in company. When designing for and studying user experience, following the content of the growing shared attention, of co-experience, gives insight both into the lives of people and to the experiences they find meaningful.

1.2 THE EMERGING RELEVANCE OF USER EXPERIENCE

How did user experience as a design term come about? Why is the literature on user experience so diverse? This can be attributed to how design as a group of disciplines has evolved in response to new technologies and changes in consumer markets. The world of science has faced increasing specialisation of skills, knowledge and technologies. Technologies become increasingly smaller and more efficient while computation capacity increases, which makes technological solutions cheaper and more widely applicable in consumer products. Pro-

duction cycles are short and the stakes for success in the marketplace are high.

Although designers have always had to work with other disciplines, in practice people need to know about each other's work as well to collaborate effectively. Edeholt and Löwgren cite Jantsch's original concepts from 1972 of multi-, cross- and interdisciplinary collaboration. These are part of a hierarchy of collaboration between disciplines, each are able to address a higher degree of complexity. (Edeholt & Löwgren 2003) Today an even higher level of discipline mix can be identified: transdisciplinary work combines methods and knowledge adapted from other disciplines. In the field of new product concept and technology development designers need to talk to users, their team, executives and other stakeholders alike (Fulton Suri 2004). For this they need concepts that go beyond one discipline's boundaries, which are holistic and inclusive of all the aspects that need to be part of the design domain. User experience as a concept is already being used in this way. The following section follows the history and emergence of the term user experience to this day. The historical review is complemented with a timeline combining the evolution of design, computing, inventions and research (see the Appendix).

1.2.1 TOWARDS USER CENTRED DESIGN

Although user centredness could be reviewed from other disciplines as well, from the point of view of this work it is relevant to do it from and industrial design perspective. Industrial design has always had to deal with the separation of client and user, and to do so in a business and production context. The first designers to be called industrial designers worked already a century ago. Rather than merely designing a product, as had mostly been the case, they took as their challenge to also design its production and presentation. Design was also more than just business; it embodied values and ideology. For example, both the Arts and Crafts spokesperson Moore as well as designers of the Modernist movement believed that good design would bring more happiness to people's lives while both movements had differing ideas of what counted as good design (Tambini 1996). Joining AEG in Germany in 1907 as artistic advisor, Peter Behrens influenced not only the designs of products but also of the factories. His strategy for standardisation and interchangeability of components was a success for both design and business. Behrens also sought a new aesthetic and freed the new products of the decorative cultural baggage of earlier methods of production. (Buddensieg 1984) Industrial product design called for an industrial form language.

Industrial design and its ideological and aesthetic impact spread and grew in Europe; for example the famous Bauhaus school was founded in 1919 by a pro-

tegé of Behrens, Walter Gropius. The 1925 world exhibition of Modern Decorative and Industrial Arts in Paris showcased many modernist designs, and in fact this exhibition transferred the idea of modern design to the United States. There it was soon taken up on a large scale, and consequently both Loewy, known for his streamline aesthetics, and Dreyfuss, known for his human factors and shop-floor production approach to design, opened their respective offices in 1929. Loewy later became known as the streamline stylist and Dreyfuss contributed to the development of a user centred and research driven approach to design. (Tambini 1996)

In Designing for People (1974, first edition in 1955) Dreyfuss describes his five principles for design: Utility and safety, Maintenance, Cost, Sales appeal and Appearance. Dreyfuss also describes his human factors (known on the European side as ergonomics) research, the use of anthropometric data as characters Joe and Josephine. He describes design cases and how good design practice is made to happen with sketches, visualisations and prototypes, through visits to factories, production plants and offices, and by taking courses in sewing, apprenticing with a telephone repair man and selling alarm clocks at the department store.

> "… if people are made safer, more comfortable, more eager to purchase, more efficient – or just plain happier – by contact with the product, then the designer has succeeded." (Dreyfuss: Designing for People, 1974)

The emergence of human factors can be traced to Taylor's "scientific management", practised in the early 1900s and published as a book in 1911. It advertises the detailed study of work broken down into small tasks, analysed, timed and studied and re-organised for maximum efficiency. According to the philosophy, management is responsible for selecting and training workers who are best suited to their tasks. In optimising efficiency, science was to replace rules of thumb: objective measurement and analysis provided information on the previously mysterious nature of work (see e.g. Modern History Sourcebook). Taylor's stopwatch studies were used by human factors researchers well into the 1960s (Tambini 1996). This is in line but also in stark contrast with for example Dreyfuss' empathic and humane approach.

1.2.2 DESIGNING PERCEPTIONS

How did it happen that the mention of the word "apple" causes some computer users to sneer and others to express great enthusiasm? Or that certain types of

fizzy flavoured water seem to be about all but thirst or even the flavour? Or even that small stitched labels on clothes say something about who you are? It is also worth nothing that you are not supposed to sew them on yourself.

Symbols such as emblems, signatures, initials, heraldry and watermarks have been used for centuries on products to identify producer or trader and guarantee quality of produce (Haig 2003). As producing and creating new products became an increasing business, companies needed to enable consumers to recognise products as theirs when seeing them in stores and catalogues. Products of the same manufacturer were made identifiable because of shared visual or design elements or qualities in the design. Recognition did not have to rely on a long history; it could also be designed as any other aspect of the product.

The first systematic corporate image development took place at AEG in Germany at the hands of artistic director Behrens at around 1907. Setting standards for products and interchangeable parts was important also at the corporate level to make managing products and parts easier. What AEG stood for was made concrete in visuals, factory buildings and products, each contributing to the common image (Buddensieg 1984). Corporate image was later also addressed in Italy in the thirties at Olivetti – despite a lack of design schools and industrial designers as such, artists and architects were employed to design Olivetti's advertising, exhibitions, products and factories to a high standard (Kicherer 1990). Philips was a leading technology product developer already in the 30s. In the United States corporate branding emerged in the late 1950s and early 1960s as IBM and Westinghouse integrated the design of their products, graphic materials and even architecture to the consultants' guidelines. (Cagan & Vogel 2002)

As in the cases mentioned above, the use of industrial designers to improve the appearance and style of products and product lines boosted sales – and not only of consumer products but of industrial machines as well. The new consumers of the post-war United States were the large middle class who could now afford a new kind of life style and consumer products – this was the introduction of mass markets. Youth culture emerged in the 50s and 60s, creating a new and eager market segment for whom to market and design. Some companies restyled their products every year to boost sales – designed obsolescence was wasteful but provided more work and business. Some companies rejected this path, and for example Braun's home appliances were known to be durable, long-lasting products with a style of their own. (Tambini 1996)

In the 1970s the values that had maintained the mass markets began to disintegrate. An increased awareness of the needs of special user groups and a growing demand for quality and safety split the market into smaller niches. People's

expectations were higher, and went beyond their own immediate needs, wants and desires. Designers also felt the need for social responsibility to people with disabilities. As the mass markets crumbled, it became necessary to target particular tastes and attitudes. (Cagan & Vogel 2002) Design management entered the business stage.

Branding, the strategic and co-ordinated design of products, graphics and advertising, aims to create a coherent brand image behind the product. These product identities are used to address specific target audiences. A good product with a good brand is more profitable than just a good product, but failures in maintaining the brand also increase losses. Branding also means that a good product does not necessarily succeed on its merits alone (Haig 2003). The marketing and business literature follows design trends closely. The term "experience" was perhaps first applied to design in the context of brands and in talking about brand experiences. In the late nineties, marketing literature introduced the term "experience economy" (Pine & Gilmore 1998). Companies were observed to be offering more than just materials, products and services. To differentiate in competition, the experience (of eating, shopping, buying or using the product) had to stand out from the rest and deliver experiences as well. In his analysis of society and the business of experience, Jensen (1996) claims that people prefer buying a story that has a product attached to it. People are prepared to pay more for eggs that tell the story of a happy chicken laying her eggs in an idyllic farmyard setting. Although this particular example could be seen as an ideological choice, plenty of other examples that are more purely experience-related can be found. This suggests that experience as a commodity will have a great impact on the ways that business is conducted in the western world.

1.2.3 FROM INTERFACES TO INTERACTION

The transition from fuel-powered mechanical machines to electronic products has had a great impact on design and the development of the disciplines that support it. This leap from cogs to electrons has forced disciplines to look at use and the user much more closely, although it took almost half a century from the first computers to computer chips being common in consumer products.

The first computing machines of the 1930s were not much more than extremely delicate and large calculators. They existed in special labs and were operated by expert engineers. Programming was first hardware-based, then command-based and later programming languages and compilers were developed to make programming and debugging easier. (History of Computing) The challenge in operating computing products was that their functionality was elec-

tronic, and there was no movement or mechanism to reveal in the interface. The early usability studies, however, did not come about with the development of computers, but instead in a military context, in the cockpits of fighter planes. During the Second World War only the best men were trained to be pilots but no matter how well they were selected and trained, many pilots crashed their planes needlessly. After some time it was determined that what needed improvement was the cockpit and its controls, leading to new kinds of studies on reaction times and decision-making. (Human Factors and Ergonomics Society) Products had to be designed for physical as well as psychological fit.

The development of computers during the Second World War focused on using them to handle encryption of communications and calculations of trajectories. Various technological innovations influenced the computer, and as the parts of computers became smaller, so did the computers themselves, bringing first terminals and then entire central processing units on the desks of non-scientists. (History of Computing) This challenged traditional ergonomics as well as interface design. These new work environments bound the gaze and attention of workers to poor quality terminals for long periods of time, creating challenges that had not previously affected office workers to this degree. Research on the influence of the environment on people (design, lighting, architecture, population etc.) began in the 1960s (Papanek, 1995). If scientific management focused on physical labour now it was time to take into account workers as thinkers as well.

The field of Human Computer Interaction emerged to apply cognitive psychology to the design of computer interfaces. In the 1970s in Scandinavia, computer systems development proceeded with social and democratic, sometimes even outright revolutionary values regarding work, and created the roots of participatory design as well as the object-oriented programming called SIMULA. (Participatory Design) This was design ethics: systems had to be designed to respect the skills of their users, and to do so, these users had to take part in defining the systems.

In the late 1980s and early 1990s usability engineering became an established part of software development. Procedures such as user testing as well as heuristic evaluations and cognitive walkthroughs became standard practice in software development. About half of all code written relates to the interface, which goes to show how important a good interface is to the task of programming (Nielsen 1993). It was important to establish usability as a measurable and testable quality of the product. The current definition of usability comes from the ISO 9241-11 standard from 1998, which describes usability as “the extent to which a product can be used by specified users to achieve specified goals

with effectiveness, efficiency and satisfaction in a specified context of use" (cited in Usabilitynet). As the consumer demand for better products increased in the 1980s, industries took up quality development programmes to systematically improve quality control in the design process (Cagan & Vogel 2002).

The next challenge and destination for computers was the home environment. Personal computers were revolutionised by Apple in 1984 with the launch of the Macintosh. The Mac was compact and user-friendly and allowed its users to be productive from the first click. It was completely unlike the machines of the office and industry (Cagan & Vogel 2002). The first digital consumer products arrived on the markets in the 1980s as well, bringing with them new design challenges. In the design of interactive content, for example websites or computer games, the product or platform and even the user interface are usually predetermined – not so in the design of information appliances. The designers of these "smart" products need to also address the interface, interaction, form factor, material and context of use issues, which require a greater amount of research and context knowledge and have to be managed with conflicting design requirements (Keinonen 1998: 12). The term "interaction design" was reputedly coined in the 1980s by Bill Moggridge to describe his company's work on graphical user interfaces and smart products (Hartfield & Winograd 1996: 165). The scope of interaction design is broad and includes the product as well as the user, the user's context and actions.

A small number of design companies were involved in pioneering ethnographic experiments in the United States to learn about contexts and users in the 1980s, most prominently Doblin Group, Fitch and IDEO, and later E-lab and Cheskin (Ireland 2003). The design of products and the design of computing are becoming increasingly inseparable to a degree where old discipline-based distinctions of design fail to be useful and multidisciplinarity is a requirement for success.

As usability guru Donald Norman confesses, long ago when colour displays became available he seriously did not think they were better than black and white ones, despite his own reluctance to give up his colour display (Norman 2004: 9). Emotions and aesthetic appeal had at first no weight in the study of cognition or even usability. By the nineties, usability had become something of an everyday word, and had undergone a shift from being a satisfier to being a dissatisfier. Users expected a certain standard of usability and only noticed its absence, when they were dissatisfied. (Green & Jordan 1999) This forced even usability professionals to take a more open view on usability and address the increased importance of satisfaction. The newly invented visual design platform World Wide Web provided a growing forum for creative visual designers

and content developers to channel their creativity into the interactive domain. For many, usability was indeed sometimes perceived as the antithesis of what they strove for: aesthetically pleasing, quirky, delightful, inventive, rich and exploratory, enjoyable in itself, and pushing the abilities of the technology ever further. These kinds of designs (and their indisputable appeal) helped to challenge the usability engineering dominance and prove that aesthetics and delight matter. Among these new designers of interactive content, Shedroff was among the first to latch onto the term "experience design" and apply it to the digital design domain (Shedroff 2001). As a term it was not the previous property of any of the existing disciplines, and even in common use has several different uses and interpretations.

1.2.4 DESIGNING FOR USER EXPERIENCE

Although the term "user experience" is recent, experiences have been addressed in design – always. More specifically they have become central in design that takes a user-centred or people-centred focus. Ehn & Löwgren review the approaches of "human-centred design" and name three worlds in which design is active: the objective, the social and the subjective. All three need to be addressed both in the product (structure, function and form) as well as in the process (engineering, participation and aesthetics). The challenge in design is to find a balance in these questions in the design practice. (Ehn & Löwgren 1997) Although they do not use the term experience, all these aspects are part of the contexts for experience and can be seen as the framework in which designers must operate when designing for experience. Burvall posits that both usability and contextual design (an observation-based process for designing information systems for work contexts, see Beyer & Holtzblatt 1997) fall short in addressing experience, and points out the need for a new product design paradigm (Burvall 2001). While both are relevant and respected in the field of Human Computer Interaction, neither can be called the dominant paradigm of product design, although they have influenced those designers that need to learn from Human Computer Interaction.

The emergence of the term experience in the design literature can be connected partly to this disappointment with usability. Usability has been seen as the facilitator of utility. Since usability does not address the more fleeting qualities of interaction with products, such as aesthetics, associations, delight, excitement, challenge and many similar, relevant aspects of human experience, research has moved to these areas beyond. When the target market's likes, values, expectations and other possible sources of pleasure and delight are known, they can be supported in design through form, visuals and other qualities. How-

ever, it is evident that there is cultural bias regarding human qualities should be supported with design, and what are "less nice", but the truth of what sells products often overrides it (Hudspith 1997). It would seem odd that matters of vice and virtue should affect which user needs are articulated for design. However, when discussing matters of, for example, designing for pleasure and fun, these value judgements become evident. Perhaps user experience as a term can help to legitimise this discussion in a constructive manner.

The beyond usability movement, which stems from hedonic psychology, is one approach for looking beyond functionality and its objective, measurable qualities. Jordan proposes a hierarchy, where functionality is followed by usability, which is topped with pleasure, loosely following a maslowian hierarchy. Jordan's adaptation of Tiger's four pleasures identifies four kinds of pleasures that products can provide: ideo, socio, psycho and physio pleasures which are discussed mainly in a consumer product context. (Jordan 2000) Although the pleasures are convincingly presented and capture a wide range of product experiences, the relevance hierarchy can be questioned – is there not some pleasure in "pure" functionality, regardless of its usability? Hedonistic psychology has been studied also in the area of interfaces (Hassenzahl 2003). However, focusing only on pleasure may fail to account for understanding the role of negative emotions in experience (Desmet 2002). Negative emotions provide depth and contrast for positive experiences: they make challenges exciting and accomplishments sweet. The most satisfying products are ones that support people in achieving suitable degrees of satisfaction, success and sense of reward.

It is a shame that the word experience means so many things at the same time – certain distinctions might be useful. For example in Finnish, there are two words, *kokemus* and *elämys.* The latter denotes "an experience" (a term and distinction that is also proposed by Dewey 1980), something that is multisensory delightful, unusual and that stands out from the rest. The word kokemus means experience in the sense of the experience of the moment, and accumulated experience. The approaches to these different kinds of experience are quite different as well.

Perhaps due to this all-inclusiveness, though, the term "experience" has become an umbrella concept that encompasses all aspects of the product including usability as well as more fleeting feelings of positive or negative quality and things such as entertainment and events. Design for user experience focuses on the user centred design and the challenge of considering people's product-related experiences in design. To rephrase an old design slogan: form and function must fulfil fantasy (Cagan & Vogel 2002).

1.3 WHAT IS DESIGN FOR USER EXPERIENCE?

As this historical review shows, the term user experience has become relevant to many kinds of design and related user research. The term is widely embraced in interaction design, but it is also relevant to the user study stages in concept and product development and technology studies. Its advantage is that it is a commonly understandable, holistic, all-encompassing concept that includes the user, the product and the context of use. User experience also emphasises the importance of the emotional aspects of experience as at least equally important as the previously over-emphasised cognitive and functional aspects.

The problem with the term is in its lack of proper or at least widely acknowledged definition. Defining experience – as is evident in the literature – is hard to do because of its dynamic, even paradoxical, nature. On the one hand, experience is private and unique and no other person can know exactly what an experience is for someone else (Pine & Gilmore 1998, Forlizzi & Ford 2000, Buchenau & Fulton Suri 2000). However, this is seemingly ignored in everyday life as people talk about their holidays, films and food and gossip about absent people, quite able to do so despite this philosophical principle. If close enough is what the entire world operates on, why would that not be good enough for design?

The definition of a concept as inclusive as user experience is not simple. Even the idea of user needs in a neat, maslowian hierarchy (see e.g. Jordan 2000: 4–5) is fundamentally flawed from the experience point of view. Determining that something is usable does not mean that it is at all desirable – the most clear examples of this clash that come to mind are in the area of assistive products (see e.g. the study of bathrooms and elderly in Boess et al. 2002). This is because usefulness, not to mention delight and acceptability, is something that is determined by a person in the context of use, and people have full right to prioritise their needs and desires as they see fit. Functionality is what the product does; utility and usefulness are qualities that a person perceives in it and this is a key distinction. This changes the role of the designer from being the judge of good and bad to being a facilitator and a fellow human being. Understanding the experiences of others is an empathic process and requires that the researcher and designer use their own emotions as a sounding board for understanding those of others.

Consequently the definition of user experience has been avoided in some branches of design literature (as has been noted by at least Hassenzahl 2003 and Marcus 2004). At the same time, there is clear evidence all around us that we can recognise good quality design with a clear purpose, which has been created with aesthetic considerations, and that people are generally more pleased with these products than with things that are poorly defined, designed and im-

plemented (Alben 1997). As long as designers know for whom they are designing (for example, themselves, other designers, a particular user group), they can better imagine and discover what would delight and be useful for the audience. Products and environments are contexts for experience (Overbeeke et al. 1999). Design for user experience is respectful of its future users as represented by people today.

However, in about the last ten years there have been a steadily increasing number of publications from thoughtful designers and researchers who are striving to come to grips with the concept methodologically and to connect methods and processes to a more theoretical understanding of user experience. Researchers have also approached the topic from many disciplines: e.g. psychology, ethnography and philosophy. Some of the definitions refer to previous work, but those who do often do so only selectively. To overcome this disparity, this dissertation analyses existing user experience literature as well as some related fields with the intention of connecting efforts to each other and discussing their limitations. These limitations generally relate to one or more of the following areas: the treatment of emotions, the relationship between time and experience, the definition of context and the origin and interpretation of meaning.

The shortcomings in the framing of the context may range from the focus being entirely on the product without considering to what other real world experiences and situations it should connect. The qualitative differences between lab-based interviews or product trials and the same conducted in the real use context are to my knowledge not available, but excluding the physical surroundings as well as the social context may lead to a disconnected and unrealistic evaluation of a product, be it about physical fit or social acceptability.

The study of product-related emotions is gaining popularity, but the key difference between studying them and studying user experience is that studies on emotion treat meaning-making processes as a problem because they distort the reporting of emotions. However, it is not possible to describe experiences without these processes. Secondly, the study and definition of emotions often follows a stimulus-response type of model, but does not take into account how emotions are interpreted and modified in social situations and used strategically as a resource in social interaction. A more thorough review of this issue is presented in section 2.2.

If people are to reflect meaningfully on their experiences, they need time to do so, and if they are to determine relevance and purpose through experimentation, they need even more time. In the case of field studies on product use, the novelty effect may last several weeks. Adopting products into use is an even

longer process, in the order of months, even years (Muller et al. 2003). Although many constraints on time and resources affect how user experience studies are conducted, some aspects of product experiences cannot be studied in a matter of hours or even days. As a designer once said in reference of time constraints and research in the design industry: "we are in such a hurry that we have to run with our bicycles." Sometimes the difference between doing research and doing research properly is not great, but convincing the necessary people of this difference can be impossible. This is one issue where research, hopefully, can give back to design practice.

1.4 User Experience and Meaning

Meaning is the glue and thread that connects moments into events and stories, that connects one incident with another, and that introduces strategy and organisation into daily life. On the one hand it is learned and observed from others, on the other hand it is necessarily also an individual interpretation and creation. In any case, it needs to be accounted for in design, and its definition influences the resulting activities and processes. This section discusses the concept of meaning. Following Dourish's analysis of the term, meaning can be seen as an ontological question – how meaning arises. The idea of meaning as intentionality has also been explored. Meaning can moreover be seen as a question of communication: how can experiences and meanings that are essentially private become shared with others? (Dourish 2001) This angle on intersubjectivity is key to the concept of co-experience – the sharing of experiences.

Meaning as a matter of ontology is a question of how meaning is constructed and how it emerges. In Cartesian ontology meaning is internal, something that is assigned to sense data (Dourish 2001: 127). Blumer describes the same in simpler words: meaning can be seen as something that people attribute to objects, or in an opposite fashion that it resides in objects and emanates from there to the surrounding world. The last in the list of three is usually the preferred view, and according to Blumer, meaning should be seen as something that is created by individuals interacting in the social world of people and objects. (Blumer 1956: 4–5)

The problem with Cartesian philosophy is the tendency to develop and work with abstract models that fail to account for the details of real phenomena, the tacit and experiential and emerging properties of life. If data do not fit a model two things can be done: the odd data can be discarded or the model can be revised. In this situation designers should, and probably would, forget the model and instead become curious and begin to investigate what the anomalous

has to say about the ordinary and the possible design opportunities that have been revealed. In studying user experience, the focus should be on the world according to the users, not according to the designers, the professional critics and makers of products.

Designers are interested in creating something new – to do this they need an understanding of the current and use that as a starting point. One common strategy is to begin by studying existing products to define the starting point. Aside from feature lists, this evaluation process is often also an evaluation of appearance – as Vihma notes that the semantic and aesthetic features of products are often treated together and seem to be related (Vihma 1995: 14). Products communicate with their form and appearance. In product semantics, products have representational qualities, which mean they act as signs. Products can contain iconic signs such as images, diagrams and metaphors. They can also serve as an index, like smoke is an index for fire. Symbols refer to general ideas; examples of such are the things that come to mind when seeing a word or a colour – ideas that have been learned in the culture. (Vihma 1995: 68–70) However, the question of the relationship between an object's design and the context in which it is evaluated is not particularly taken into account in this treatment of meaning. The conclusions that designers can draw from observing products in their office or studio should always be treated as designer's general evaluations, and not reliably representative of those of the users in their environments.

It is also known that people bestow personal meaning on objects. For example, these objects may be kitschy souvenirs or trinkets (Norman 2004), or any of the many things in people's homes, where each family member may have their own meaning and story relating to a particular item (Csikszentmihalyi & Rochberg-Halton 1981). Stories of meaningful or significant products can be a good vehicle to learn about people and the things they hold important and the experiences that are relevant. However, studies show that such personal meanings to objects are not entirely arbitrary, and that people can guess or empathise with many of the more general meanings that objects can have for people. This suggests that the meanings that objects are given are not entirely private and idiosyncratic, and that these meanings possibly have different cultural levels as well. (Richins 1994)

The third idea that meaning is created in interaction between the person and other people and the world is interesting, because it looks at meaning making as a process, which accounts for change as well. This idea has existed in debate both in phenomenology as well as in pragmatist philosophy. It is a critique of the older Cartesian division of mind from body and the idea that thinking is

something independent of being and doing (see e.g. Dourish 2001: 18, 127; Peirce 1995: 38). The phenomenological philosophy's trail is reviewed from a computing standpoint by Dourish (Dourish 2001: 106). Dourish's purpose is to track the concept of embodied interaction, and discuss its role behind both social computing and tangible interaction. It ties in perception and action, thought and emotion, and physical and social contexts.

Pragmatist philosophy include the rejection of final truths, a desire to avoid endless philosophical debates and instead focus on practical consequences and applicability (see e.g. James 1996: 56). Dewey writes that "experience is the result, the sign and the reward of that interaction between organism and environment which, when it is carried to the full, is a transformation of interaction into participation and communication" (Dewey 1934: 22). Thought is tied to experience, which arises from interacting in the world. Dewey suggested that acts of expression (as in acts that result in works of art) are a way to deal with emotional tension and distress – positive forces for action. He also suggests that the work of a scientist and the work of an artist are in fact similar, not polar opposites (Dewey 1934). Tension and equilibrium are fluctuating states of existence and action and expression affect and influence them. Meaning is discovered and expressed in action with the world.

The theory of affordance, originally by Gibson and the field of perceptual psychology, addresses the particular aspect of an individual interacting with his or her environment, and also states that meaning is created in the interaction (Overbeeke & Wensveen 2003). People perceive their environment according to the abilities they have, and thus perceive it as either enabling or disabling: a person who is travelling on foot looks at the terrain ahead in terms of its walkability. However, applying the idea of affordance to contemporary design problems remains superficial: even if a button clearly invites pushing, how can pushing a button to cancel be different from pushing a button to initiate, when the purpose of these actions are opposite? The concept of feedforward has been suggested to extend the idea that form should communicate action to the fact that form should through interaction also communicate its purpose (Wensveen et al. 2004, Djajadiningrat et al. 2004). However, the role of social interaction can also be included in a symbolic interactionist fashion to this debate. Following the example above of the walkability of the terrain, the evaluation of the walkability of a mountain path is greatly affected by seeing small children run and play along it, or by hearing about an experienced hiker who last year stumbled on it and fell to his death.

The key to this social transfer of meaning is intersubjectivity. Intersubjectivity is the process of many individuals coming to know a common phenomenon,

although each does so through their own subjective experience (Dourish 2001: 131–134). Dourish describes the challenges of communicating actions and purpose in the form and appearance of products as intersubjectivity between designer and user. When designers claim to be "designing experience", they have the first approach in mind, communicating to the user through the design. The product, whether it is a form, a song, a website or a space, is designed to evoke particular experiences. To say that the experience has been designed suggests that the receiving end merely comes into touch with the design and the experience is delivered to them. Experience is constructive and active (Sanders 1999), regardless of whether people are sitting still in a cinema, snapping photos or building a log cabin. Communication is as much about sending as it is about receiving, and feedback in the form of sales is not necessarily enough to constitute experience feedback. A product may sell, but for what reason?

Another kind of intersubjectivity is what happens between users as they communicate with each other using products or systems (Dourish 2001: 131–134). In evaluating their own experiences people take the role of others to determine what is relevant and acceptable for sharing and how it should be communicated Many approaches overlook this process as something worth studying (with the obvious exception of communication technology studies where using *is communicating).* However, by studying the process of sharing experiences designers can come to know the kinds of experiences people find relevant and how they share them with others. In doing so they can learn about the product as well as the story that goes with it. People communicate with each other because they like to and because they can. This is what is at the heart of co-experience. The design of a product or system as a context for experience impacts what kinds of experiences become shareable, how they can be shared and how others can respond to these shared experiences. Even more interestingly, new technology products put people into the role of content developers. With new information and communication technologies all content can be digital, which means that it can be easily copied, transmitted via cables or wireless to other personal products, and published for the possible viewing of millions on the Internet.

1.5 DATA AND METHODS

For the source material on user experience models, frameworks and theories, this dissertation relies heavily on the review and study of published design and research work. Although these reports of published work come from many relevant design conferences and other publishing forums, only a fraction of design work ever gets represented in this way. The more research-minded com-

panies are more likely to publish reports on their work, but the quality of the design work cannot be equated with the willingness to report it. However, it is likely that within the published results there is a strong representation of best practices and field leaders – review processes support this kind of positive bias. Language issues and cultural affiliations have partly affected which geographic areas and cultures have become represented in this study. There is a clear North-European and Anglo-American emphasis in the selection of reviewed work, and only material published in English (or, in a few cases Finnish) has been used. However, English is the preferred language for international reporting of work in this field, and as a source language it is probably the least limiting one both culturally and regionally.

The research that has been used to exemplify and develop the analysis on the concrete level in this work belongs for the most part to two projects involving field studies. These are the Maypole project for designing social communication product concepts for children (see article 1, Mäkelä & Battarbee 1999) and the Mobile Multimedia project for ascertaining what consumers of mobile multimedia communication would like to do with it (see articles 2, Battarbee 2003a, and 3, Battarbee 2003b). The same issues are also discussed in articles 2 (with anecdotes of product use involving a mobile phone and a internet chat environment in Battarbee 2003a) and 6 (which describes a concept design workshop group's process and thoughts for developing communication concepts for urban communities in Battarbee et al. 2002). The main key data are field studies of technology use and involve mobile, personal technologies for communication. In Maypole, users were given new products to experiment with for a week and the results were collected in artefact interviews together with the pictures the participants had taken. In Mobile Multimedia, groups of users were given multimedia messaging capable phones and a free account for messaging for five weeks. No interviews were conducted, but the messaging data in itself provided a rich window into the groups' new and evolving messaging patterns.

Both projects represent design problems in which user experience is of the highest importance and in which contexts of product use change. Both are a challenge for conducting studies and consequently, these cases can be treated as examples of extreme cases of user studies. (Naturally, each context has its problems, but the mobile context is always a observational challenge.) It is not surprising, then, that when observations from these cases were used to test existing frameworks of user experience, the frameworks were found to be lacking in accounting for and explaining the importance of social interaction and its role in making user experiences meaningful.

The analysis of the user experience approaches and frameworks has proceeded by comparing models to each other and identifying similarities and differences. The groupings have been revised as the work has progressed, and thoughts have become clearer and better defined.

The concept of co-experience has also gone through several cycles of descriptions and definitions, which are evident in articles 2 (Battarbee 2003a) 3 (Battarbee2003b), 4 (Battarbee & Koskinen forthcoming) and 5 (Forlizzi & Battarbee 2004). The early attempts to describe what kinds of experiences become shared or what dimensions describe such shared experiences also address different audiences. The short article 2 (Battarbee 2003a) is for the computer human interaction audience and article 3 (Battarbee 2003b) is aimed at a design audience with an interest in pleasure and its relation to design. The definition of co-experience became more solid in article 4 (Battarbee & Koskinen forthcoming), where it was described as a process of lifting up and responding to experiences. Article 5 (Forlizzi & Battarbee 2004) further attempted to connect the concept to other evolving models of user experience.

1.6 THE STRUCTURE OF THE DISSERTATION

This dissertation contains two parts: the introduction essay and the articles. The purpose of the introduction essay is to present the work that has been published in the articles as a coherent whole, describing the backgrounds of the arguments, the arguments themselves, and connecting the work and ideas described in the articles together.

1 INTRODUCTION describes the aims of the study. It states the problem of individualistic bias in the understanding of user experience, and the general lack of a common definition. It seeks to explain this situation with a review of the emergence and development of the term user experience through the last one hundred years. The concept of meaning is described as a key aspect of user experience. The data, methods and structure of this article-based dissertation are also explained.

2 USER EXPERIENCE DEMYSTIFIED reviews a broad selection of existing frameworks that describe or define user experience and compare them to each other. As emotions are identified as a key element of experience, the chapter also reviews current research approaches to emotion and design, defining their essential differences. The interactionist approach is selected as the most valid one, and emotions in interaction are also discussed. The chapter also compares and analyses four well-published approaches of understanding and designing for user experience.

3 CO-EXPERIENCE takes the most promising aspects of existing frameworks, but points out their shortcomings: a lack of addressing how meaning comes to be and how it changes in social interaction. To account for this, the work builds on a framework based on symbolic interactionism. This chapter also discusses the methodological implications that co-experience has on conducting user studies and design, emphasising field studies, prototyping and empathic observations.

4 PRESENTING THE ARTICLES introduces the articles and discusses the work described in each. The articles included in this dissertation are all published in English in peer-reviewed conference proceedings or journals, and are printed in this chapter in their entirety.

2 USER EXPERIENCE DEMYSTIFIED

2 USER EXPERIENCE DEMYSTIFIED

This chapter does three things: it outlines and groups together existing frameworks of user experience, it reviews current research approaches to emotion and design and finally describes four design approaches that take user experience into account in an interesting way. The frameworks presented here have been published in a range of different sources, but what is common to each is that they represent theoretically informed understanding of user experience. Why should we theorise about user experience? Dourish argues that philosophies influence both the theory and practice of design and determine what efforts are made and what kinds of success can be expected with the results (Dourish 2001: preface). Although Dourish focuses on interaction and computing, his work has been helpful in looking at user experience as well, because both hinge on the concept of meaning. The philosophy was reviewed in chapter 1, this chapter is dedicated to the theory and practice.

2.1 USER EXPERIENCE THEORIES AND FRAMEWORKS

A number of designers and researchers have put effort into creating frameworks to describe user experience; some have reviewed the work of others and some have chosen to reflect on their own work and process. In the following they are organised into three loose groups according to their basic principles. The first

group is for person centred frameworks that focus primarily on the individual's experience and the elements that contribute to it. These tend to be a description of general characteristics of experience that are relevant for going beyond utility and usability. The second group is for the approaches that aim to connect product features to experience and create checklists describing the product-related experience contexts. They tend to focus on the practical ways in which evaluations or distinctions can be made of the experience. The third group is an approach that focuses on the interaction between person and the product in its context. In fact, for these the product is merely the connective node in a network of things in context. Furthermore, in contrast to the other approaches that often seek to identify relevant dimensions for experience, needs and desires become relevant if and when they emerge in the interaction, but there is no prescribed checklist for those either.

What all these frameworks have in common is a designer friendly simplicity and the preference for using a small number of concepts, generally three to five, over detailed, complex and specific categorisations, processes or methods. After all, an idea needs to be well-understood to be easy to apply in designing and creating something new.

2.1.1 PERSON-CENTRED FRAMEWORKS: WHAT PEOPLE NEED

These frameworks cover a wide array of ways to understand people. Some of the frameworks focus on people's needs in general, others focus on the relationships that people have with products. Further still, some approaches look at why some activities with products are pleasurable and others are not. What these all have in common is the idea that products should satisfy people's needs and that user experiences revolve around these needs. The frameworks then differ in the naming and interpretation of the needs and how specific or generally human the named needs are.

Although not a framework on user experience, it is relevant to begin with the key formulation of the "beyond usability" literature. Jordan's version of the four pleasures (first presented by Tiger) lists the kinds of pleasures that people can have with products. Ideo pleasure refers to values that products can satisfy. This means that products are sometimes chosen because they reflect or represent values that are important to the person. Socio pleasure deals with interaction with others. Products that facilitate communication as well as those that serve as conversation pieces contribute to socio pleasure. Physio pleasure relates to the senses. Visual qualities are important, but so also are audio, tactile and olfactory qualities. Psycho pleasure relates to the mind, and is rewarding

because of the way people enjoy challenge, learning and problem solving. (Jordan 2000) These four kinds of pleasure show how pleasure can tie into almost any aspect of life.

The six degrees of freedom of user experience space (Marcus 2004) focus on the user's needs although the descriptions of the elements are written to apply specifically to the design of interactive products and websites. I-ware relates to identity and privacy, you-ware to connecting to other people and communities, fun-ware is for entertainment, buy-ware is about commerce, know-ware about information and be-ware about self-enhancement and wellbeing (see Figure 1). The advantage and shortcoming of such application-specific frameworks is that some aspects (as here privacy, commerce and knowledge) are presented in a way that relates to the activities or product categories of the specific domain, but that applying such frameworks to other kinds of design might not work as well. This seems to echo the kind of thinking that is behind Jordan's four

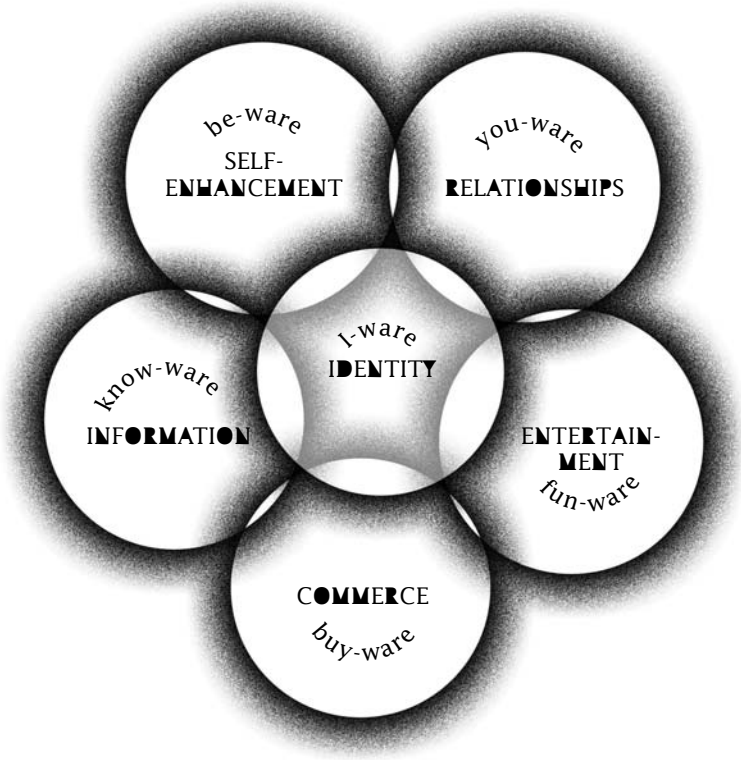
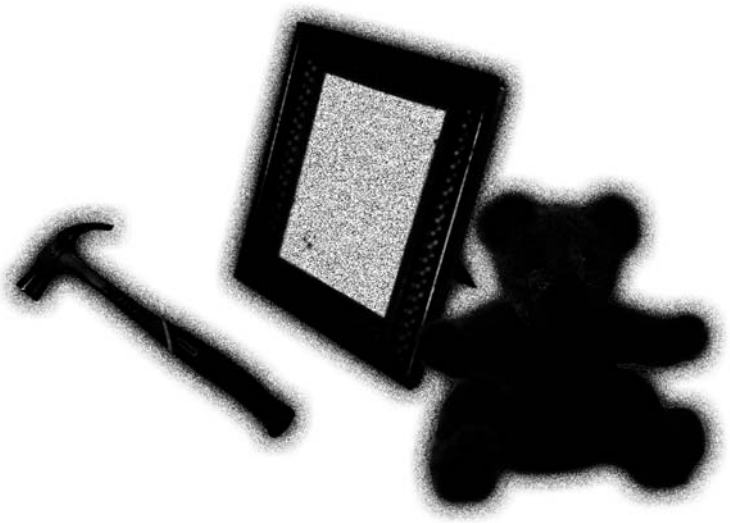


FIGURE 1 *Six degrees of freedom of user experience space (Marcus 2004).*



MEANINGFUL TOOL MEANINGFUL ASSOCIATION LIVING OBJECT

FIGURE 2 *Meaningful relationships with products fall under three categories: meaningful tools, meaningful associations and living objects (Battarbee & Mattelmäki 2002).*

pleasures, but specifically for the web – sensory experiences, for example, are not included at all.

Another way to focus on product experiences is to see what kinds of meaningful relationships people can have with products – assuming that people have needs that lead to product use and then to relationships. The study on the meaning of things (Csikszentmihalyi & Rochberg-Halton 1981) is a classic, but their exhaustive classification is too heavy for designers to use. Similar meaningful relationships could be described in a more general model, in for example three categories. These are meaningful tools that help people to do things that are important to them; meaningful associations such as memories, stories and values that are attached to products; and living objects, products that people become fond of and to which they are attached (Battarbee & Mattelmäki 2002) (see Fig. 2). Such relationships are relatively far removed from the actual experiences during use; other models focus more on these experiences.

Hudspith considers four aspects of psychological needs that need to be addressed for user experience: perceptions, latent needs, beliefs and emotions. The model offers three concepts for making these salient. Utility is the useful-

ness – the ability to facilitate tasks. Ceremony is about facilitating rituals, symbolic uses that attach ceremonial qualities to the products that play a part in them. Appeal refers to the perceived qualities of products, including aesthetic values, social perception and identity. (Hudspith 1997) While utility and appeal are concepts that are easy to grasp, the idea of ceremony is a little odd and elusive – Hudspith notes that evaluators found it the most difficult to grasp and evaluate. Sometimes the symbolic value of an object and its monetary value are entirely unrelated, and this relationship is probably also culturally influenced (Battarbee & Mattelmäki 2004). A different term would perhaps give the richness of material culture a better foothold in this model. Although appeal deals with hedonic psychology, Hudspith also notes that sometimes less attractive qualities in people such as gullibility, vanity and greed are the ones that help to sell products. What is missing from this model are the pleasures that deal with product use for things like creativity, self expression and challenge – it would seem that breaking them up into utility and appeal would cause something essential to be lost.

Margolin offers four dimensions that could help better elaborate the relationship between the designer and the user – for him experience is a way to gain a better notion of the person who will use the product than the traditional idea of the user. These are the social dimension, the inventive dimension, the operational dimension and the aesthetic dimension. The social dimension in this point of view relates to products, social problems and legislation. The inventive dimension relates to being able to conceive products that will be enjoyed by and be valuable to the users. The operational dimension relates to use and usability. The aesthetic dimension he lists as being the one where designers are most prescriptive and are least accepting of the taste of the public. (Margolin 1997) Margolin further lists three ways that the user experience can come to be known by designers: by own experience, by users forming developing communities and by specific user research activities. What seems to be lacking in this understanding of user experience is its empathic and emotional quality, and what is unusual (yet problematic in its directness) is the attempt to relate user experience to society and legislation. Although for example Dewey (1980) takes the discussion of art as experience to the level of societal well being, product design literature rarely connects to society on this level.

Hummels places emphasis on the need for aesthetic interactions and respectfulness, and calls for resonance and products that people can engage with and create their own rituals. Her approach emphasises personal meaning and tactile qualities of products, and her interpretation of respectfulness and resonance deals partly with the way in which people handle and interact with products. For

example, the grace and care needed in using an old record player with a needle should be compared to the operations of compact disk players. (Hummels 2000) The full capacity of people's senses could be addressed more widely in the design of electronic products. Aesthetics is not just for the eye but for action as well. This view seems to emphasise a designer's way of seeing and relating to objects, although it is true that the experience of operating products is commonly not addressed as much as it should.

Hassenzahl states that people have two modes for product interaction: goals and action. The goal mode is practical and work-oriented; the action mode is for fun and entertainment (see Fig. 3). Hassenzahl thus suggests that enjoyment has more to do with the human mindset than with the product. Hassenzahl helps to clarify why the same thing can be experienced at times as irritating and stressful (in the goal oriented mode) but at other times exciting, challenging and fun, when in the action oriented mode. (Hassenzahl 2003) The model does not account for how or why these modes change or what other aspects may influence experience, such as aesthetics.

As can be interpreted from the variety of these mainly person-centred models, determining the most relevant dimensions that people find significant in product experiences and making them understandable, accessible and usable is not simple. In that sense, Jordan's framework of pleasures is probably the most general yet practical. Focusing more on action and the moment of experience, Hassenzahl's model explains why Hummels' call for resonance sounds at the same time both wonderful and annoying, as our preference for enjoying action versus accomplishing tasks varies in interaction. These two models tie our experience more tightly to the moment of experiencing instead of separating utility from pleasure and other emotional aspects.

2.1.2 PRODUCT-CENTRED FRAMEWORKS: DESIGN AND RESEARCH CHECKLISTS

As design is about creating something, it is natural that models also focus on the qualities of the design and their relationship to people's experiences and evaluations of them.

Jääskö et al. have developed a framework that describes the elements that contribute to user experience from the product point of view especially in the context of concept design and user studies. To understand the user experiences that relate to products, five different viewpoints, or worlds, can be identified: the world of activities, the world of product meanings, the physical world, the world of products and the world of humans (see Fig. 4). They call the set up the scene of experiences (Jääskö et al. 2003).

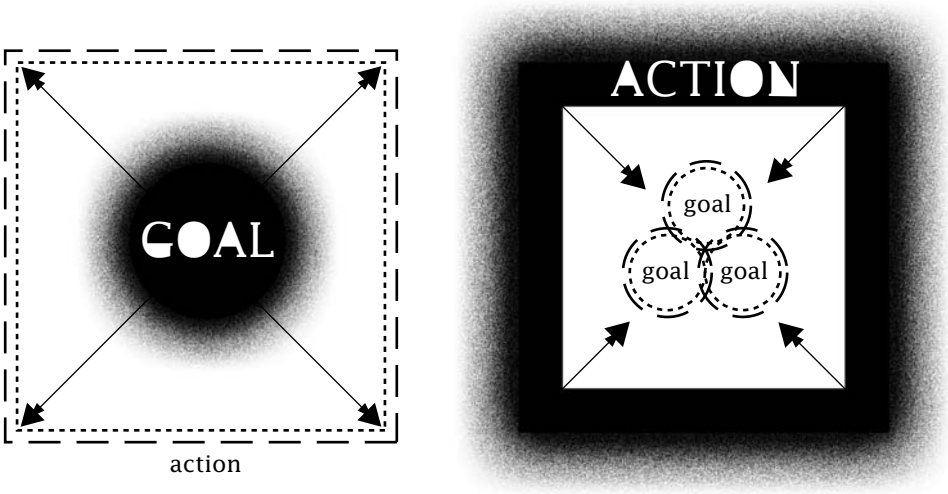


FIGURE 3 *Hassenzahl's model of goals and action in work and fun: Goal mode is for productivity, action mode for fun (Hassenzahl 2003).*

The framework's advantage is that it connects clear techniques and activities to each of these worlds, creating a comprehensive chart for placing user study activities in relation to each other.

Kansei engineering (Nagamachi 2001) attempts to identify the feelings that customers seek and engineers products to create and suggest these feelings in their look and feel. Feeling, here, is a crude translation of the Japanese concept of kansei, which means something like the psychological feeling or image of a product – an exact translation is difficult to create. Through a systematic engineering and testing process, products can be designed to support the image the manufacturer wants to convey.

Hassenzahl (2003) gives product features a European treatment, basing the views on combining usability and pleasure. Product features contribute to character, but the features of products can be identified as hedonistic and pragmatic attributes. The hedonistic attributes are stimulation, identification and evocation, which relate to the self – the pragmatic attributes relate to what Hassenzahl calls the act dimension. The consequences of products can be satisfaction, pleasure and appeal (see Fig. 5).

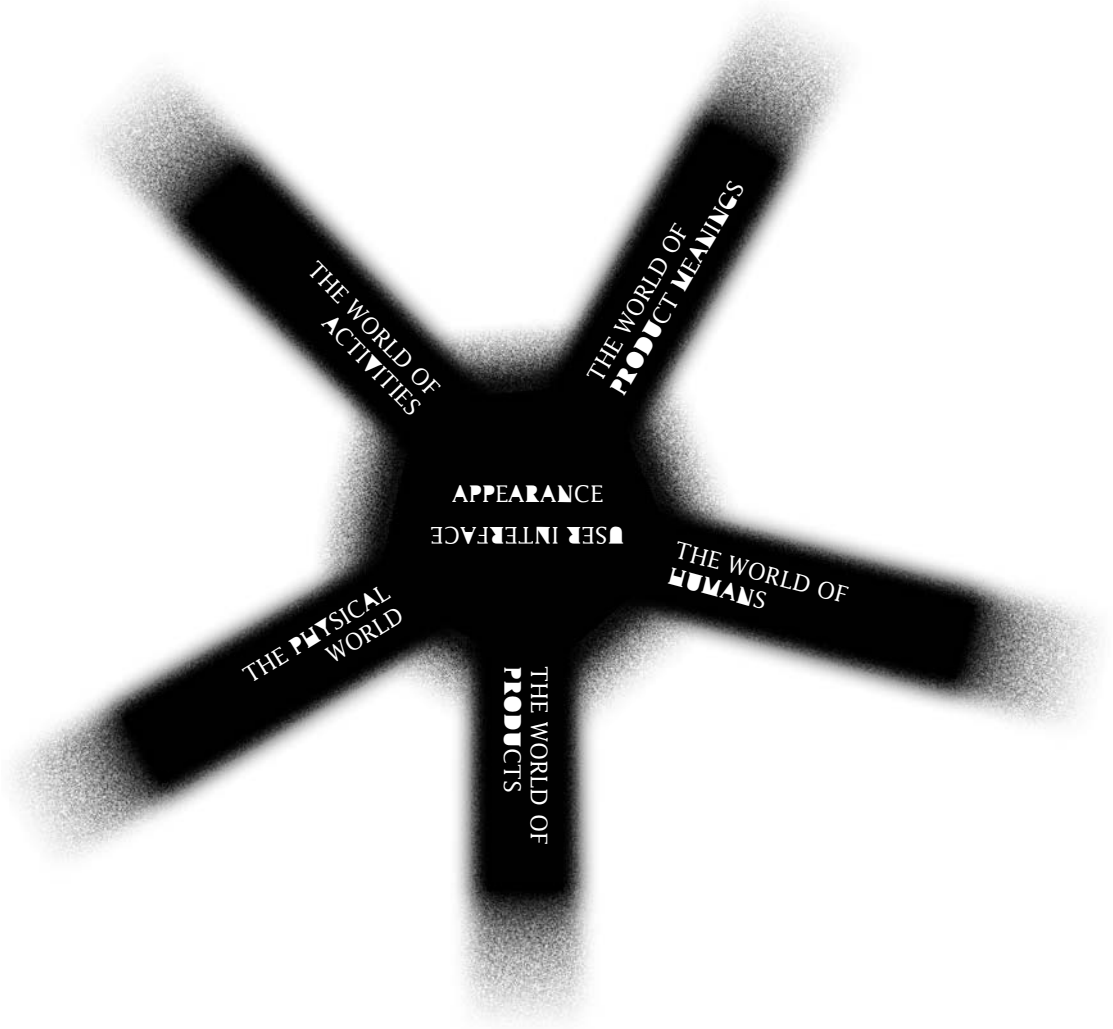


FIGURE 4 *The scene of experiences – the five worlds which need to be understood to learn about user experiences. (Jääskö et al. 2003).*

Interaction designers who focus on designing digital content address a particular subset of product use in their frameworks. Garrett offers a model for information design that connects structuring the user experience of hypertext and interface with creating the interface for a website. The design of experience happens on five levels: strategy, scope, structure, skeleton and surface. (Garrett 2002) However, this model of user experience for information design fails to include sensory qualities of experience, which can be included as an elaboration of Garrett's model towards all kinds of online experiences (Olsen 2003). Compared to the scene of experiences by Jääskö et al., these two versions of the model relate to the development process, not the evaluation of a product, and consequently they do not include the context of the experiencer as a part of the experience.

Products can have different roles and stages over time – static views do not always emphasise enough the ever-changing nature of product experiences. Holman's study of roles of products as seen in advertising demonstrates the range they have from background and low intensity to higher intensity prod-

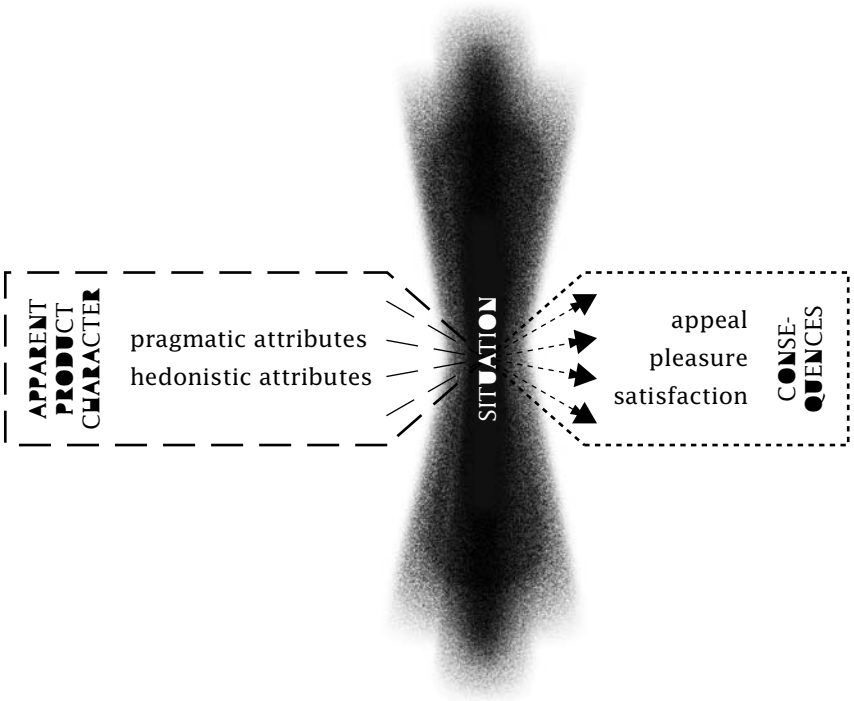


FIGURE 5 *The user perspective of product experiences: in a situation, a product's pragmatic and hedonic attributes result in appeal, pleasure and satisfaction (Hassenzahl 2003).*

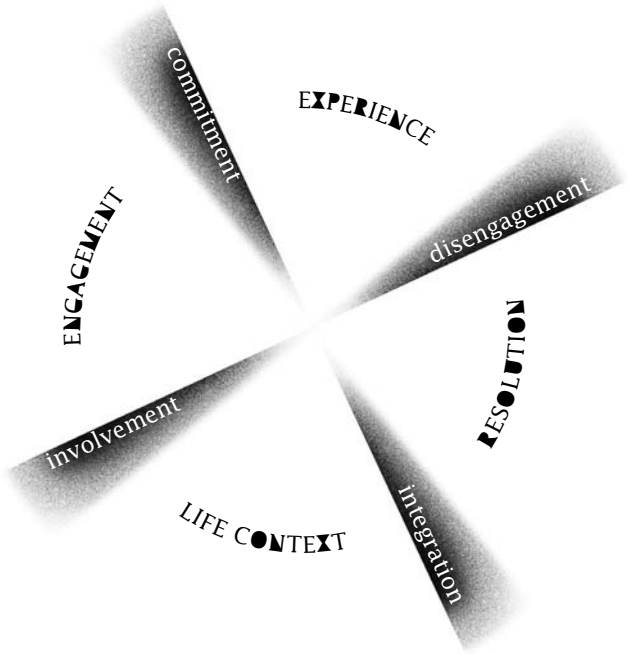


FIGURE 6 *The life cycle model of product experiences with transitions and stages in the product involvement (Rhea 1992).*

ucts in the focus of attention. (Holman 1986) Holman does not account for how products achieve these positions in life, or what qualities in them support a high involvement; however it is important to note that background roles can also be relevant for products. Rhea's life cycle of product meaning explores this idea of changing roles from the point of view of one product. In this life cycle events change a product's position and the experiences that relate to it (see Fig. 6). (Rhea 1992) As often with cyclical models, things do not necessarily move only in this order, and even if products disappear from a life context, they may return to it.

Product-centred frameworks typically do not take time into account in their formulations – of these the only real exception is Rhea's model. These views on what contributes to experience are most connected to practice and pick and mix resources from disciplines and practical experience. Frameworks that focus exclusively on the product or solution may be less helpful in a situation where desired experiences do not have an obvious product form. Frameworks that focus on the design process are also less directly transferable: what may work for designing the structure of a website may not address the core design issues of

other kinds of products. These models also emphasise a designer's way of looking at products and experiences rather than a user's manner of perceiving and evaluating them – a distinction that needs to be acknowledged in design.

In fact, many of the models, both person and product centred, can be seen as representing personal or corporate philosophies, and have probably been created as part of developing a business brand or profile on how a company does good design and being distinguishable from other, competing designers. They use terms and frameworks that are simple enough to serve as communication tools by customers as well as for in-house use. As all designers are individuals, what works for one may not work for another – it is the mark of growing as a designer to develop a personal process and approach. The trend, in fact, may be towards turning designing into a myth and avoiding actual theoretical reflection (Buchanan 1995). Design, however, has such economic potential that relying on a myth may not be viable. Certainly there is no need to create user experience hype. Experience as a term is too useful to merely be used as marketing hype and then discarded.

2.1.3 FOCUS ON THE ACTION: FRAMEWORKS ABOUT INTERACTION

The person-centred and product-centred approaches described above have their purposes and uses, but as the evaluations attest, there are aspects that leave something unaccounted for. They are at times too static; they attempt to use terms and categorisations to describe user experiences that reflect designing more than experiencing, and in some cases time and context are not included in the frameworks. The way to span all these aspects in an experience-oriented way is to take interaction as the focus of study. There are currently two ways to address interaction: from an experience-in-interaction point of view and from a perception-and-meaning point of view. The experience-in-interaction view takes the individual and describes his or her experiencing in relation to time. There is the moment, what came before and what comes after. It is precisely the addition of the moment that sets these frameworks apart from other kinds of studies on product meaning or pleasure. The perception-and-meaning view describes the kinds of changes that happen to how the moment is experienced.

Focusing on the interaction requires accounting both for the subjective and the observable: what people do and how they interact. Sanders describes user experience as the spark (see Fig. 7) between what has happened in the past and what is expected in the future (Sanders 2003). This is the simplest of the models.

This model provides an appealing visual for describing experience as both of the moment (the spark) and as something that aims to connect past experiences to

the moment and to future experiences. Further, the same illustration contains the various ways to access these experiences: the doing, saying and the making.

Mäkelä and Fulton Suri break down the moment of experiencing to the elements that can be analysed: the context, motivations and actions. The model describes how previous experiences influence motivated actions in context, which produce expectations. (Mäkelä & Fulton Suri 2001) This model then lists the things that need to be studied: a person's past experiences, his or her current motivations and what he or she does, the context and any expectations for coming experiences be identified (see Fig. 8). The importance of this model is that it is also relatively simple and it takes time into account – experiences change in time.

Further, Kankainen (née Mäkelä) elaborates in her dissertation the motivational theory behind part of the work. It postulates that action is influenced both by motivational level needs (why someone is doing something) and action level needs (how something is accomplished in the moment), which may be emotionally directed. (Kankainen 2002) This follows that the motivational level of action is engaged with thinking about identity, roles, values and such, and that action level needs connect with usability and tasks. This distinction derives most likely from the process of interface development. However, the examples presented of motivational and action level needs are too similar and seem to suggest that drawing these distinctions, or at least their application to field study findings, is not straightforward. Social learning and influence of others are mentioned as important factors in forming expectations. Positive emotions and satisfaction are the results of met or exceeded expectations, but over time products face value erosion – something that was delightful today may be ordinary tomorrow and dissatisfying the day after.

Forlizzi & Ford base their work on the philosophy of John Dewey and examine what happens to user experiences in interaction. They identify and address three ways of talking about experience: as the ongoing, as an event that has a beginning and an end, and as something that is part of storytelling. Experience thus fluctuates between these states. The model suggests that experiences can be of different natures: well learned and subconscious, or in the process of being learned and cognitive (see Fig. 9). As experiences become meaningful, people's actions take on a storytelling quality, resulting in changes in the product, and changes in the person (Forlizzi & Ford 2000). The nature of experience is volatile and ever-changing. This model has been later elaborated to include co-experience as well (Forlizzi & Battarbee 2004, article 5).

This is, as far as can be seen, the first model of user experience that mentions meaning explicitly as a part of user experience. The model also accounts for

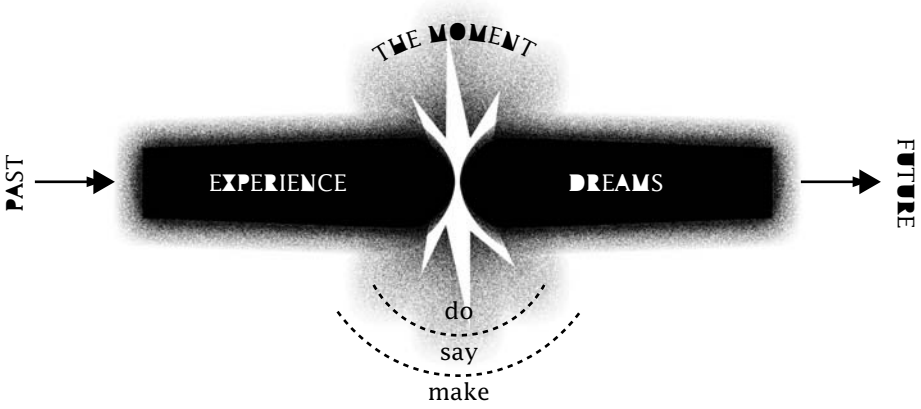


FIGURE 7 *Experience as a spark of the moment between the past and the future. Tools for understanding what people do, say and make relate to experience (Sanders 2003).*

FIGURE 8 *User experience as motivated action in a context, which is influenced by past and which results in modified expectations for the future (Kankainen & Fulton-Suri 2001).*

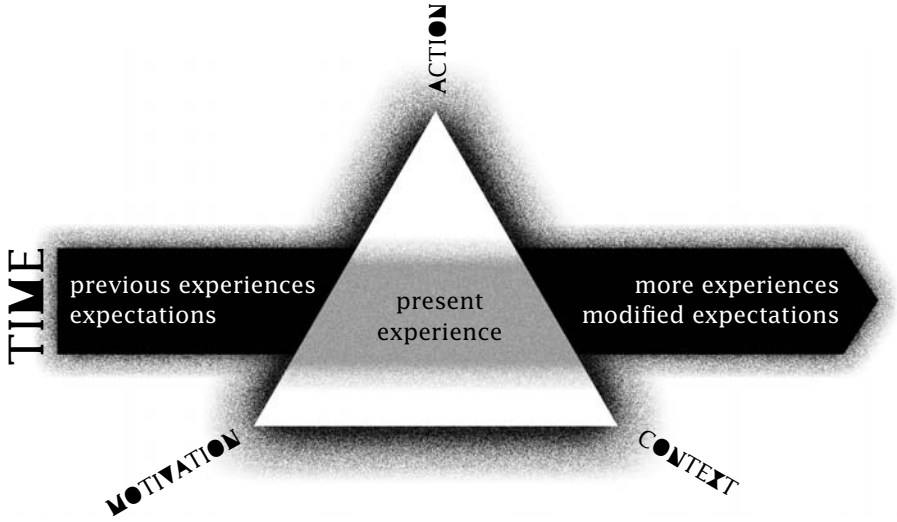


FIGURE 9 *Experience in interaction: changes in the kinds of interactions and the resulting experiences that people have (Forlizzi & Ford 2000).*

FIGURE 10 *The four-thread composition of experience and activities of meaning making (McCarthy & Wright 2004).*

experiences with products that do not need much attention, as well as how these experiences can be transformed and reinterpreted – for social contexts as well. Although slightly complex, this model begins to try to describe and relate experience to interaction, the moment where person and product meet.

The same phenomenon can be described also in a less dynamic fashion. Experience is composed of four strands: sensory, emotional, spatio-temporal and compositional strands. This means that all experience has a meaning structure that happens in space and time and is sensory as well as emotional. (Wright et al. 2003, McCarthy & Wright 2004) As Forlizzi and Ford (2000) attempted to describe how experience changes, this points out instead what is common to all experience. In addition, Wright et al. describe meaning making activities that relate to experience: anticipating, connecting, interpreting, reflecting, appropriating and recounting (see Fig. 10). The strands describe elements of the being-in-the-moment kind of experience, the meaning making aspects of how we connect the moment with the past and orient towards the future. In this sense this model connects also to Sanders' model describing not only what happens but also how in more detail.

Overbeeke & Wensveen (2003) focus on interaction but it represents one aspect of meaning in user experience. The framework that is presented in Wensveen et al. (2004) elaborates the idea of interfaces and coupling as suggested by Dourish (see Dourish 2001) and describes the role of interfaces in interaction. The framework, called the Interaction Frogger after an arcade game classic, studies information as the bridge between action and the interface (see Figure 11).

User experiences in interaction can be seen from a more person and action based emphasis, as with Kankainen and Fulton Suri, but also as a more detailed study of interacting with a product, as with the Interaction Frogger (Wensveen et al. 2004). All of these see user experience as dealing with sensing, perceiving and meaning making qualities of people, but at the same time as something inseparable from its context.

Dourish describes Heidegger's phenomenological ideas of embodied interaction that relate to the ways in which people encounter the world and act through it: ready-to-hand and present-at-hand. When acting through objects without thinking of them but the end result, objects are ready-to-hand. When problems are encountered, people become conscious of the objects and they are present-at-hand. (Dourish 2001) The experience of products is not always the same, but dependent on what people are doing (action) and what they are thinking and intending to do. This idea is in fact also echoed in the user experience as interaction model (Forlizzi & Ford 2000) as subconscious and cognitive interactions with products, although the cited references are Dewey and others.

Dourish in fact pursues the idea further by stating that these two interactions are not enough to account for the complexity of interacting with computers, but the multiple layers of abstraction and representation need a more thorough analysis (as indeed has been done in the Interaction Frogger framework).

Focusing on the action in interaction connects the making of meaning to experience – at least in some ways. People-oriented approaches may study meaning as it has been created already, but do not account for how it emerges in the first place. Product-centred models also often fail to acknowledge that the acceptance of products is social and that people's product related experiences are context dependent. Kankainen and Fulton Suri base their person-centred model on an axis of time – their model combines elements from several sources with practical value. The people centred frameworks come closest to being interested in emotions, and the interaction centred models are furthest away from studying them – although emotions are central to experience. The relationship between emotion, meaning and experience thus needs clarification.

2.2 EMOTIONS AND USER EXPERIENCE

In the frameworks described above, the person and his or her needs are addressed and the product as a contributor to experience is analysed.

The study of emotions is relevant to design, because emotions are a key part of experience and they influence people's actions, expectations and future evaluations. Emotions are an integral factor in people's behaviour – and bad experiences tend to influence more people than just the one with the direct experience. Emotions are possibly the most researched aspect of user experience. Perceptions are always first emotionally evaluated before any cognitive process can take part (for a thorough account, see Damasio 2000). Studying emotional responses is one aspect of learning about user experience. However, the relevance of an emotional response is determined in how it affects the experiences and actions that follow. From a user experience point of view an emotional response emerges in a context and then is mixed back into the ongoing action and interpretation process. Tracing the longer lasting effects of a particular response becomes difficult. By necessity the study of user experience needs to track the development of experiences and evaluations from a more holistic perspective.

2.2.1 EMOTIONS AS MOTIVATORS FOR ACTION

Hedonistic psychology suggests that people are driven by the pursuit of pleasure and the avoidance of displeasure, and that the purpose of design is to provide pleasure and minimise displeasure. Jordan's adaptations of Tiger's four

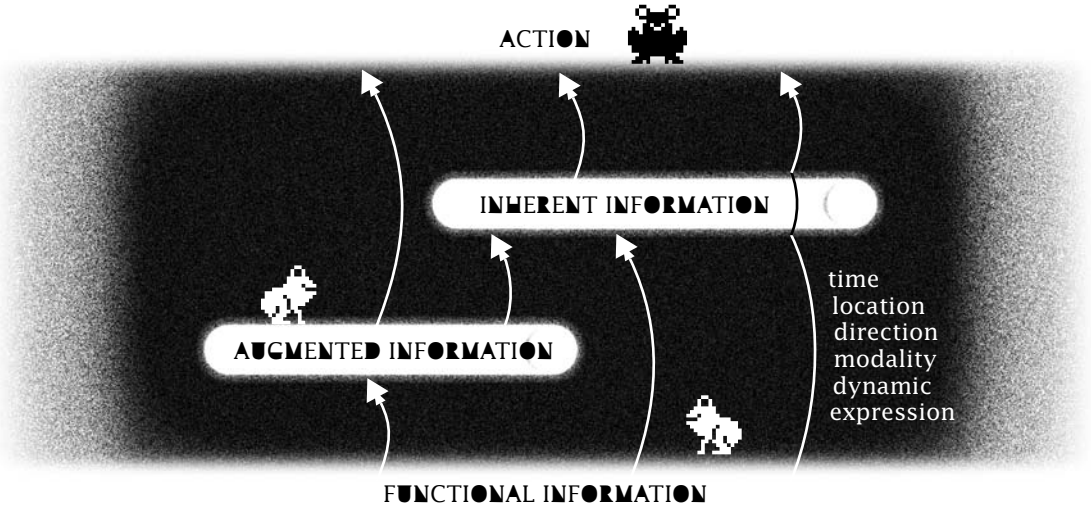


FIGURE 11 *The interaction frogger: an interaction framework describing all the ways in which action and reaction are coupled. Different kinds of interfaces offer different coupling profiles (Wensveen et al. 2004).*

pleasures have been influential in understanding the dimensions of pleasurable experiences that people have in relation to products. (Jordan 2000) While useful on a general level, these theories fail to reflect product experiences as something that change over time although the product itself might stay the same and the general expectations and values of people would also remain similar. Neither does the hedonistic approach acknowledge the important roles that negative and ambivalent emotions have in people's lives (Desmet 2002). Emotions are recognised as a motivating force in action, but the relationship between emotion and action can vary. Emotions can be part of the stress that invites creative release (Dewey 1980), or the reward in the hedonic pursuit of pleasure (Jordan 2000) or part of the evaluation of certain kinds of mental states achieved in interaction, such as engagement and flow. The difference in seeing emotions as responses to designed products compared to emotions as part of interaction is significant. Views that include use and interaction necessarily invite including the user and the context in a broader sense, which is necessary for understanding user experience.

So far, the most comprehensive model that explicitly accounts for motivation and action in user experience is the one presented by Mäkelä and Fulton Suri. Their model sums up experience as motivated action in a context, which is influenced by past experiences and where future expectations are also formed (Mäkelä & Fulton Suri 2001). The examples that the work cites deal with communication and the positive emotional experiences that relate to it, such as joking and expressing affection – which are all emotional by nature. In their model emotions influence motivation and thus can also direct experiences as expectations are created and past experiences reviewed.

Jordan's views of pleasure treat pleasure with products as something that is sought and displeasure as something that is avoided (Jordan 2000). It is clear that with new or old products alike, people seek experiences they enjoy – which has also led to the study of fun. Defining "fun" in the field of human-computer interaction has been taken up in earnest only in the last five years or so, beginning with the "Computers and Fun" seminar in 1999 (where article 1, Mäkelä & Battarbee 1999, was also first presented). This has led towards the serious study of fun, Funology, a common forum for studies focused on fun, enjoyment and engagement. Designing for fun or enjoyment is difficult: on the one hand certain products are quite supportive of enjoyable experiences, but ultimately their success always depends on the person's willingness to be entertained. There is the fun of novelty, and then enjoyment that is inherent in activities that can be labelled as work in one context and entertainment in another. In certain environments people are very willing to be entertained and have a good time.

Hassenzahl defines fun as a mode of doing that is opposite of productive work. Fun focuses on the action, productive work on goals. In fun, goals are small and less important, subservient to action and only serve to frame the action. In productive work, action serves the achievement of goals. What will excite and challenge in fun will cause stress in work. (Hassenzahl 2003) People, however, frequently switch between these modes during the day even when they are at work, making the actual separation of work and play an idea that has fewer roots in practice than most employers might like to think. Work and fun can be seen as even more closely affiliated than the flip sides of the same coin. Brandtzæg & Følstad describe aspects of enjoyment, building on a demand-control-support model for good and healthy work. First, there must be demands of challenge and variation. Second, there should be the opportunity to both use and develop skills, and the person should have the authority to make decisions. Third, social support in the form of co-activity as well as a sense of belonging increase enjoyment. (Brandtzæg & Følstad 2003)

The term engagement, as used by Laurel, describes the positive, first person interaction experience that people can have with computers. Like watching a play, people willingly pretend that the representations they interact with are real. This accounts for two advantages: in so doing people gain many new potentials to act with the representation, but also, as the representations are not real, they are not affected by the negative aspects of the world, and can thus be much more pleasurable to interact with. This is called the mimetic state, which is disrupted if the person has to stop thinking about what they are doing and instead interact with the system on a meta-level, thinking about what the system wants to do. (Laurel 1991)

Csikszentmihalyi (1991) focuses on the optimal experience, flow (not unlike Laurel's term engagement, above), and describes elements not dissimilar from the ones listed by Følstad et al. above. The flow experience consists of challenging activity, a merge of action and awareness, clear goals and feedback, concentration, the paradox of control, and loss of self-consciousness and track of time. The flow experience is a highly rewarding state of doing. Awareness and action could be both a person playing a computer game, or it could be two dancers perfectly responding to each other or a group of musicians improvising together – matching skill levels is essential for the flow experience to be created together.

Game developers and researchers have much interest in understanding what makes games enjoyable (or, possibly, fun). Good usability does not to correlate with a good engaging game, and instead concepts such as social usability and playability are introduced to support evaluation of gameplay experiences. Play-

ability can be divided further into functional, structural, audiovisual and social playability. (Järvinen et al. 2002).

If the willingness to be entertained is partly supported by the environment and partly the person's choice, what other factors affect the situation where fun is to be had? The context of the social gathering is essential to the success of for example an enjoyable game experience. While the game is played, realities outside the game are consciously ignored and as long as the rules are followed, play is fair. The management of tension, or the disparity between the outside realities that are suspended and the gaming realities that are played with, is essential to the success of game gatherings and game play. Only as participants can people then enjoy and have fun in winning. However, participants may become too involved in the game and take it so seriously that fun disappears. If people leave in the middle, the remaining participants have to work harder to try to maintain the fun in the game. (Goffman 1961) Fun, games and play are also affected, then, by the social context and a mutually maintained agreement to have fun.

The above examples suggest that fun is a matter of perception, framing and interpretation which has to do with activities, their purpose and a temporary, manageable and mutually agreed detachment from "serious" reality. Fun has a social dimension, because framing situations is more enjoyable when others engage in it too; having others around helps in maintaining the tension between the big picture and the "fun" activity at hand. Fun is then not a property of a product per se, but rather a type of action with self-contained aims and purposes that can be communicated and understood by others as well. In the work and play contrast, fun is about instant gratification, which is gained at the expense of the "real outside world". In practice it may be integral to our wellbeing, and called forth because of unnatural demands on "serious" work and productivity.

2.2.2 WHAT A PRETTY THING!
EMOTIONS AND DESIGN

Most people remember a moment of unbelievable frustration with a video recorder or similar product. Sometimes these experiences are the unpleasant norm rather than the odd exception. All product developers are keen to minimise the frustration, dissatisfaction and desperation that alienate customers and anger users. In the context of product design and user research, emotional responses are interesting because of their business consequences: emotional responses to the product itself or advertising help the customers select a product from among many similar ones. As Desmet elaborates, seeing, using, own-

ing, and coveting products all elicit different kinds of emotions and emotional responses, most of which are not well understood in design (Desmet 2002). With "understood", Desmet refers to academic research. Traditionally, product designers have worked to develop sensitivity and skills that allow them to address these aspects in their work, even if they have not been able to describe exactly how and why they achieve this. Desmet's research addresses emotions that are elicited by the appearance. There are other emotions and experiences that relate to product use, although for the purpose of user experience, both should be included as appropriate.

Norman lists product related emotions in three categories: visceral, behavioural and reflective. Visceral relates to instinctive attraction to form, colour and the resulting bodily reactions. Behavioural responses deal with use and functionality, and the interfaces and objects that people for example touch, grip and drive. Reflective responses deal with matters of identity and culture that are associated with products. (Norman 2004) While Norman can do much to legitimise and bring forth research and discussion on emotions, these results are not groundbreaking or new. Researchers strive to connect product features and qualities to emotional responses and these further to attitudes, actions and experiences (see e.g. Rhea 1992). However, this becomes increasingly difficult: the more the qualitative richness of the product and context is included, the less transferable the individual findings are.

There are needs for basic research, because design projects, as any activity, need to be anchored on something. Such beliefs can be, for example, that usability is important for the success of a product. But what constitutes usability for the future customers may not be well understood. In fact, perceived usability in smart products is very one-dimensional: a product with a few interface elements is perceived as easy but simple; one with many elements is more capable but more difficult. However, the emergence of usability problems does not logically correspond to the number of interface elements (Keinonen 1999). A study on the usability of interfaces (see the experiment of e.g. Tractinsky 1997) aimed to prove that an interface that is evaluated as more beautiful is experienced as more usable as well. It must be assumed that a beautiful interface evoked more positive emotions as well, however, exactly how beauty was defined and applied in these studies can be debated. More recent studies suggest that functional quality and hedonic quality are independent factors that contribute equally to product satisfaction (Hassenzahl et al. 2000). However, satisfaction and user experience are not synonyms – the term satisfaction is a concept that nests inside the definition of usability, a measurable quality of a product and its interface.

Usability still applies a very narrow view of context – most people do not live or work in a usability laboratory. Although the definition of usability has evolved since its original conception, the definition of specific tasks, specific contexts and specific users excludes experiences that relate to aspects such as non-use and misuse. These might be very relevant to user experience: we might feel proud to own a product or safer and happier because of a product's presence, or adapt the product to other, unintended uses. The emotions that become relevant in these situations relate partly to a product's appearance, partly to its functionality, and in a great part to its meaning. The next section will review the current situation in studying product-related emotions.

2.2.3 HOW TO CAPTURE THE EMOTIONAL

There are many ways to access and measure emotions. Observation and biometric measures are one way to identify immediate emotional responses. However, if these emotions are to be verbalised, they need to be interpreted, which is a context dependent activity. The moods and emotions of others around as well as social norms can influence how the interpretation of, for example, excitement is affected.

The way most people first express their emotions, consciously or not, is through changes in facial expressions, body posture, voice and so forth – this is called sentic modulation. Many of these are plainly observable. (Picard 1997: 25) Some emotional responses can be extremely fleeting, for example certain facial expressions may be as short as 125 milliseconds (Hatfield et al. 1994: 19). Expressions may not be plainly visible also because they happen inside the body and require biometric measurements such as galvanic skin response, heart rate or blood pressure to be detected. When coupled with observational data biometric measurements can identify, for example, a frustrating incident and connect it to a specific situation. The aim of affective computing is to furnish computers with the ability to recognise and respond appropriately to emotions. Possible applications for such computers include game controls, therapeutic feedback tools and jewellery that indicates its wearer's emotional state. (Picard 1997, current research projects are also described on the MIT Affective Computing website)

It is common, also, to ask people to report on their emotions and experiences. Many tools exist for measuring for example subjective satisfaction using questionnaires and surveys (Keinonen 1998: 46). Verbal reports and scales have their challenges, though, as developing a reliable tool is difficult and language-dependent. Desmet argues that the best way to understand emotions elicited by a product's appearance is by non-verbal means, although both verbal and non-

verbal self-reports are subject to the general tendency of people to increasingly over time modify their emotional reporting. For studying emotional responses to design, Desmet's tool, PrEmo, uses animated cartoon puppets, which convey a response with sound, facial expressions and body gestures. Users select the ones that apply of the fourteen. The advantage of this tool is that it allows people to express conflicting emotional responses to products – although people may like one aspect of a product, they may dislike something else about it.

In product design one necessary part of setting design goals is to determine metrics on how to evaluate them. Having tools that allow benchmarking, independent results and such are a quantitative way to monitor the quality of the design. Such measuring approaches may not, however, be as useful for the generative stages of design work.

2.2.4 THE ART OF INTERPRETATION: EMOTIONS IN SOCIAL INTERACTION

For the practice of user centred design and concept development it is rarely practical to use surveys or measuring devices. It is much more useful and effective to put designers in direct contact with users in their context, and trust that the emotional responses of the (future) users is conveyed in social interaction. For this, it is necessary to understand the role of emotions in social interaction. Emotions can motivate action but cannot dictate it: in social interaction at any given time there are a range of available acceptable and many more unacceptable actions from which to choose. For the purpose of understanding user experiences, product use and product related emotions should not be isolated from their real material and social contexts. Flipping a light switch with more force than necessary may mean a range of things: that someone left the light on all day, that the price of electricity has gone up again, or that the person just trod on a Lego brick and hurt their foot, or all of the above.

The majority of emotion research that pertains to Human Computer Interaction is limited in its treatment of emotion. In fact, all of the models of interactivity that are applied in Human Computer Interaction design fail to account for symbolic uses of interactions (Svanæs 2000). The purpose of expressing an emotion relates to the context, and people can train to suppress or exaggerate the visible expressions of emotions, or use them to communicate with others.

In a study to understand how emotions play a part in computer interaction, experiments testing principles of social psychology were created with computers playing the part of the other person. The results suggest that interaction, with humans and computers alike, is social, even if the interaction involves only text-based commands. People evaluate a computer's performance more honestly on a different machine, and like a computer better when it adjusts its interaction

style to match that of the person's (Reeves & Nass 1996). The global validity of this social interaction with computers theory has been challenged with a study focusing on small handheld products such as palm top computers and phones. When the politeness test, i.e. people are more polite face-to-face than not, was replicated, the results were not the same as with desktop computers. This suggests that other, more complex social perception phenomena, situational variables and cultural differences may play a part in perceiving computing products as social interaction partners (Goldstein et al. 2002).

Dewey examined actions as expression, as something that people learn to do to achieve particular consequences or outcomes (Dewey 1932). When people act together, their smiles, offered to others, may take on other meanings. They may wish to communicate their good-natured personality, their delight in subjects presented to them, such as pets or small children, or to emphasise that despite the last disagreement the friendship is still intact. They may fish for compliments or sympathy, or otherwise seek personal gain. (Goffman 1967) In fact, sometimes people's problems lie in how to convince others that their emotions are in fact "genuine", and not part of a manipulation trick. Goffman's interpretation is that both can be true: people act at the same time cynically and manipulatively and yet with good intention and sincerity at heart (Manning 1992). Many meanings that float about in social interaction are ambiguous and remain so, and are constantly, or at least potentially, changeable.

Emotions are also reflexive. Because of people's ability to treat the self as a subject, people can also observe, reflect on, regulate and produce alterations in the internal processes of emotions. These influence the way that ambiguous emotions are identified, how emotions are displayed to others appropriately and how people can intentionally influence their emotional experiences towards positive or negative. (Rosenberg 1990) Emotions can be also expressed intentionally: a car door can be closed lovingly or slammed angrily – both actions result in a closed door but suggest different interpretations, should anything be sensing it. If products could sense how they are handled and operated by people and what this conveys about their emotional expectations, products that afford these interactions could have a natural channel to receive input about what is expected of them (Wensveen et al. 2000, Wensveen et al. 2002). Interfaces that provide many ways to achieve the same result can support rich interactions and provide a medium for products to read emotions directly from use.

Some of the questions that come to mind about the projects underway at the Affective Computing lab relate to the purpose and desirability of having emotions recognised. Therapeutic and special needs contexts are important but what purpose could these technologies have for the common person? Wens-

veen's alarm clock (ibid.) is interesting, but the final stage of the scenario is still missing: if I slam the alarm clock controls to set the time, how would the alarm clock respond? Should it have the possibility for reflexive emotions as well? Would it sulk, or be fearful? Would it behave angrily back at me? Would it be all the more friendly and eager to cheer me up or would it refuse to work under abusive conditions? Without risking losing the actual waking up service, how am I supposed to determine this? And what are my emotions if I accidentally offend my alarm clock beyond apology? Will my enjoyment in alarm clock use centre around the subversive pleasures of torturing the poor device to its limits, rather than the more elegant satisfaction of interacting with it beautifully and expressively?

Clearly an alarm clock is a simple thing that serves an important function in our society, and there is no reason why products with important functions should be boring or tedious to interact with. However, the motivations for interacting with products and using them go beyond mere utility.

Focusing on one person only reveals half of how the experience is shaped as people try things out, evaluate outcomes, laugh, tease, get upset or find a new thing to talk about. When people act together, they come to create unpredictable situations where they must respond to each other's actions creatively. They influence each other and create experiences for each other. If social interaction is described only as belonging to the same general concept of context along with objects and spaces, the actual impact that social interactions have on experiences becomes overlooked. However, people generally behave in ways that allow others to anticipate the general direction of a likely outcome. Experiences also exist in this volatile, and yet relatively predictable, world. Focusing only on the individual or the product, or the individual interacting with the product, do not account for all that happens in the real world.

As studies on social interaction (Goffman 1961) suggest, people in general are motivated by the search for meaning, rather than emotion. Emotions are a resource, a tool, a bargaining chip, and their value depends on the meanings that they are attached to. This is in some ways an issue of scale. Emotions, negative, positive and ambivalent, are but elements that influence the search and interpretation of meaning in experience.

2.3 SHARING THE SUBJECTIVE

As described in Chapter 1, designers have always delivered more than functionality and used form and material elegantly, playfully, aesthetically and expressively. Moreover, the people who use, handle and own products have experi-

ences with them regardless of how much this was part of the initial specifications. It is necessary for design, however, to understand the relationships between products and their specifications as well as what people actually come to experience.

In real life there are many ways in which people can learn about the subjective experiences of others, even if they can never exactly know them, as discussed in the previous section. Through observing what people do and how they behave, by becoming exposed to the same or similar experiences and interacting with people designers can create working interpretations of the experiences of others. The more two people have shared common experiences and learn about each other, the better and closer their empathic understanding of each other.

The limitations of sharing become evident when trying to design for people with different abilities. For example, a visually disabled engineer in Helsinki has often consulted architects on how to design public spaces that are friendly for people with visual disability. He had often tried to explain the painful and temporarily debilitating effects that strong direct light, especially when reflected off shiny surfaces, has on people with these conditions. This advice had completely been ignored several times. Contrast problems are, according to him, the one thing that normally sighted people always forget first, and most often ignore. Eyes with normal vision accommodate faster and better to changes in light, and hardly ever experience it as a problem. Many visual disabilities cause such changes to become much more difficult to manage: a simple transition from outdoors to indoors can render a partially sighted person completely blind for several minutes. His conclusion was that sighted people cannot relate to such an experience, cannot imagine the significance of the experience, and thus cannot relate to it (personal communication, 11th June 2003).

Sanders' framework offers an explanation for this by suggesting that what people do, what they say and what they make are all needed for forming an understanding of the experience of others (Sanders 1999). No one method or tool alone can give a reliable account of experience; instead many methods and techniques need to be used in parallel (e.g. Sanders 1992, Black 1998, Buchenau & Fulton Suri 2000). The matter of communicating experience depends on both people, the person who is the (potential) user and the person who is the designer and/or researcher.

As the approach examples in this chapter illustrate, there are many ways to support processes that help people to become more aware of their experiences and to find ways to share them. But it is not only a matter of how to get the user person to communicate; it is also necessary for the designer or researcher to receive them properly. As the example above of the design of public

spaces illustrates, merely telling someone that an aspect is important may not be enough: it has to be anchorable to some kind of personal experience. A key part of experience is that it is marked by emotions. Emotions help to prioritise matters, to determine the significance of one alternative compared to another (e.g. Damasio 2000). Personal experience is what turns information into knowledge, something that is actionable.

How can designers then get the experience to which to connect the information? This is done the same way any person can learn: from others and by trying it out oneself. Even if the exact experience of others cannot be known, approximations can and should be sought by seeking experiences with similar contexts, situations, actions and products. The experiences then are used as a learning tool: they are compared and contrasted to what other people do and how they behave. Learning about experiences is a process of interpretation where different elements and senses contribute to an emerging understanding.

The ability for a person to relate to another's experience ranges from complete incomprensibility (as for example a foreign culture, different gender or different abilities) to having developed a sense of a closely shared experience and being able to discuss and understand them with the help of shared reference points (see e.g. Yerkovich's study on establishing a gossip relationship, Koskinen 2000). The way in which a sense of rapport (it could also be called empathy or intimacy) is established is with subtle body language: mimicry, mirroring and synchrony of gestures, moves and expressions (Hatfield et al. 1994). The study of emotional contagion suggests that the reason it is so necessary for designers to truly interact with the people they are designing for is the fact that building rapport, the element necessary for developing the conditions for empathy and role taking, is something that happens in face-to-face interaction.

People have a great ability to imagine actions and consequences from their own point of view or from the point of view of another person they know (McCall & Simmons), and this can be leveraged in design. The use of personas (Cooper 1999) to embody design criteria in the form of person descriptions and the use of extreme characters to explore interaction ideas (Djajadiningrat et al. 2000) are both good examples.

Verbal stories of experiences focus more on the meanings of the experience than the sensations and feelings themselves. Communicating experiences to others is an act of reconstructing past memories into descriptive, coherent, even story-like elements (for a detailed study on stories see Sacks et al. 1995, and on stories in the workplace Orr 1996). Photo albums are good examples of how artefacts support storytelling and how stories are constructed for others (Frohlich et al. 2002). When a person is talking about experiences, she may

say things like “it was a nice conference and I met some people I knew”, or begin to recount the story of the opening day when at the same moment three different people called her name and she didn’t know who to greet first. The first is the kind of description that Sacks (Sacks 1995) refers to as “doing being ordinary”, where the aim of the description is not to focus on the unusual, but rather on the expected and the normal, while the second story is an account of something unusual. Actual stories are a production that take into account rules of storytelling that affect the content: how it is introduced and framed, who is entitled to what degree of emotional responses and so forth. (Sacks et al. 1995)

Although the production of stories depends greatly on the situation in which they are told, storytelling can be useful to collect information quickly about key problems, relevant experiences and breakdowns (Erickson 1995 provides some examples). How and what is communicated depends very much on how the questions or recall situations are created. Images can also be used to prompt stories in discussions (Mäkelä & Mattelmäki 2002). Direct questions often force a presumption on people which they themselves would not have used or considered. Designers and users alike can also use various media to express their experiences: diaries and other written accounts, visual material, drawings and diagrams, photographs, video and any combinations of these. This media can help capture rich qualitative and sensory expeirences, document findings and keep them fresh and convincing even for those who were not there themselves.

In the following, several approaches to learning about the subjective experiences of others are characterised and compared to each other. The characterisations are not necessarily mutually inclusive, nor is this listing definitive – however these are the ones that have been emerging in the field of design for user experience.

- applied ethnography – analytical reporting of observations
- empathic approach – observations are balanced with empathy
- participatory approach – supporting the creative thinking of participants
- inspirational approach – people’s idiosyncrasies fuel creativity and ideation

Being user centred does not mean that designers even agree on how to best involve the user in the design process and to what degree. The roles of the designer and researcher vary. The inspiration-oriented approach is a designer-centred,

even artistic, approach that treats people as a source of stories and the subject of curiosity. The empathy-based orientation is also built around the designer as a person, but balances this with observations to create a working balancing act and to filter out mis- or over-interpretations. Participatory approaches to user experience support participatory design and a heavier involvement of people in the process through the co-construction of an understanding, while design ethnography focuses on the practice and aims at being much less invasive. The ethnographic approach leans on a more rigid theoretical and methodological background than the interpretation based empathy and inspiration approaches – and yet all can be lauded for being sensitive to people's experiences and supporting design for user experience.

2.3.1 INTERPRETING OBSERVATIONS FOR DESIGN

Ethnographic methods have been applied to design in many ways and have resulted in some design approaches that echo the spirit and attitude of ethnography: the researcher is a middle man between the informants and the audience. Although design ethnography is not generally advertised as being a user experience approach, as a contextual, person-to-person approach to learning about the users' world it is most suited to learning about experiences. Millen points out that ethnography is often thought to be a method of collecting field data, when in fact it is a form of analytical reporting of the data. Ethnography studies emphasise observational studies in real contexts, providing a larger picture and understanding activities from the informant's perspective. (Millen 2000) Ethnographic reporting is done through taking small observational notes, which are then sorted and analysed to formulate hypotheses of how to further focus field studies and to propose information on what people do and why (Schatzman & Strauss 1973). In rapid ethnography, the number of informants must be cut down and carefully selected and several approaches used concurrently to save time (Millen 2000).

For a well-known example of an approach based on ethnography, the Contextual Design process follows four principles: context, partnership, interpretation and focus. The role of the researchers is to pick up on aspects that are invisible to the people they need to learn from and help them articulate what they know. To this end, and the interpretation of the collected data, Contextual Design offers a comprehensive team process. (Beyer & Holtzblatt 1997)

Cain outlines a similar approach and distils experience-based design and its aims in the following way: in understanding everyday experience, the components of experience are sociocultural systems, patterns and routines of action and things that people use and the subsequent impact on what people think and

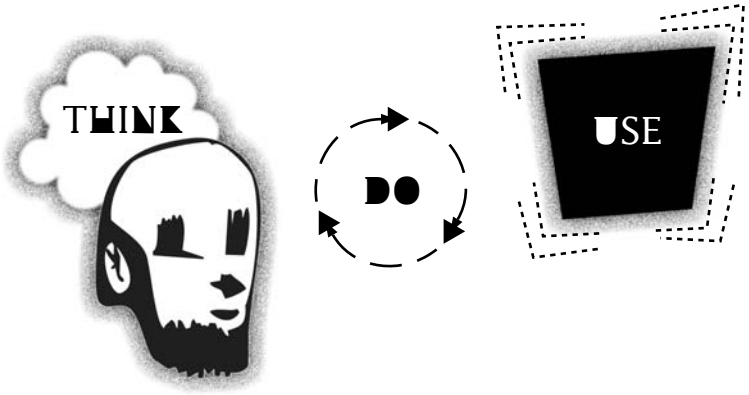


FIGURE 12 *The focus on studying people: what they think, do and use. An ethnographic approach for creating a framework for each studied case (Cain 1998).*

do. By studying what people think, do and use (see Fig.12), experiences can be learned from and turned into design requirements. (Cain 1998)

The intended outcome of ethnographic studies are detailed descriptions of people's activities and their meanings, which are the result of the researcher frequently studying, visiting and talking to people, and analysing and refining empirical data. This requires ethnographic training but may divorce research work away from the designers, emphasising a separation of research and design. Ethnography and design have contradictory aims methodologically: one to understand, the other to transform (Dourish & Button 1996). It seems that if user research results are to be transferred from one person to another, this requires tight collaboration and involvement.

2.3.2 WITH HEART AND MIND – DESIGN EMPATHY

Empathy can mean the mimicry of emotional expressions, the following of another's gaze or, through role-taking, the ability to imagine someone else's experiences without having them directly. The last of these is the definition that is useful and used in design empathy (Koskinen 2003b). It is the "altered subjectivity that can come from immersion into a particular context" (Plowman 2003: 34). Design empathy is an approach where observations in real contexts and em-

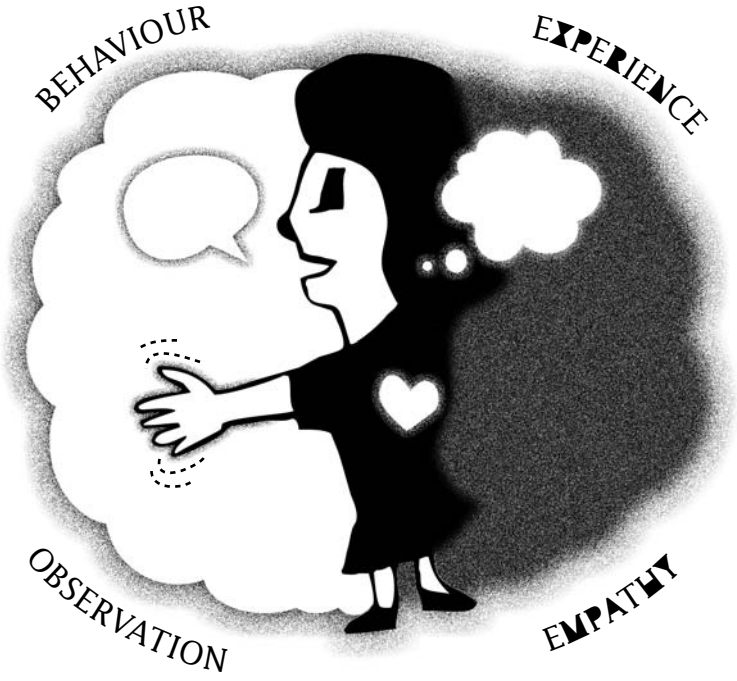


FIGURE 13 *Design empathy is about observing people and relating to them emotionally (Fulton Suri 2003).*

pathic tuning in are used in turn to learn about the experiences that people have and the meanings that these experiences have (see Fig.13). In practice, empathy helps to make the leap from knowing to understanding.

As each designer is different, approaches like design empathy that require direct and personal engagement are dependent on the person's willingness and ability to empathise and engage. This may also mean that the role of the "expert designer" needs to be traded for a more useful role as a learner, partner and fellow human. The empathic immersion needs to be balanced with times of cooling off, emotional tuning in with an outsider's calculative gaze and reflective thinking. Creativity is stumped by critique and judgement – the same applies to learning about experiences. With empathy the aim is not to judge but to relate to and understand the situations and why certain experiences are meaningful to these people.

A key part of the design for user experience process is to leverage the ability to have new experiences and experience new things for learning and under-

standing. Empathy in the field visits is important as empathic design is based on observation (Leonard & Rayport 1997). The observations can be documented with rich media: pictures, video, sound, things that people have made or used, scenarios, stories, and so forth (see Figure 14). These observations and materials then need to be processed, organised and communicated with others.

Schön & Bennett outline three kinds of reflection in relationship to design. Reflection is always spurred by an element of surprise. Firstly, reflection in action happens while doing, and implies a process where the person begins to observe the situation while doing and take it into account. Reflection can also happen on action, which means that people stop what they were doing and begin to analyse the surprise and its cause and implications. The third is reflection on practice – which is how masters teach novices. (Schön & Bennett 1996) Design empathy works because it helps to find the things that surprise, that move, that are emotionally significant. Design empathy deals not only with context, but also with the role of the researcher (for a more complete account, see Koskinen & Battarbee 2003) (see Figure 15).

Empathic design is user-centred, but offers ways to extend the experiencing into other contexts as well: role-playing, bodystorming and trying things out can be important aspects of design studio work as well. As in usability, discount methods such as cognitive walkthroughs and heuristics can help designers challenge their own thinking; some of these methods can be seen as a way to improve the experience vocabulary of the designers as well as to jump start and fuel their creative processes at the office.

The empathic approach supports ideation more than the ethnographic approach, because it does not imply that designing and learning about users is separate. The results are often described as stories, scenarios, and even design ideas. It could even be called more designerly, as it does not follow a strict methodology, but rather puts the designers in direct contact with their end users at least at times. The analysing is kept to a minimum; reporting is designed to be convincing and rich and the emphasis is on personal experience.

2.3.3 PARTICIPATORY CREATIVITY

Design is often understood as a production process, but it can also be seen as a learning process. In user centred "learning", people are brought into a process where they can together with researchers reflect on and construct knowledge about their experiences (see Fig. 16). A true understanding of experience happens when people are actually involved in the process, as more than just informants (Sanders 1999), the term anthropology uses of the people they study.

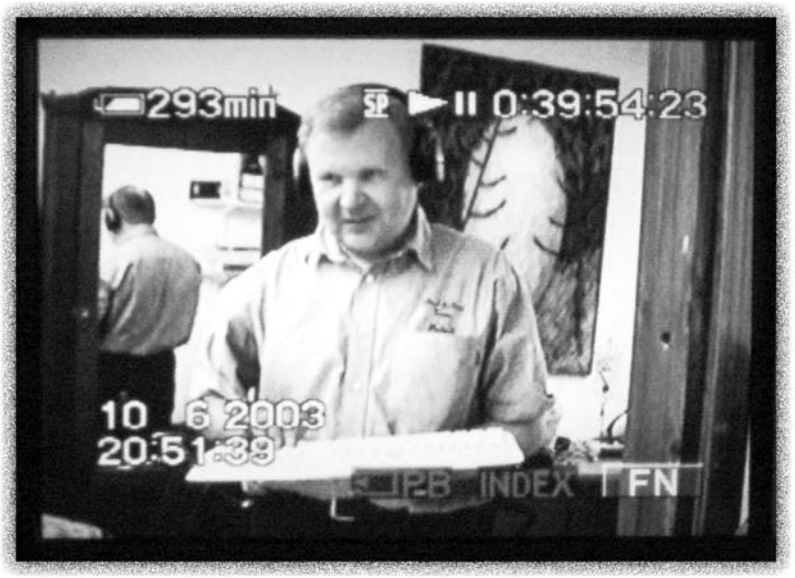
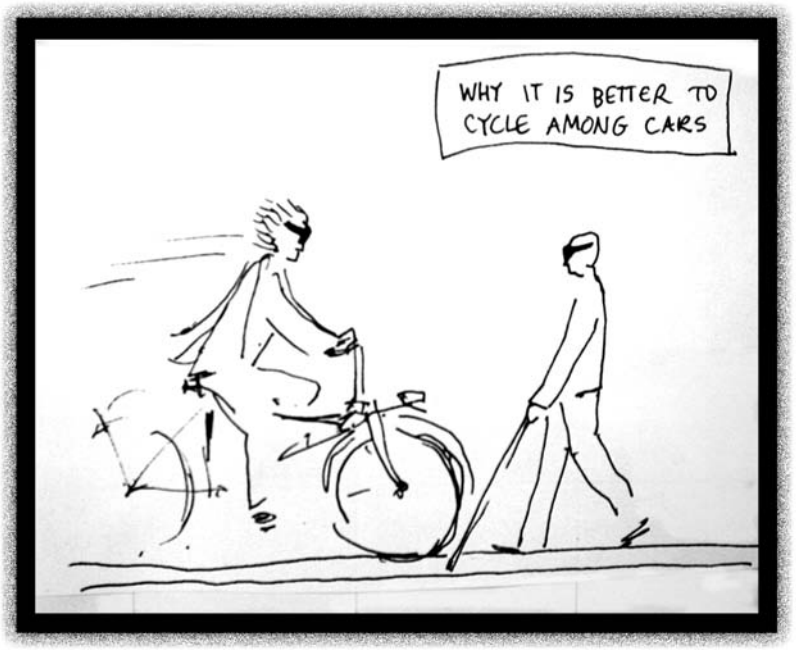


FIGURE 14 *Empathic observations on videotape and visualised into notes and sketches. In the video a visually disabled person "reads" magazines with wireless headphones and a keyboard – an experience very different from sitting in a sofa, looking at printed pages. Jokes and stories also help to convey attitudes and expectations.*



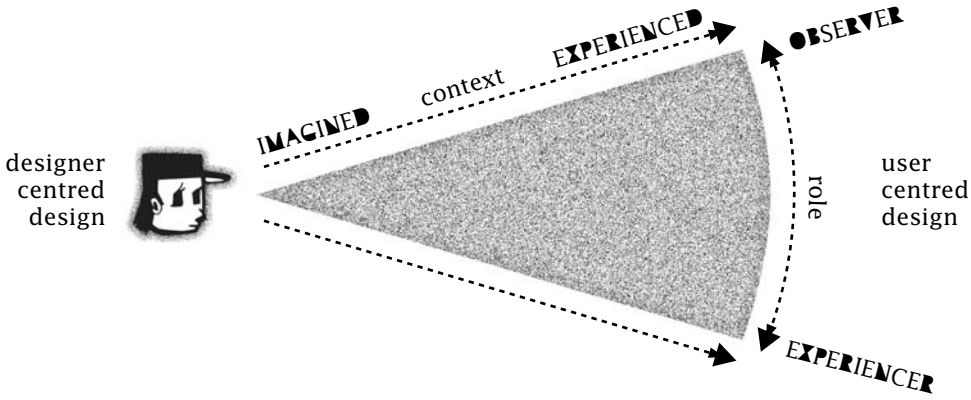
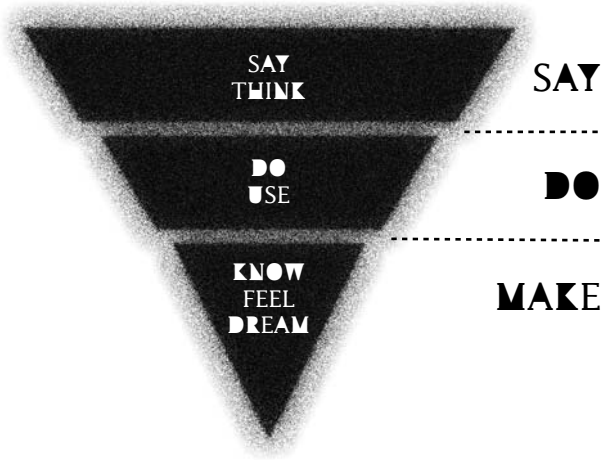


FIGURE 15 *A designer's radar – design empathy depends on the designer's active role-taking activities in the user's context (Koskinen & Battarbee 2003).*

FIGURE 16 *By studying what people say, do and make, designers can learn what people think, use, know, feel and dream (Sanders 1999).*



Liz Sanders has been influential in developing the methods and tools for studying experiences with people. She is, consequently, also an advocate of participatory design. She uses three ways to access experience: by studying what people say, what people do and what people make. The argument is that with each way people are able to communicate different kinds of experience. Making is a way to let people access their dreams: those parts of experience which are not well constructed with words alone and which cannot be shown (Dandavate et al. 2000). Special tools are used, such as velcro models (Sanders 1992), picture sets, cardboard forms and other materials with which to involve people. These and other assignments such as self photography are then talked through and observed. Furthermore, at SonicRim, these very qualitative tools are used to prime people to be ready for a meeting with the research and design team. Using images in participatory design activities has also been explored elsewhere, for example in the context of bathrooms and old people (Boess et al. 2002).

This approach allows seeing users as people that can be brought into the process despite their lack of formal training and experience in design. When they are put into a position where they can reflect on their own experiences they create new information, to the benefit of the designers. In the constructive process the participants are actively involved in creating a better understanding of themselves and their experiences. This calls for special techniques, concrete materials and active participation (for a comparison study of such materials and media, see Stappers & Sanders 2004). The process usually begins with priming tasks that start gearing people's thinking towards an area of design interest and lets them process it typically for some days, after which the actual design and interview discussion takes place. According to the requirements of the project, participants discuss and further construct descriptions that reflect their experiences.

Other participatory activities emphasise for example the use of video, mockups, prototypes, collaborative acting out and designing together with target users (e.g. Bødker & Buur 2002). The sheer amount of data that is collected this way is only manageable by experts. SonicRim uses cluster analysis software and a rigorous transcription routine in making sense of and connecting the materials from up to twenty participants. Material kits are customised for each case, but are standardised so that they can be used to aid in other projects as well. Video data needs editing and metadata added to it to make it truly useful.

2.3.4 SEEKING INSPIRATION

In the previous empathic approach, inspiration and empathy is balanced against observations and information. But what if inspiration can run free? This inspira-

tion-oriented approach has sprung forth from the Royal College of Art in London, most prominently from creative minds at the Computer Related Design studio. Their focus is to become inspired by and of people and to treat concept design as a tool for creating value fiction – creations that challenge people to think about their relationships with technology and products (Dunne & Gaver 1997 – they approach value fiction mainly through concept prototypes). One of their most influential works was the original Cultural Probes process, a process or technique for collecting input from the elderly in various locations in Europe for the EU-funded project Presence (Gaver et al 1999).

The cultural probes approach from the Presence project has become influential at least in Europe (Gaver et al. 1999). They used designed tasks in a kit to help people describe their experiences and attitudes towards their life and their neighbourhood. The results, as postcards, photographs, maps and stories, trickled back to London one by one through the mail from Norway, the Netherlands and Italy. The principle of the cultural probes was that the designers could become inspired by what the people created directly, and that the sometimes even ambiguous material would evoke stories and help the designers to approach the issue of the elderly and neighbourhoods creatively.

Their approach to becoming inspired is to interpret the ambiguous, focus on the idiosyncratic, blow it out of proportion, design for it and then inspect the results. This approach is best at home where design concepts are used to inform, speculate, learn and warn: they have been used in art installations and student work (Dunne & Raby 2001). The creative and highly inventive quality of the Cultural Probes, and later the Domestic Probes, has not been surpassed. Both projects aimed at collecting highly personal, subjective and fragmentary pieces of input from people on a broad, experience-related topic and using the results to fuel creativity and ideation.

The probes approach has been applied to pre-concept research in different areas as well, and has been combined with other types of user studies. Wensveen applied the probes approach to help people document their waking experiences, something a visiting researcher could not very well come to do. His probes helped people express their emotions during waking up and their attitudes towards the alarm clock. (Wensveen 1999) Probes, then, do not have to travel far to be useful. Probes were also applied in a case of exercise and wellbeing, and following that, several pre-concept research projects (e.g. Mattelmäki & Battarbee 2002). The approach was more towards using the probes approach as one part of establishing a dialogue between participants and reserachers. The process involved several stages of studying materials, forming profiles or conclusions and then meeting again with the participant to learn more (see Fig. 17). In cases

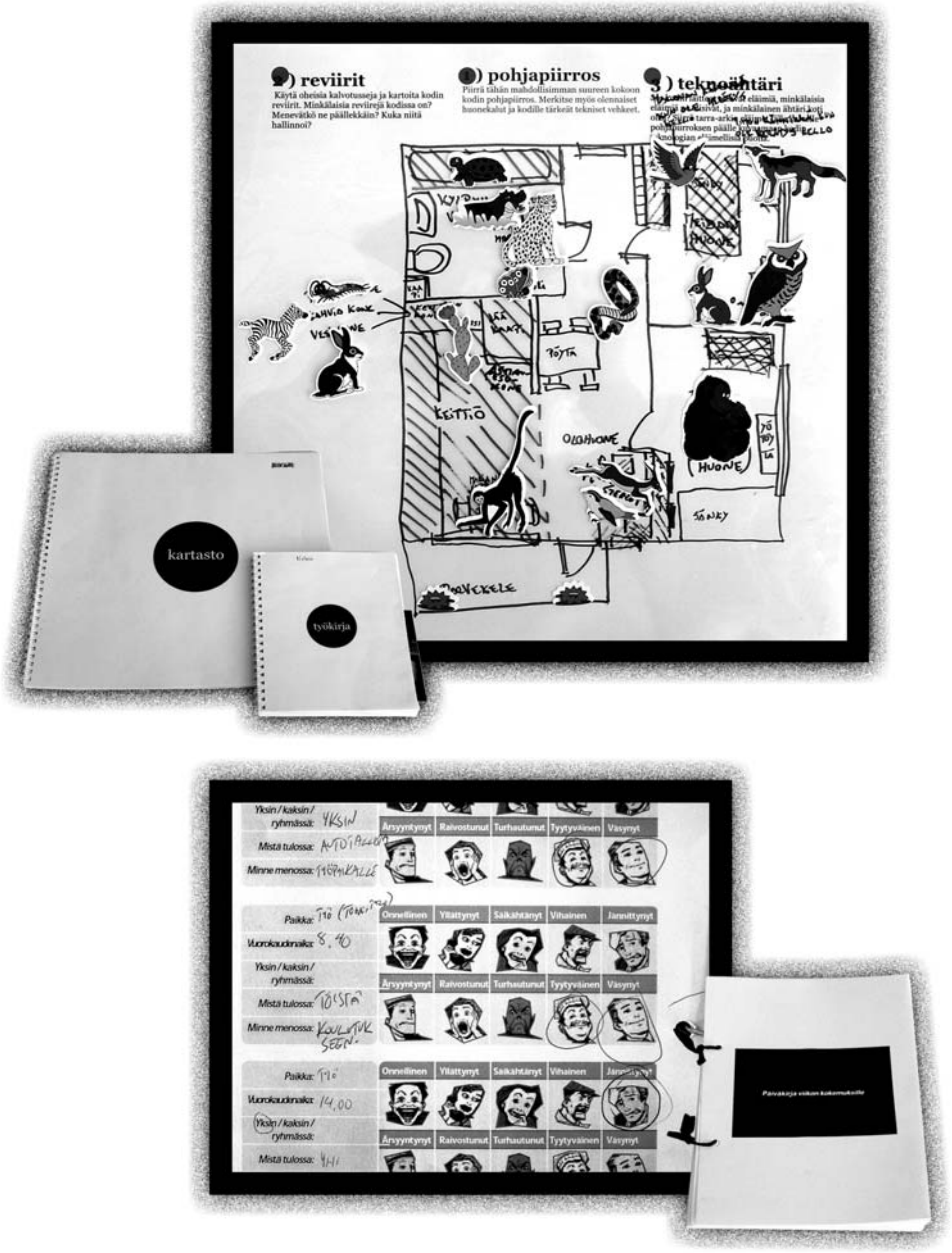


FIGURE 17 *Examples of self documentation probes from projects at the University of Art and Design Helsinki. Project Morphome (PROACT, Academy of Finland) studied experiences of living with technology in homes using e.g. animal stickers and a floor plan. A student project for Kone corporation studied the experiences and moods of wheelchair users as they encounter elevators during their day (student team: Bogesits, Uhari-Pakkalin and Vasara).*

with companies and design consultants the approach has been developed in the pre-concept stages to inform how users experience their work or the products the company makes (Jääskö & Mattelmäki 2003). Probes have also been applied in the context of technology and families (Hutchinson et al. 2003). Digital media tools are already used in digital ethnography (Masten & Plowman 2003) and the first reports on using mobile phones with cameras in probes experiments (Hulkko et al. 2004) are promising.

The original probes study has inspired more focused applications in user research that typically try to produce some kind of analysis as well (to the stated disappointment of the original idea developers, Gaver et al. 2004). However, it seems that the value of this type of artistic endeavour is precisely that it can inspire other types of user research to be creative, and to take the process of becoming inspired more seriously (Mattelmäki & Keinonen 2001).

In learning about user experience, these approaches have different principles. The ethnographic approach focuses on learning about the users' world by personal experience and observation. The participatory approach is not concerned with preserving authenticity but instead brings the participants into a storm of materials to help them express what they know and do and feel and dream. The empathic approach is based on observations and experience simulations, and uses prototypes to develop a sense of the design context and desirable outcomes. The probes tools have been applied in different kinds of projects, some more empathic, some more ethnographic.

3 CO-EXPE-RIENCE

3 CO-EXPE-RIENCE

The previous chapters have described what user experience is, how it relates to for example emotions, meaning and social interaction and how it is interpreted in design. Frameworks of user experience have been reviewed and the role of meaning has been discussed. Each approach has its merits and shortcomings, and this chapter discusses one approach that has not been evident in the user experience discussion so far: user experience in social interaction. Rather than using this description, or calling the phenomenon intersubjectivity between users (as Dourish 2001 does), this work suggests using a shorter and catchier term: co-experience.

The idea of co-experience emerged in a way described as appropriate by James (1996). He suggested that when a disparity between theory and a perceived thing is noted, this should set forth a search for accommodating ideas and following a try of many, trying to find an explanation that upsets as little as possible the previously believed "truths" (James 1996). The aim of this exploration is to find a framework that includes as much of the sensible existing knowledge of experience but which also helps to account for the observations that challenged the existing knowledge.

This chapter describes how the search for the concept came about, explains what is meant with co-experience and matches it to existing approaches and practices in design.

3.1 REALITY SEEKS THEORY FOR SERIOUS PARTNERSHIP

In 1998 an EU project called Maypole was developing concepts to support social communication among children and their immediate family and peers. The team at Helsinki University of Technology engaged in a host of different activities involving children, foam and cardboard models and real products, each tried and learned from in turn (Maypole 1999). Experiences with prototypes were useful and guided towards a common research interest, but the most interesting study – in fact the seed for this work – came from field studies (Article 1, Mäkelä & Battarbee 1999). The first was a field study of a kid computer called in2it, a product never launched on the market. Five siblings used the in2its for a week and were interviewed about their use. The second was a field experiment with Gameboy Cameras. Two groups of children used gameboy cameras and printers for a week, taking pictures, editing them and printing them out as small stickers. The interviews took place after the week and the children showed us copies of the pictures they had taken describing what they had done, where and with whom. The results of their activities are described in the following scenario sketches (Figures 18 & 19).

In these examples the important experience and explorations of the products are not private and individual, but social and shared. New kinds of uses and applications emerge and are tried out in collaborative use. The models of user experience that are described in Chapter 2, while addressing social needs in general, do not, for the most part, take into account what happens to user experiences in interaction when people start collaborating, communicating and doing things together.

These aspects have been addressed in some other fields of research. The children in the scenarios are clearly having fun, but can this be explored in terms of user experience? The interaction approaches in Chapter one (Forlizzi & Ford 2000, Wright et al. 2003) come closest to breaking the invisible conceptual barrier that surrounds the individual in user experience frameworks. Forlizzi and Ford (2000) describe storytelling interactions that result in meaning-making or narrative experiences. Wright et al. (2003) describe processes of meaning making that are part of experience. Although these – recounting, anticipating etc. – can happen in self-talk, a social activity that treats the self as a subject, most often these meaning making interactions involve other people. Both models state that things are made meaningful or become meaningful, but neither the presence nor absence of others is elaborated.

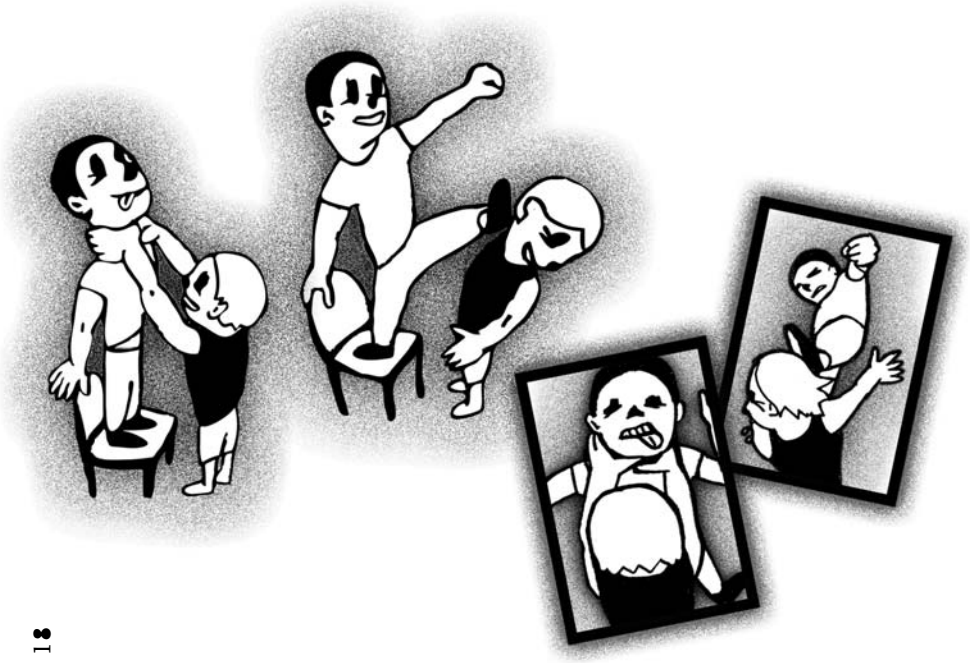


FIGURE 18 *Boys acted out dramatic fighting scenes together to get photo evidence.*

FIGURE 19 *The infrared connectivity of the in2its was used to anonymously tease others.*

3.1.1 EXPERIENCES IN SOCIAL INTERACTION

Social interaction, when face-to-face, consists of verbal and non-verbal actions, which together constitute a move – everything that happens during a turn taking action (Goffman 1959). Goffman further describes that moves consist of messages (the actual content or information), ritual respect for others, regard for self, communicative restraints in order to be understood and framing instructions, that give clues as to how the message should be interpreted, in jest or seriously. (Manning 1992) When social interaction is mediated with technology, the forms that moves take can change and the communicative restraints may also be dictated by the medium: a maximum number of characters, length of video or audio, size of file, number of pages, and so forth. In co-experiencing as in social interaction, what is shared may be no more important than how it defines the relationship of the person towards others and what kinds of interpretations are offered to make sense of the message. In co-experience products support, constrain and shape the sharing of experiences with others, and the shared experiences are influenced by other people as well. It is a process of interpretation and change in terms of the meaning of an experience but also of continuity for social relationships.

For the purpose of understanding how users share experiences, it is useful to borrow from a theory that accounts for this. Blumer's symbolic interactionism is a theory of social interaction that, as outlined in section 1.4, sees meaning as something that is created by people interacting with others in the world. Symbolic interactionism is based on three main principles:

- people act upon and towards things according to the meanings they have for them,
- these meanings arise from interaction with other people and that
- these meanings are handled in and modified by people in an interpretive process. (Blumer 1986)

People's social interactions consist of symbolic interactions (which communicate meanings as the results of interpretive processes) and non-symbolic interactions. That is to say that people are able to purposefully act to convey meaning to others. People do not merely respond to outside events or execute their plans – their actions also have strategic, communicative purposes that go beyond the task itself. In being able to use products to share experiences with others, the meaning of the technology itself emerges as well.

Historically, the value of symbolic interactionism was that it popularised participant observation as a study method and rejected quantitative surveys in

favour of seeing people as actors. Learning happens through role-taking on the researcher's part. (Coulon 1995) Symbolic interactionism stresses the importance of interpretation in the meaning making process. All things, be they physical objects such as chairs and clothes, social objects such as mothers and politicians or abstract objects such as forgiveness or ideology, get their meaning through interacting with others and perceiving what kinds of meanings others have for them (Blumer 1986). This is a very dynamic view of the symbolic interactionism classic. Blumer's version of symbolic interactionism reflects the environment where it was created: the city of Chicago of the 1930s was a city of restlessness with high immigration and social disorder. However, once these meanings are learned, they remain relatively stable, and even in restless environments, people strive for stability and respectability of conduct (Duneier 1992). Similarly, in more stable surroundings such as present-day Northern Europe or the United States Midwest, roles and identities play a greater role in how people interpret each others' intentions and actions, which makes interaction more stable compared to Blumer's view (McCall and Simmons 1978).

When translating the symbolic interactionist principle to design, symbolic interactions are interpretations of a product's meaning and of the meaning of the experiences it provides, made relevant to the recipients. Therefore, by following how people interact and communicate about or with a product, their mutual process of evaluating its appropriateness, potential, purpose and meaning is made evident also for a researcher to begin to interpret. In co-experience, social interaction contains elements of (see Fig. 19):

- Lifting up experiences to shared attention
- Reciprocating experiences (acknowledging, accepting, reciprocating)
- Rejecting experiences (ignoring, making fun of, downplaying, rejecting).

The "shared attention" creation proceeds in the interpretations and actions of its participants: from the feedback and responses of others people can determine what part of the lifted up experience has been received and how it has been interpreted, and fit their responses accordingly.

For instance, an example in article 4 (Battarbee & Koskinen forthcoming) shows a sample of mobile multimedia messages exchanged between friends. Thomas has sent many messages about his toddler son having temper tantrums. His younger single friend finally grows tired of the topic and gently teases Thomas about the baby's behaviour and Thomas' lacking parenting skills.

He succeeds in terminating the reports, but at the cost of being called a crybaby himself. In the example the friends share an experience, but they also interpret it, reinterpret it and in doing so come to define their relationship for a moment.

The example above is particularly rich with mixed emotions. These can be interpreted from the exchange by taking first the side of one, then the other. Emotions mark those experiences that are worth lifting up and sharing with others. Thomas the father is proud of his son, but probably also amused and frustrated by his temper. The single friend is first sympathetic, then bored, even slightly offended that he is expected to sustain interest in wailing babies all day. Thomas recognises the possibility for hurt pride and retaliates. These are the experiences that they offer to each other, and their subsequent responses offer clues to the interpretation of these experiences. Whether a particular response was the intended one is plausible or debatable and is of secondary relevance from the point of view of the meaning of the technology. In the process of the chatter, the mock fight, the pictures of wailing babies and weekend afternoons, the meaning of mobile multimedia messaging takes shape, renewed in the exchange of each message. The messages themselves are documents of how the experiences were selected and lifted up, but it is also necessary to "see the forest, not just the trees", the emerging bigger picture.

The argument thus far is simply that social interaction is essential to many kinds of experience. Social interaction is not only a framing context; it invites and motivates people to interpret and communicate the meanings for technology for themselves and the social group. In interaction, people evaluate their experiences and identify entities of experience that are significant for sharing. These are created into custom-made interpretations according to the interests of the others or otherwise taking into account the gist of what has been previously communicated.

3.1.2 CO-EXPERIENCE AS A SENSITISING CONCEPT

Symbolic interactionism suggests the use of sensitising concepts. These are concepts with relatively open definitions that however offer a perspective for studying people. (Blumer 1986) The purpose of such concepts is that of scaffolds in the construction of the house: they are put up to make constructing the house easier but they are taken down before the house is complete. Sensitising concepts offer ways to structure attention and observations especially at the beginning when no observations have yet been made, while still remaining open enough to let new interpretations be formed. As the perspective of studying the individual is still strong, having another angle for focusing on the social

interaction makes sense. Empathy is always for another person – co-experience proposes that this should take place in the context of social interaction.

The reason for suggesting that sensitising concepts might work in design is plain: in symbolic interactionism the researchers cannot know when they begin what is relevant and what is not, because such interpretations can only be made after learning about the situation and reflecting on it. Designers or researchers doing observations for design also do so because they need to develop and understanding of what is relevant and what is not. However, some kinds of structures are necessary to help in getting started, and co-experience could well provide a way to begin to understand the experiences that people have. When looking at the frameworks and models created by designers and researchers, they all contain only a few concepts or terms. For a framework to be useful in a complex situation, it has to be simple and easy to remember. A good framework is also transferable from project to another and is not tied to a particular solution or context.

To learn about how to support co-experience in a particular context, the focus of the study needs to include the possibilities of the technologies that are considered, the use of other relevant products and the contexts of use that could be served with the combination. Techniques that allow capturing experiences over time and communicating them can help in this process: be they instant messages, digital photos (Masten & Plowman 2003), journals or tools for experience sampling (Csikszentmihalyi & Larson 1977). Mainly these are used to facilitate communication between participants and researchers. However, when the technology is also part of the picture, it is important to track communication of the participant with his or her social networks. The purpose of this would be to see how people currently or in a special situation lift up experiences to others and respond to them in face-to-face situations and in mediated and remote communications. This can then be interpreted and used for inspiration to create new ways to support desirable experiences.

The principles in learning about co-experience are that the experiences can be observed directly and implicitly from the social interaction between the people involved in a broader sense. Direct observations are similar to any kinds of product use observations, especially relevant to technologies and products in co-present use. An example could be the story of co-present challenge games with mobile phones, a drinking game invention of a group of young men (article 2, Battarbee 2003a). Implicit observations relate to the ways in which people document what they do and experience to others with products that support creating and sharing content and communicating. Ample examples of this have been reported from the Mobile Multimedia pilot and the conclusions that can be

drawn from the content and continuity of the mobile multimedia messages created by groups of friends (article 3 Battarbee 2003b, article 4 Battarbee & Koskinen forthcoming).

An essential factor for studying co-experience, then, is to accommodate social interaction – to conduct studies in real context and with enough time. Typical ethnographic studies will last months, with the same amount of time for interpretation – studies on co-experience need to take the time that is appropriate for the design project and for the amount of communication that participants can be expected to have (Millen 2000). Studies on mobile communication exploration (Koskinen et al. 2002, Koskinen 2003) have shown that the number of messages sent decreases over the first 2–3 weeks, indicating that "the honeymoon" of abundant exploration is over and that longer term frequency of use may remain close to this level. However, the maturity model of instant messaging states that purposes of use will in fact increase over time, suggesting that a successful communication medium and the increase in networks will continue to shape user experiences over longer periods of time as well. However, even studies of one week have been informative in allowing participants to explore relevant experiences together – the predictive quality of such a study on long term use may not be conclusive (article 1, Mäkelä & Battarbee 1999). In fact, even Suchman's transcription of product states and the discussions of two people trying to use a photocopier are useful (Suchman 1984).

Learning about co-experience is by nature empathic. In order to make sense of and understand social interaction, a role in the interaction needs to be assumed, and one must seek sensitivity to the experiences of others as they are communicated and offered for interpretation. Analysis can then take place to see how the social interaction has influenced and shaped the experiences. Interpretations must be made – and yet must remain open for reinterpretation as well. Finally the purpose is to reflect on an emerging larger picture of purpose and meaning.

These principles address both research in the pre-concept stage as well as in the stages of product evaluation. In fact, as mentioned in chapter 4, the discussion addresses the paradox of user centred product and technology development.

3.1.3 EXPERIENCE PROTOTYPING AND CO-EXPERIENCE

Prototyping, along with iterations, is one of the key elements of user centred design. In designing for user experience it is necessary to make the designs concrete so that they can be experienced first-hand by designers and future users

alike. A prototype can be anything that is built to learn from during the design process, serving a whole range of purposes. In the area of developing interactive products, paper and screen-based prototypes are used in various stages of usability testing. In product design, prototypes represent dimensions, form and materials. Engineering prototypes serve engineering needs. Prototypes, regardless of how narrowly or broadly they are defined, are essentially things that resemble the intended product in some aspects in higher or lower fidelity (Virzi et al. 1996). Houde and Hill first suggested that prototypes should be named not according to the materials or tools they were created with or even the fidelity, but rather according to how they are used. They propose three different purposes: role, look and feel, and implementation. Role prototypes address the meaning that a new functionality might have for people; look and feel addresses a new form of a familiar technology and implementation addresses a new interaction technique. (Houde & Hill 1997) However, if prototyping for user expererience is taken seriously, the relevance of the prototype is in how well it reflects the user experience, which is a different matter of even fidelity or materials (Hoff et al.). They discuss various types of representation and the ways in which different technologies can prototype essentially the same user experience, and then again how similar technological setups can prototype very different kinds of user experiences.

Product experiences cannot be imagined for evaluation – it would be as hopeless as describing the flavour of an exotic fruit and having people think about whether they would buy and enjoy it as a yoghurt flavour. Buchenau and Fulton Suri (2000) pick up on Houde & Hill's idea, and propose the term "experience prototype" to emphasise the experiential aspect of any representation necessary to successfully live or convey the experience with a product, space or system. In their paper they describe both an interactive product as well as bodystorming in airplane interior mockups as experience prototyping.

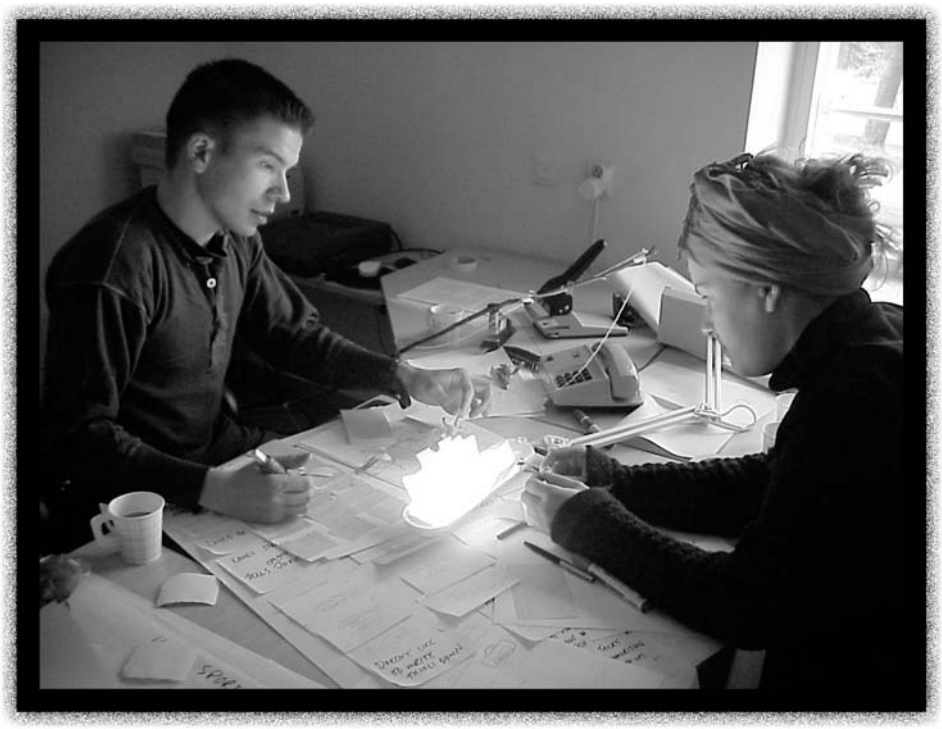
Bodystorming with physical props, in acting out movements and behaviours, can quickly help structure a design problem space (Kelley 2001). These were used successfully in a student project to support storytelling experiences for fly fishermen (see Figures 20 and 21). Although the fishermen interviewed were all technology enthusiasts, during the actual fishing all of their gadgets were left behind. The students also felt that no storytelling device could compete with the atmosphere of the campfire. To get to grips with the problem space, the two students put on their coats, found long sticks and string to be their fishing poles, tied flies of coloured paper and walked to "the river" to go fishing. One walked some hundred metres "upstream", the other a little downstream. The lines swished and the colourful flies skitted on the surfaces of the "river"

FIGURES

20 *The actual fishing experience at the "river". Photo: Raimo Nikkanen.*

Students are enacting the experience of fly fishing to understand opportunities for storytelling (students: Salu Ylirisku, Katja Pettersson, tutor Raimo Nikkanen).

21 *The "campfire" and tying the flies after fishing.*



(see Figure 20). After a while one of them decided that the experience had been informative enough, and gestured to the other that he would be going back to the "campfire" (Figure 21). The other thought it was a sign that a fish had been caught, and waved back enthusiastically with thumbs up. This incident led the students to think of a way to share the catching fish experience – through tactile feedback in the fishing rods. All other equipment was elsewhere, but through the rods two or three kinds of tactile messages could be shared between fishermen who might otherwise be out of sight or not inclined to shout loudly to each other.

Different variations of prototype use can be identified, which vary according to the purpose, the functionality, specificity and robustness of implementation.

Experience props are objects that represent for example the size or form factor of a product concept, which can be "used" or acted with in everyday life to assess issues such as portability and help in participatory design activities. Iacucci et al. describe their "magic thing", a block of foam (Iacucci et al. 2000) used in contextual ideation sessions. Simple, suggestive foam models were also used with children in a participatory design session in the Maypole project (Maypole 1999). These essentially help imagining use and learning about the relationship of the concept and the context.

Off the shelf experience prototypes are existing products that can, with some, little or no tinkering, provide a robust prototype for one or two key functionalities of interest. Kurvinen & Koskinen used polaroid cameras and paper to prototype an online photo album with a group of people (2003). Koskinen et al. (2002) used existing digital cameras and communicators to simulate mobile image communication. In article 1 (Mäkelä & Battarbee 1999), children used Gameboy Cameras to see what kinds of mobile image taking experiences they might enjoy. These are robust, functional, implementable tools that can be applied for estimates or approximations of user experience or for particular aspects of experience. The advantage of off-the-shelf products is that they can usually be put into use early in the process, when they can still influence decision making.

Experiential prototypes are specifically constructed to demonstrate an aspect or quality of functionality or interaction that cannot be demonstrated with off-the-shelf products or more refined combinations of functionalities. To communicate the intended experience of the digital camera, a large prototype was constructed to tune and demonstrate the experience (Buchenau & Fulton Suri 2000). The projects Pogo and LiMe at Philips gained much from using experiential prototypes as well (Goulden & McGroary 2003). Experiential prototypes are

typically half-way prototypes that help evaluate particular new aspects of experience. These can be complemented with, for example, scenarios.

Mini-designs are specifically constructed concept designs that allow the evaluation of an idea in a finished looking form and interaction. The word mini-design has been taken into use at The Eindhoven university of technology for research through design. Mini-designs are conceptual in nature and are not intended directly for the purposeful world of use, but rather to demonstrate and study an idea. For example, a game was constructed to test children's flow experiences during gaming (Eggen et al. 2003). These are typically research oriented prototypes that bring together both design and research.

Field testing prototypes are like experiential prototypes, but often developed in small numbers and made robust enough to be tested by groups of people in real contexts of use over time (Mäkelä et al. 2000, Buchenau & Fulton Suri 2000). These are typically costly, labour intensive and built when technology ideas are already relatively strong. For software creating such prototypes may be easy, for handheld products extremely difficult.

The situations in which these different kinds of prototypes become part of the experience prototyping are varied as well. Prototypes may be necessary for in-team activities among designers themselves to learn about relevant experiences, seek inspiration and test and develop their ideas further (Moggridge 1999, South 2004). They can be also instrumental in communications between design consultants and clients. Prototypes can be used in sessions or situations where designers and future users collaborate and do things together with them. Provotypes (Mogensen 1992) are existing products, prototypes or mockups that are used in analysis to provoke awareness of current practice by exploring alternatives (Kjærsgaard et al. 2003). In reciprocal evolution (Allen 1993) the idea is that use is design. Quite often it happens that a new technology is introduced, and users start then also using it in ways it was not designed for. Therefore, the most interesting results can be found when studying emerging practices, when the process of negotiation, meaning seeking and change is rapid, and gained insights can inspire the development of products and technologies.

Users, researchers and designers can also experiment with the products their participants are using. Sometimes design ideas can emerge from relatively loosely framed experimentations. As an example, two colleagues and myself conducted a small experiment on lifting up experiences and context. Two of us lived in Helsinki, one in Belgium, and although acquaintances, the Belgian had not been in Finland and the Finnish had not visited the Belgian. We were interested if something could be done with location awareness – this was a general interest without a specific need attached to it. We used short messaging with

FIGURE 22 *Even short and small field experiments with technology can lead to experiences and insights. "Sorry, I cannot respond to your request right now" – and taking a photograph to explain why.*

mobile phones to signal a note-taking moment, and notebooks and digital cameras to document the location and the situation. The analysis was done in two stages: first only the notes were shared and we each sketched small drawings with which we imagined what the picture would be like. This was an empathic exercise, but also a challenge to see what kinds of images the notes would evoke. Finally also the photos were shared and compared to the drawings and notes.

In analysing the results, several interesting things emerged, for example that close friends can sometimes accurately guess the angle and framing of a photograph taken by the other person. But the design idea that emerged from the experiment related to a moment of unavailability and the knowledge that the mobile phone alert was likely to beep at any moment, requesting note taking at a time that was inconvenient. I took a photo in anticipation to describe what I was doing and why I could not take notes. This brought forth the idea of using photographs to communicate unavailability (see Figure 22). As we had experienced, knowing another person's physical environment and context brings an added level of interpretation into photographs. The better two people know each other, the more meanings can be offered and interpreted from a single photograph.

The solution to co-experience and prototyping is to turn the traditional design process around, where field testing has traditionally happened last, and treat

field testing as an early research tool. Experience prototyping needs to expand towards social experience prototyping. With activities that introduce change into existing social and physical contexts new things can be learned and the process of change can be studied as well.

3.2 DESIGN FOR CO-EXPERIENCE

In designing for co-experience, following a few key principles in the design process is more important than the actual method used. The paradigm that describes the required conditions for designing for co-experience consists of at least the following elements:

1. People are involved and present in a user-centred process to overcome studio-based contemplation of irrelevant issues.
2. More than one person is involved in a unit of study, to create the conditions for co-experience in a manner that is appropriate for the design context.
3. The interactions and co-experiencing take place in a real context, not a laboratory.
4. People are the authors of their own experiences. They are involved as creative actors, who can and will engage with available products that support them in their interests, their social interaction and experiences that they find meaningful.
5. Experiences are followed over time, with an eye to trace the trajectory and path of the experiences after the "first five minutes" and the "first five days" and to be sensitive to the process of exploration and redefinition that takes place.

The studies presented in this thesis follow these guidelines to a large degree. For the first, each article presents work that involves "real people". The exception is in article 6 (Battarbee et al. 2002), where lack of a common language made observations limited. The intervention's factual worth for the final design was relatively low although its inspirational value was relevant. The article is included to illustrate that co-experience can be accessed with design tools like scenarios. The second rule is also followed, as all the studies focus on a person in some kind of a small community – a group of friends or acquaintances, a family or a romantic couple. Also, the ideas are tied to the observed contexts of the Italian town of Ivrea. In all the other studies, technology of interest was given to people who could take it with them wherever they went. Not a single one

of these studies was conducted in laboratory conditions. This is a challenge for data collection but a necessity for data creation – the consequences of unpredictable events and other contexts can inform design in ways that controlled set-ups and laboratory environments never can.

The fourth notion – that people are creative – is trickier. Creating solutions is a skill that most people engage in their everyday life. For example, clear acetate tape with pressure sensitive adhesive was developed and marketed as something with which to repair books. However, people started using it for dozens of other purposes, many of which turned out to be new business opportunities for product development. The meaning of the invention was discovered in dialogue with people. (Schön & Bennett 1996) Sanders suggests that rather than focusing extensively on "designing the user experience" (and, one may presume, continuing to ignore the impossibility of literally doing so), designers should support collective creativity. It can result in new uses, new practices and applications for technologies and products that are relevant to understanding what motivates people and what latent needs people are discovering for themselves in product use (Sanders 2002, 2003b).

Sanders prefers to address this as "the creativity of everyday people". Non-designers are not in the habit of expressing their creativity except perhaps in areas of one or two passions and interests. She identifies four levels of creativity: doing, adapting, making and creating. On the level of doing, everyday products and services satisfy people's needs and require minimal skill and effort. When adapting, people invest more effort and skill to make products fit their use or environment. When people make things, they follow directions or a recipe and sometimes invest much in both money and time to do things they truly care about. In creating, people leave instructions behind, and use raw materials and their skill to create and express themselves. (Sanders 2003a) Designing for creativity – what people like to do – is a strong departure from designing for something like pleasure derived from owning a particular product.

Seeing people as creative actors with an unlimited capacity for experiencing supports a more collaborative approach to thinking about user experiences. The way fads, trends and popular ideas spread is social (for an interesting analysis of seeing the spread of ideas as an epidemic, see Gladwell 2002). Design (in the sense of cultural production) is expected to be creative and feed, guide and live off such trends. But when it comes to doing and using, the experiences that people create for themselves are always personally rewarding (for a fun example, see fig. 23).

Fifth, it is important to study use for a long period – several weeks seems to be ideal – to see how experience develops. The first days and weeks are when peo-

ple explore a product or a technology. The new uses that people invent can seem self-evident and small unless followed carefully (article 3 Battarbee 2003b). Only later, people settle to certain uses (Koskinen 2003). Some changes take months to become part of routine (Millen 2000). Thus, in a study of mobile multimedia messaging, participants started to use mobile multimedia phones and ended up collectively defining the purpose and meaning of the technology for them (Koskinen 2003, Kurvinen 2003). Utilitarian uses did not emerge more than in an isolated incident, but the participants came to a (mostly non-asserted) agreement that the purpose for their messaging was, in fact, mutual entertainment. Here the participants were recruited as groups of friends through one person, and such an explanation makes sense because of the nature of the social ties.

The key to applying the concept of co-experience is that people's actions are social even when they are alone. In any given situation, all the person's social

FIGURE 23 *This is a more radical departure of the concept of motorised transport. It is called RIOT (Reinventing Of The Wheel) and is here being demonstrated at the Burning Man festival in 2003. The RIOT is a large wheel with a motorised hub and a balanced seat in front. The RIOT challenges previous concepts of monowheels with an imaginative design. The purpose of the RIOT is to reintroduce thrill and excitement to the experience of motorised transportation. © Jake Lyall 2003 http://theriotwheel.com/.*

interactions are dormant, waiting for an opportunity and a purpose. What this opportunity is and how it is realised is a matter of the context, the technology and the people. Therefore, as in the story of the mobile phone drinking game (see article 2 Battarbee 2003a), a product that supports remote communication is useless in face-to-face communication situations, unless its functionality is revisited with an eye for entertainment.

In any context and with any product, situations can be reviewed with an eye for co-experience with two concrete views. The first is *here and now* – supporting the creating and sharing of experiences in the moment between co-present people. What is available, what is the situation? What kinds of experiences are they creating together and how are products facilitating, constraining and shaping them? The other perspective is *there and later* – how could future or remote interactions be supported as well? This perspective leads to thinking of the people who matter, and what could be shared with them of the current moment and how (Battarbee & Kurvinen 2003). Would a grandparent like a sound clip or a post card or both? A toy for the son, or a long letter to a partner? A floating balloon in the sky, an icon on a screen or a ring on a finger glowing pink? Or perhaps something merely touches the imagination and a purpose for it will be found later. Such souvenirs of moments can take any form, and people are their own craft artists in that respect. The next step for the designers would be to discover ways to try out these ideas and to learn from them.

Research on product use and the kinds of experiences people enjoy is typical of the early stages of design, in the pre-concept research of the fuzzy front end of design (Cagan & Vogel 2002). At this stage the inquiry is into opportunities that could be supported, problems that could be addressed and other sources of inspiration from the users' lives that can help in the formulation of ideas, translating them to matter and discussing them. Once designs are implemented, products are subjected to usability testing and marketing studies. User experience is generally defined in a much more narrow fashion in these stages, and is much more likely to be context, technology platform or project specific (Garrett 2002, Marcus 2004). Different stages of design call for different methods and processes, although the principles of user centred design still apply. However, the usefulness of the concept of co-experience is not limited to the realm of pre-design user research. The work described in the published articles of this thesis focus on the following three things:

- Studies on existing technologies, with findings that suggest that using products to communicate and share experiences with others posed a challenge for user experience frameworks existing at

the time (articles 1 Mäkelä & Battarbee 1999, article 2 Battarbee 2003a, article 3 Battarbee 2003b, article 4 Battarbee & Koskinen forthcoming)
- Concept development and scenarios that take the needs for sharing and communicating into account (article 6 Battarbee et al. 2002)
- Elaborations of the concept for interactive system design (article 5 Forlizzi & Battarbee 2004).

Rather than a particular method, co-experience is a perspective that opens designers' eyes to a feature of reality that sometimes is blinked away: the fact that people often make sense of their experiences together, and the definition of the meaning or purpose of a technology emerges from these shared experiences. The ways in which these experiences become shared become evident in all the forms of social interaction, both face-to-face and mediated. The methodological argument for co-experience is that observing how people lift up experiences for each other and respond to them is the best way to learn about the experiences that are relevant to a technology or product. Meaning is emergent in social interaction; therefore to learn about it, the conditions for it to happen must be created. Once the conditions are set up and exist, preferred approaches that allow these experiences to be interpreted from the interaction can be used, with empathic sensitivity to the experiences and also their emotional significance.

3.3 REFLECTION

Dourish (2001) draws an exhaustive list of why research (social studies, ethnographic studies) and design (in most cases, system design for computer supported collaborative work) have not been able to connect properly in the design process despite the dire need to do so. Social studies and design have opposing aims: frameworks are either too general to be practical or too detailed to be useful but to the person who created them. This dissertation has, hopefully, addressed these challenges and managed to provide enough of a theoretical background but also enough of practical reflection to be both interesting and useful. This is why there are attempts to connect to philosophy, theory and practice, at the expense of none of them being in the central focus.

It also seems unfortunately rare that designers actually visit the places their users work (Dourish 2001 mentions this and his observations are probably not outdated). It seems there is still plenty of work in the field, especially in relating

social interaction to design, be it about work or systems of collaboration (Heath & Luff 2000).

All kinds of design are still needed as in the days of Modernism. There are the rare but necessary radical innovations that usually have little to do with involving the users and at the same time users' social innovation in taking existing technologies and appropriating them. Similarly, there is need for a good, solid development of products involving design work, materials and manufacture development and which clearly can benefit from user centred processes.

There is also need for experimentation, style and styling, fashion, interactivity and breaching the boundaries of design, interaction, art and technology. Increasingly, design is also part of creating technologies for people's lives, for communication, for activities that tie many others together, and for allowing people to create content. This line of work could probably most benefit from this study, as it is about how technology, social interaction and design all come together in ways that can be learned from and designed for. Co-experience as a concept can inform the design of spaces, of products, of human computer interaction, new media, and events.

The validity of the ideas and proposals, in a practical sense, is determined by how many user experience professionals learn about them and whether the ideas presented have a positive effect on the definition and perception of the term "user experience" in practical work. Determining such success and effect is difficult – the dissertation alone should not be expected to change much in a grand scale – such a goal should rather be a life-long one.

Secondly, the validity of the ideas can be seen more directly in how they become visible in further research on design and user experience – thanks to online reference tracking in databases, following this kind of influence is easier, though possibly rather superficial. Thirdly, the proof of concept of the validity of the ideas is to be seen in how these ideas can be put into practice in my own future work, be it practical design work, design education or technology research. Of this I am most optimistic. Applying the idea of user experience in social interaction and collaboration contexts seems a promising one.

4 PRESENTING THE ARTICLES

4 PRESENTING THE ARTICLES

This ordering of the articles is not in strict accordance with the chronological order of the publications, although the key developments are in order. ARTICLE 1, "It is fun to do things together" (Mäkelä & Battarbee 1999), predates all of the others considerably. Its focus is on the use of existing products in field experiments to learn about what is fun for children about a particular technological possibility. The paper has elements that are key to the idea of co-experience, but it is not written from the user experience point of view. In fact this paper is a starting point; the shortcomings of existing models for user experience were revealed when they did not seem to address the point of the paper, the experiences of doing together, in a satisfactory way. Thus emerged the need to discover how this could be accounted for in the field of design for user experience. The paper proposes that fun – or the enjoyment derived from using the Gameboy Camera – for these users was related to doing together. This insight, initially suggested by the first author Anu Kankainen (née Mäkelä) and then presented for the first Computers and Fun seminar in York, is the cornerstone that has helped to orient all the various papers together into a research direction. My task in this publication was the reporting of the studies. This result was not explored further at that time by the authors.

A first attempt at explaining the need for a new concept for describing shared product experiencing happened in a CHI short paper called "Co-Experience: the Social User Experience", here (ARTICLE 2 Battarbee 2003a). The conference's spe-

cial theme was emotions. The paper uses two "technology legends" or stories of creative social uses of a communication product. It describes the co-experience as being social, fun, multi-modal and creative in an everyday kind of way. The paper's aim is to show that these aspects may not be addressed well enough in the HCI literature and outlines the work ahead: a framework to explain the concept, case studies and further attention on methods and processes.

ARTICLE 3, "Defining Co-experience" (Battarbee 2003b) takes the challenge from the previous paper and attempts to define co-experience for the design audience. The paper takes the design for user experience point of view and illustrates it by products and experiences "coming to life" when people do things together. The central aspect of the communication as the key element in co-experience becomes evident as the data used here (as well as in many other subsequent papers) comes from a multimedia messaging pilot, where the communication can be studied as it happened in one medium between groups of friends. The presentation at the conference demonstrated not only what was in the messages, but extrapolated what must have happened between them, partially reconstructing the necessary steps between them and thus showing how the experience is shaped in the course of the messaging turns.

Articles 2 and 3 both describe co-experience but in different ways. At the time of the writing the idea of co-experience was clear in the sense that it was about people interacting and products being involved. Different audiences (human computer interaction people vs designers and interaction designers) require a different amount of background work. The point of article 2 was to point out that shared experiences were not addressed in product design. The point of article 3 (Battarbee 2003b) was to seek to describe what was particular about shared experiences and sharing experiences. Three main dimensions were presented: explorative – organised, synchronous – asynchronous and creation – interpretation. The matter of being explorative or organised is perhaps poorly phrased, but it refers to the degree of established forms of activities. These, in hindsight, are what can be seen as resources for interaction: if people know what is expected of them, they can comply with it or deviate from it. When new products or technologies are brought in, these kinds of expectations have not become established, and it is in fact a process that continues to be upheld or changed. The synchronicity of communication is mainly a technological standpoint, although in practice face-to-face interactions also often leave topics and return to them later intemittently (see e.g. newsroom conversations in Heath & Luff 2000). The creation vs interpretation dimension mainly addresses the role of people as consumers of content or creators of content. To some degree these are particularly illustrated by the case of mobile multimedia messaging. Compared to article

2, this is already a better formed description of the qualities of co-experience, but it still fails to deliver a theoretical basis for the concept of co-experience.

ARTICLE 4 (Battarbee & Koskinen forthcoming) works towards a theoretical understanding of co-experience in relation to the other design models and frameworks on user experience. It answers the key question of what happens to experiences in interaction in Forlizzi and Ford's (2000) model, and borrows a sociological theory called symbolic interactionism to form an answer. The article is conceptual in nature: the connection back to design is not this paper's main point, and in fact the review of the existing fields is more complete in both article 5 as well as here in chapter 2. The article makes again heavy use of material from the multimedia messaging study. In this paper Ilpo Koskinen's knowledge of theoretical and practical work in the field were important in helping to shape the paper's key contribution and form.

ARTICLE 5 (Forlizzi & Battarbee 2004) is an attempt to integrate the concept of co-experience back to the models of user experience in interaction. Existing approaches are reviewed, and this paper then builds on the Forlizzi & Ford model, connecting co-experience to the individual experiences as a parallel possibility through communication. Examples of different experiences are illustrated with suggestions on how to study them for the design of interactive systems. The conceptual task of bringing co-experience and the previous model together was shared. My tasks also involved arranging illustrations and case examples and working on the concept as well as overall work on the text.

Finally, ARTICLE 6 (Battarbee et al. 2002) was written before the term co-experience had surfaced. It was a write-up of a summer school project on designing for communities and designing for intimacy in the city. The premise, however, is perfectly co-experiential, which is why the article and the design cases as well as the interaction requirements presented in it can be now used to discuss how co-experience could be applied. It also discusses the term intimacy in a way that makes it a term useful in thinking about new technologies, communication, co-presence and communities for interaction design. In the presentation at the conference, the focus was on describing the design requirements and illustrating them with the scenarios. The design requirements that must be supported are: intimacy, interactivity, meaningfulness, and openness to participation. This reflects the idea of connecting people directly with each other, rather than creating ambient art installations with more oblique effects on people's experiences. The rationale for this was that for intimacy, the design had to bring people together, not just paint an abstract moodscape or create artistic displays. My task in the writing was management and integration of the individual participants' contributions, and the final editing task was shared with Nik Baerten.

ARTICLE 1 IT'S FUN TO DO THINGS TOGETHER – TWO CASES OF EXPLORATIVE USER STUDIES†

Mäkelä, Anu[1] & Battarbee, Katja[2]

[1] *Usability Group, Helsinki University of Technology, Espoo;*
[2] *Department of Product and Strategic Design, University of Art and Design, Helsinki, Finland*

ABSTRACT

This paper describes two explorative user studies conducted in a research project called Maypole. The purpose of the first user study was to understand how children thought communication with personal technologies could be fun. The second study focused on what children thought was fun in taking and editing digital images. In both studies, children aged 7–12 were given existing personal technologies to use in their own environment for one week. After that, a focus group was held with the children in order to discuss what they thought was fun in using the technologies.

† First published in Personal Technologies (1999) 3: 137–140.

The results of the two user studies illustrate how fun in using personal technologies could relate to a user's social behaviour, and not only to human–computer interaction. Therefore, designers are encouraged to explore further the social aspects of fun in their creations. Moreover, the two studies illustrate some methodological problems in studying a user's experience of fun, which refer to a need for more public research on methods.

KEYWORDS
Children; Product concept design; Social aspects of fun; User study

1. INTRODUCTION

This paper is not the report of a scientific study on fun and computers, but the description of two explorative user studies carried out as a research project. We believe that it illustrates nicely how fun in using personal technologies can be based also on human interaction and not only on human–computer interaction. It also illustrates the methodological problems in studying users' experience of fun.

The paper describes two small user studies carried out in a project called Maypole (see more about this project in [1]). The aim of the project was to explore and create new ideas for communication products for children aged 8–12 and members of their social networks. It followed the principles of the user-centred concept design phase of product development but was a research project of six different European industrial and academic partners.

1.1 USER STUDIES

The aim of the two user studies described in this paper was to learn more about children's ideas of fun in order to design fun product concepts for them. They were not the only user studies conducted in the Maypole project [1,2].

The first study, on the in2it, was carried out at a time when the scope of the project was focused

on everyday communication, and several completely different concepts were generated by the partners. The second study, focusing on the Game Boy Camera, was done when it had already been decided that the project would concentrate specifically on communication with digital images, and design and engineering partners were about to start the design of the concept for prototyping (Fig. 1).

In both studies, children were given existing yet novel technology to use for one week in their own environment. It was believed that by giving the children access to technology with features similar or close to the area of the

project interests, allowing them to freely use the technology and discussing it afterwards, information could be gathered for generating and designing new product concepts.

2. METHODS

2.1 IN2IT STUDY

With the help of the Netherlands Design Institute, we were sent six in2it devices by Philips Electronics for the first study. The in2it was designed by Philips in a user-centred process especially to meet the needs of young girls, a fairly untapped market niche [3]. It had a calendar and an alarm, it could be used for making tunes, drawings, stories and cards, and these could be traded between in2its via infrared. It could also be used to calculate biorhythms and make matches between two people.

The children participating in the study were five siblings, aged between five and twelve. The reason why we selected siblings to be the test users was that at

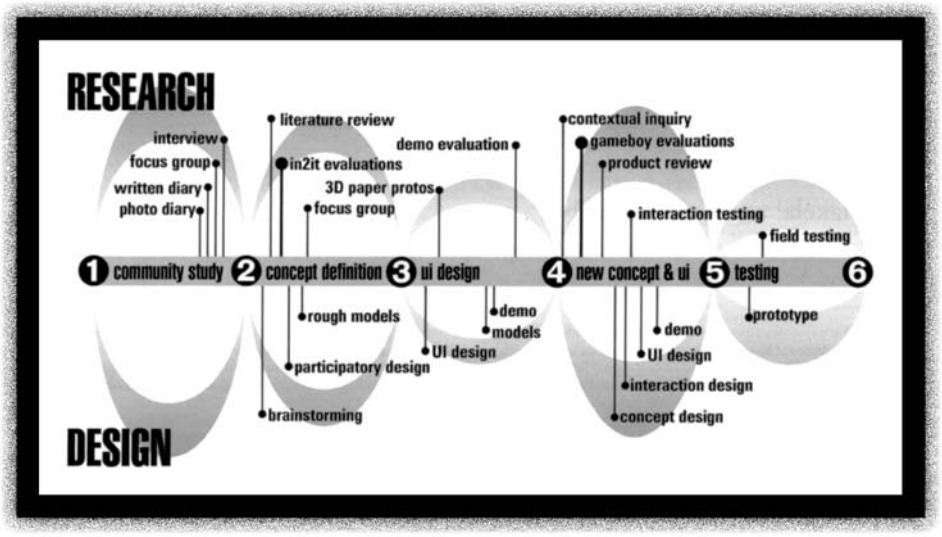


FIGURE 1 *Illustration of the experimental design process of the concept for communication with digital images in Maypole. The in2it study was carried out in the concept definition phase, and the Game Boy study in the new concept and UI phase. Reproduced from [2] with permission.*

FIGURE 2 *One of the users with a Philips in2it.*

One of the users with a Nintendo Game Boy Camera. FIGURE 3

the time of the project it was not clear on which age range the project wanted to concentrate. The siblings were different ages but still part of the same social network.

The siblings were given the in2it devices and translated manuals, and were invited back a week later to return them and discuss in the focus group what they had liked about them, what they had done and where. A large part of the discussion was about their interests in general and they everyday lives and social activities. They were also asked to give suggestions for ways to improve the in2it devices. These suggestions were not intended to be used to improve the devices but were asked for because it was believed they would reveal something about the children's preferences in general.

2.2 GAME BOY CAMERA STUDY

Three Game Boy Cameras and Printers were bought for the second study. The Game Boy Camera was an accessory for the Nintendo Game Boy, and has only just arrived on the Finnish market. It can be used for shooting and saving black-and-white snapshots, adding on stamps, frames and text, making animations, and taking panorama pictures. The self-made pictures can be printed out as stickers with the Game Boy Printer.

The field trial was conducted with separate groups of boys and girls. The groups were already established friends, the girls aged nine and ten, and the boys aged 8–13. The children were given the Game Boy equipment, a brief tutoring, and a translation of the basic features from the manual. They were also given a phone number to call in case of problems. A week later, they were invited to return the equipment and talk to us about what they had liked about the Cameras and Printers, what they had done with them and where, and show us what kind of pictures they had taken.

3. RESULTS

3.1 IN2IT STUDY

The first user study on using in2it devices gave firsthand impressions to the design-research group on what children thought was fun to do in their leisure time. The children considered gossiping, spying and practical joke messaging to be special fun activities related to communication. These activities were then explored in the features of the new product concepts generated by the project partners.

The favourite in2it features of the over-9-yearolds were matchmaking and creating face collages; the younger children liked drawing. The boy had also en-

joyed the challenge of breaking the eldest sister's user password. At home they sent anonymous teasing messages to each other via the infrared link. The size and bulkiness of the in2its were not seen as a problem when used at home, but the children thought the machine was too big to be fun to carry around.

In the focus group, we found that the older siblings tended to control the conversation and do most of the talking. In order to get everyone's opinion, the younger ones were encouraged by asking them individual questions.

3.2 GAME BOY CAMERA STUDY

The study using the Game Boy Camera indicated that users should be able to edit digital images before sending them over the wireless network to others. All the children who participated in the Game Boy Camera study liked editing the pictures with silly stamps, such as adding ugly monster or beautiful princess eyes.

Moreover, the boys enjoyed the activity of taking pictures, preferably together, by spying on people, play-acting stories and staging silly pictures. They also spent a lot of time together exploring the product for new features and possibilities. They showed the Cameras to their friends and gave away most of the printed pictures they took. The girls preferred to take pictures of family, friends and pets, and they traded pictures with each other. The best pictures were printed out and kept as treasures, stuck to a notebook or pencil case.

4. DISCUSSION

Although it is not possible to generalise about the findings of the two explorative user studies, it would appear that experiencing fun in product use would relate to human interaction as well. We hope that this paper works as an inspiration for designers to explore more fully the social aspects of fun in their creations.

The paper describes activities that the children experienced as fun, such as spying, gossiping, and taking pictures together. Personal technologies could support playful aspects of work as well. For example, experiencing work as a game and goofing around in the workplace [4] could be some them to explore further.

We also hope that our methodological problems in studying user experience of fun will encourage researchers and designers to study and develop valid techniques for observing and testing feelings of fun in product use.

Due to the tight schedule of the project and other parallel tasks, we did not think to observe the children in their own environment during the trials. In hind-

sight, a field enquiry could have given more reliable information on how the children used the devices, but we did not have the methodology for observing feelings in the field. Field methods developed for user research, such as contextual inquiry [5], or those presented by Hackos and Redish [6] or Wixon and Ramey [7], do not provide specific techniques to understand the user's feelings or attitudes, as their approach is more about understanding a user's tasks at work.

Another methodological problem was that, on the basis of our previous user studies with children, we were aware that children might adopt other group members' opinions in focus grolips. Indeed, we did detect sometimes that those who had different opinions did not say them aloud. However, it also worked the other way round, because sometimes, if a user tried to tell exaggerated truths in order to impress us, they were corrected by their friends in the group.

The reason why we took the risk of missing something in the focus groups was that we did not know the right terms and questions to talk about fun with children. We believed that in focus groups children would use their own language when among other, familiar children. If given more time, we could have tried to apply an informal method called "co-discovery exploration" [8] for iterative design of consumer products. In "co-discovery exploration", the users are asked to come in pairs to a laboratory. The method concentrates on cognitive and emotional aspects of the first impression, and initial use of a product. We wanted the users to explore the devices for at least some days in their own environment, but the idea of users exploring the devices in pairs after the trial could be worth trying, if field inquiry methods do not provide better alternatives.

As well as testing existing technologies, some of the empathic methods developed by designers during the design process to take into account users' needs, feelings and emotions could have been worth trying as we tried to explore what "fun" meant to our target group. However, the emphatic design techniques used in design companies vary. There are some publications about those techniques [9,10], but their descriptions are often too general to be applied in practice, and their successful implementation would also need years of accumulated experience.

Gaver et al. [11] have described a promising technique of emphatic design, called "cultural probes". To their target group they sent packages called probes, containing disposable cameras, postcards, maps, etc. with questions on specific experiences. The focus of their study was not on fun but the technique would be interesting to try when exploring users' experiences of it. However, the technique needs piloting in order to find the right language to ask about fun and a good way to communicate the gathered data to all parties in the design project.

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Correspondence to: A Makela, Usability Group, Helsinki University ofTechnology, PO Box 5400, 02015

ARTICLE 2 CO-EXPERIENCE – THE SOCIAL USER EXPERIENCE†

Battarbee, Katja

ABSTRACT

This paper presents a critical view of existing models of user experience. These models view experience as the subjective response in the individual's mind. While designers and developers have to try to provide a satisfying user experience, the means to do so remain limited. This paper presents a missing aspect of user experience. Experience can be seen as an individual's reaction, but also as something constructed in social interaction. Designed artifacts, especially personal communication and digital media products, environments and systems can facilitate this kind of use. "Co-experience" is the experience that users themselves create together in social interaction.

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KEYWORDS
User experience, interaction design, co-experience

INTRODUCTION

Usability has been critiqued for not addressing the emotional side of product use strongly enough. It aims more at the removal of obstacles than at providing engaging and fun experiences [7]. The lingering mental image is of a user sitting in front of a terminal, accomplishing tasks as efficiently as possible. As Dourish [2] points out, in general both computer science and cognitive science imply that thought is separate from action, despite the recent interest in the situational perspective [9] as well as social computing [2].

Models and frameworks on user experience have been emerging in the last ten years. The models focus on understanding the individual's experience, what elements affect and constitute it and how it may be expressed [3], a necessary starting point. These models emphasise that designers cannot design the subjective experience, only the context may be designed [5, 3]. Although some professionals claim to design and deliver experiences, they agree with these limitations.

There is, however a vast number of people who can and in fact do design experiences on a daily basis. These people are the users themselves, who together with others create experiences together, collectively. They are creating co-experience with designed artefacts.

The reason why co-experience is a relevant issue in the field of Human–Computer Interaction (HCI) is the development of personal communication technologies and digital media in affordable consumer products that allow ordinary people to take over these technologies for their own purposes. Even when describing pleasure with products, explicit mentions of multiple users are missing [6]. People enjoy the company of each other more than their products. It remains vital to design attractive, functional and usable products, but it is even more important to provide the opportunity for the users to create the relevant experiences together with their family and friends near and far.

STORIES OF CO-EXPERIENCE

To illustrate user experience, I present two examples of stories I have heard. Both are examples of re-appropriating technology for social use.

MOBILE POKER

A group of players sits in a bar. Each types a rude text message into their phone. Before sending, they swap phones and start blindly scrolling through the list of

recipients until someone says “halt”. The phones are returned to the owners, who hold them to their forehead for others to see the displayed recipient. Bets of beverages are then placed, which the player can then win by pressing the send button – the more inappropriate the recipient, the higher the bet.

The first reaction to this example is that no company would want their products to be used for such questionable entertainment. However, the situation reveals interesting facts: mobile phones are part of leisure. Phones contain games, but they typically are for one player, and require full attention. The games also do not utilise the functions of the phone: making calls and sending messages.

It is unlikely that a person invented this alone, but it is easy to see how a group of friends might have come up with the idea on a Friday night. The game provides experiences that many young men seek: taking a challenge [1] in front of others, developing sense of taking decisions and being responsible for the consequences – experiences that could be supported also in a more socially responsible game.

THE VIRTUAL THEATRE GROUP

Two young girls have the hobby of writing little plays during recess at school. In the evenings, they go to a virtual chat environment [10] on the Internet where they have set up a room with chairs and a stage. Each with their script, they act out their plays with their avatars. Sometimes they invite their friends to appear as avatars in the audience.

The virtual environment is designed as a chat room for teenagers: users log in with an avatar and move in the axonometric space, typing what they want to say. The same functions provide an outlet for the dramatic expression needs of the girls: the avatars can change appearance and the private rooms have virtual furniture. The environment supports the participation of many people remotely. Virtual performances are easier to organise than a real drama group, and provide more freedom for the characters – more imagination and less reality, in fact, the perfect setup for young girls’ imaginative play.

WHAT DEFINES CO-EXPERIENCE?

CO-EXPERIENCE IS SOCIAL

Co-experience relies on communication. A study of how professional designers construct things collectively [4] describes the collaborative design process as being a dialog, in which proposals are created, and then evaluated, rejected or accepted and new ones created in response. The designers of co-experience respond similarly to the situation presented by others, and through their inter-

pretation act to shape the experience into the desired direction. The social situation creates the incentive to respond and continue.

CO-EXPERIENCE IS MULTI-MODAL

Co-experience, like human–human communication, is multi-modal. The richness of face-to-face communication and the setting it takes place in can be augmented with various communication technologies. What is begun in one modality or channel may continue seamlessly in another. Technologies divide the interaction possibilities into more specialised niches, which users utilise creatively to meet their needs.

CO-EXPERIENCE IS CREATIVE

Co-experience is about people's everyday creativity. Sanders [8] points out that when people use technology together, they produce much more creative and interesting results than when people user products just on their own. Co-experience is a creative resource, it is what propels social innovation. However, the creativity in co-experience is not about creating products or art. It is about the ways in which participants make things meaningful for others, the way in which they use the tools to create the experiences.

CO-EXPERIENCE IS FOR FUN

Co-experience is something people do for pleasure – to have fun together, to pass the time, to keep in touch and to strengthen social ties. This means taking "having fun" seriously [7] as the driving force behind co-experience and as a motivation in its own right.

CONCLUSIONS

Future work on co-experience requires practical work: studying co-experience for design, developing the process and tools to do so, and applying and communicating the findings. A framework of co-experience needs to be developed. Finally, co-experience should be seen as the product's adoption into human life. The other, individualistic aspects of user experience precede and complement it, so that both individual and social experiences find their balance.

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ARTICLE 3 DEFINING CO-EXPERIENCE†

Battarbee, Katja

ABSTRACT

In the context of design for experience this paper presents a review of existing models of user experience. In response to a prevalent view of experience as something individual, this paper suggests how these models should grow to include social use as well. Examples from a multimedia messaging study are discussed to this end and the concept of co-experience is introduced to take into account the social aspects of user experience and the experiences that users create for themselves with designed artefacts.

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CATEGORIES AND SUBJECT DESCRIPTORS: A.0 [General]: Conference Proceedings

GENERAL TERMS: Design, Human Factors, Theory

KEYWORDS: User Experience, Co-Experience, Interaction design

1. INTRODUCTION

In the recent years there has been an increasing interest in understanding how to design and deliver user experiences to consumers. Experience is seen now as the next new business in addition to selling products and services [18]. In the field of design the word "experience" is used to mean many things, such as products, retail spaces and online content. In fact, it can be anything and everything.

The understanding, however, remains that experiences are private and subjective [18, 3] and what remain to be designed are the "contexts for experience" [3, 9, 20]. This means that design supports the possibility for having certain experiences while it is accepted that due to uncontrollable factors, the experiences may also be different. Models describing user experience thus have focused on describing experience [3] as well as defining the elements that contribute to experience [13].

The advances in consumer products and available technologies are bringing in new possibilities for product related experiences – an interesting example is the digital camera, which has been available for some years already. How is it used? Most of the time it gets no attention at all. Then a group of friends get together – suddenly the camera is pointing and clicking, being passed from hand to hand. Grouped closely over the display, the friends are commenting on the expressions, posing for pictures, deleting, approving and smiling. It seems that some experiences only come to life when they can be shared. How do current models of user experience account for this?

This question arose from the results of the Maypole study [5]. The study focused on supporting social interaction with new technologies. In the process of research and design, existing products with relevant features were field tested with target users. A field evaluation of the new GameBoy Camera was used to understand what kinds of experiences a personal product that can capture and share images might support. Collaborative use was important: teasing, editing funny images, staging pictures and creating stories – all things done together – were the most enjoyable features [12]. The final prototypes of wireless image communicators were field tested with two families in Finland and in Austria [14].

The families used the prototypes in different ways depending on their interests. Children staged stories, took silly pictures and teased each other. The grandmother started creating abstract art puzzles and would talk about them with the grandchildren over the phone. Social use experience is more than the sum of the individual experiences.

The concept of user experience needs to be expanded to encompass not only the individual side of experience, but also to take into account the social side. In fact, the issue of not being able to design experiences can be resolved by letting the users themselves be the ones who create their experiences, and who do this also together. This paper explores how people create experiences together with designed artefacts. These socially created experiences, or "co-experiences", are illustrated with a set of examples from a case study on multimedia messaging. Finally, the paper will discuss designing for co-experience, present possible dimensions for it and point to further work.

2. WHAT IS CO-EXPERIENCE?

Experiencing is a constructive activity [20]. Co-experience is the user experience, which is created in social interaction. Co-experience is the seamless blend of user experience of products and social interaction. The experience, while essentially created by the users, would not be the same or even possible without the presence of the product and the possibilities for experience that it provides.

2.1 EVERYDAY CREATIVITY IN CO-EXPERIENCE

The action of co-experience is creative and collaborative. Sanders criticises the individualistically oriented approach of experience design and suggests that the focus be rather on understanding collective creativity: the creativity of ordinary people in their everyday life. What people do and create together is much more interesting and unpredictable than what people do when they use things alone [21]. Creativity, then, is not just the domain of the designers, and what is created is not necessarily a product or art. Users create ways to make existing technologies and products work in for them in social interaction. Creativity is one of the drivers of co-experience.

Collaborative (and creative) design work has been studied in the context of professional designers, where Geisler and Rogers [6] analyse the process of co-construction, of people getting together to make something. The results can be transferred also to support and understand the collaborative process involved in co-experience. The process of creation is argumental: participants

make proposals and counterproposals, evaluate, reject and accept in a dialog of communication and action.

2.2 EVERYDAY SOCIAL INTERACTION IN CO-EXPERIENCE

Social sciences provide insights into what people do in their everyday lives with each other and why. Some of the essential tasks of being a social being are to present yourself to others in a favourable way [7], keep social connections active, maintain normality [19], and string the events of everyday existence into coherent, meaningful narratives in the process [15].

Social motives the a key driver for co-experience and they affect people's lives in all its aspects. Learning can be much more effective when it happens socially and socialising at the work place makes actual work run more smoothly [17]. We want to communicate with our near and dear even if we have "nothing to say". People are both individuals and social beings, and neglecting the social aspect of experiences would be to overlook a very important aspect of being human.

3. EXAMPLES OF CO-EXPERIENCE

3.1 CREATING AND SHARING EXPERIENCES WITH MULTIMEDIA

A pilot study on mobile multimedia messaging (MMS) was organised by Radiolinja, a Finnish mobile telecommunications operator. Groups of friends were given multimedia capable mobile phones for a period of four weeks, and with their permission, their communications were logged. The MMS mobile phones are able to take a digital image, add text and sound to it, and send it as a multimedia message to other such phones and an Internet repository.

During the one-month pilot, the 25 users sent over over 2000 unique messages, which were analysed quantitatively, and two samples of the messages were also qualitatively analysed. The messages are published here with permission and the names of people and places have been changed to protect their privacy.

Looking at the user experience of the MMS phones, the examples below demonstrate that being the owner of the MMS phone did not mean that the person was its only user. Many MMS messages were created by more than one person and received by a group or a couple, or were sent from a person other than the owner of the MMS phone to a third person in the company of an owner of a MMS phone. This was facilitated both by the features used to create multimedia messages and the context-rich nature of multimedia messaging, which was often used to introduce other co-present people.

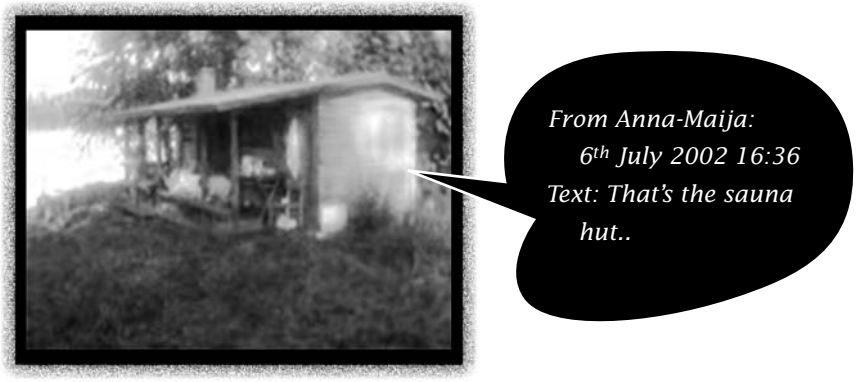
3.2 COMMUNICATING CONTEXT

This exchange shows how participants share their mood and context without prompt, then in response (to introduce all the recipients) and finally by request.

FIGURE 1

FIGURE 2

FIGURE 3



The first message (figure 1) is just a casual message where the sender is sharing her experiences of the present – the sender, Anna-Maija, is clearly enjoying her evening and is sharing some the elements of her experiences with text and image (rosy cheeks, towel around head, cabin porch). The recipient, Kira, shows the message to two other friends, Emma and Piitu, who take interest in the summer place – maybe Kira and Emma have been there or seen pictures previously and talk enviously about the lake. Within a few minutes, Emma takes over the phone and creates a reply from herself and Piitu (figure 2). The girls introduce themselves with a picture as well as their names and create a request for more pictures of the cabin's view of the lake. Back at the summer place Anna-Maija happily complies and within three minutes sends a picture of the sauna cabin, the first of a sequence of pictures describing the summer place (figure 3).

3.3 THE INVITATION GREETINGS

This message (figure 4) contains several elements: a greeting, an emotive description and an invitation all in one. It also shows how easily other people can participate in the message creation.

Leena, the user of the phone, and her partner Pate have arrived at a summer place. They are there as guests of the woman in the picture and they probably

From Leena: 10th July 2002 12:27
Subject: Greetings from Kesäjärvi!
Audio: (female voice) "So, greetings from here, our hot summer garden, from Kesäjärvi. Having a glass of sparkling. Leena and Pate are visiting, lovely. See you tomorrow then, welcome!"

FIGURE 4

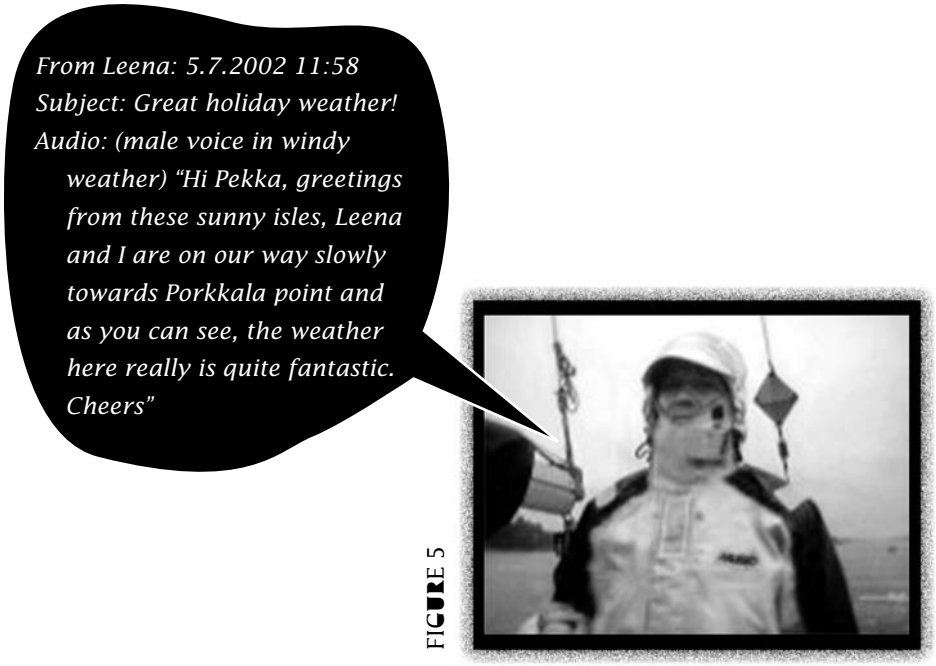


FIGURE 5

also talk about Leena's sister, who will be arriving the next day. Leena helps the woman to send a message to Leena's sister by recording the voice message and taking the picture, and sending it off to her sister's MMS-phone. The welcoming message presents to the recipient elements for pleasant experiences: company (represented by the smiling woman in picture, the visitors' cars and sounds of other people in the background), enjoyable food and drink (sparkling wine in the glass), the summery hot garden (in the background), and invites the recipient to share the enjoyment of these at Kesäjärvi (= Summer Lake) the following day.

3.4 CREATING HUMOUR WITH RICH CONTEXT

This message (figure 5) is just one example of the ways the multimedia aspects of the messages were used in a humorous way. The message plays a sarcastic version on the common format of sending post cards from holidays and describing how warm and sunny the weather is. The facts: the steely grey sky and waters behind the hooded figure, the man's voice slightly raised to be heard over the whipping sound of the wind in the microphone. In fact, it is impossible to say if the person in the picture is a man or a woman. Their disappointment must also be put to context of the season: the previous two months of the summer had been unusually warm and sunny, and July is generally the warmest

and sunniest time of year. The "fantastic" weather is in fact the opposite. Also here the message has been created together on Leena's phone: it is a man who speaks, and who maybe is in the picture, the bright reds and yellows of the sailing jacket in contrast with the gloomy surroundings.

All messages with sound were analysed in one sample in which four distinct content categories emerged: humour, greetings, emotive content and informative content. Most messages contained more than one type of content (as in the case of the invitation greeting). Interpreting humour is difficult. A well-masked inside joke may be hard to notice but this sarcastic type of humour was easily recognisable in many messages as a contradiction between the meanings of the different media elements. For example, the text and the image would suggest one interpretation and the sound would provide the final clue and turn the situation upside down. Any combination of media could be used to this effect, but it would seem that in supporting these interpretations, the richer context of the sound was helpful. In a sample (N=98) of all MMS messages, humour was present in 12% of the messages. Messages containing sound were evaluated as a separate sample, and half of these messages were found to be humorous (see table 1). Humour was divided into subsets, such as situational commentary, absurd messages, insults, puzzles and spoofs.

TABLE 1 *Prevalence of humour in message samples.*

MESSAGE TYPE	HUMOUR
Selection sample of all messages n=98	12%
All messages incorporating sound n=190	48%

These values should be understood as a rough impression, due to the complexity of identifying and classifying humour.

3.5 CO-EXPERIENCE IN MMS

Co-experience takes two forms in the data of this study. One is the use of the mobile phone in creating a message. The other is the message itself and how its content is experienced and interpreted. Both have been analysed from evidence in the messages themselves.

While typing a sms message collectively does not sound likely or attractive, creating a MMS greeting does. The picture and the sound recording feature allow openness for participation and collaborative message creation – everyone from young children to parents and grandparents can be involved in speaking into the microphone and posing in the photograph. All of these messages were cre-

ated in the first week of the experiment, when the participants were still exploring and discovering ways in which to make use of the message formats. The young women were familiar with text input and used that to communicate, while the middle-aged woman recorded her message in audio, giving a brief soundscape of the garden and the murmur of other people's conversation in the background. The sailors make sure the howling of the wind is a part of their message, too.

So how can such a small image and a few words written or spoken serve to share experiences? The parts of the message serve the purpose of providing context, which is essential for using and interpreting humour and affect [17]. The interpretation of these media fragments, especially images, is surprisingly evocative and emotional [10]. Participants of an earlier mobile image communication experiment have remarked how the events described in messages appear better and more fun than reality [10]. The creativity in authoring these messages is similar to "performance" [7] where people control the physical environment as well as their behaviour and other expressions in front of other people to convey particular messages about themselves. With the fragmentary nature of multimedia messaging, this controlling and editing becomes very easy – multimedia messages can be seen as mini performances.

In messaging, both sender and recipient take part in the creative action. The sender quite literally may put on a performance, which is then documented and composed as the message and sent to the recipient. The elements of the messages may support each other and be intuitively understandable or create a discord or a puzzle, which then must be interpreted by the recipient. Quite possibly these messages also become part of conversations and discussions, in which interpretations and counter-proposals are created. Storytelling and reminiscing over photographs are the ways in which memories are shared and kept alive [4]. Whether this will be possible with multimedia remains to be seen, but for now the messages themselves are of a semi-disposable nature with limited storage.

4. DIMENSIONS OF CO-EXPERIENCE

With the onset of affordable digital media and information and communication devices, communication takes many forms. In face to face situations people are able to use their full range of expression: language, expressions, gestures, and interaction with the artefacts and space. Mediated communication has to rely on a more limited range – text, sound, image, and video alone or in any combination. Communication can be synchronous or asynchronous and constructed to require a reply or to function as a lone comment. As people

become fluent in forms of media, these start to be used in new ways and combinations to create richer experiences.

Co-experience, however is not only about communication. Below is a first attempt at understanding the dimensions of co-experience.

4.1 EXPLORATIVE – ORGANISED

Explorative co-experiences are not planned in advance, they happen because a possibility has presented itself at a suitable moment. As an opposite, organised experiences are events such as parties, which are planned beforehand and prepared for. In the case of multimedia messages, participants use existings forms and predictable situations (postcards, birthday cards) as well as explore new forms (such as image puzzles). Dewey contrasts these two kinds of experiencing as the ongoing experience and the "an experience", one the flowing ongoing consciousness and the other with a marked beginning and end, that can be completed. This experience breaks down into numerous smaller experiences, which comprise the whole. [2]

The decreases in price and size in consumer electronics are in their part allowing everyday life to become a business opportunity. Mobile and wearable personal technologies increase the possibilities of spontaneous communication. In fact, they are present in situations that until now have not been part of our documented environment just because of their unexpected nature. New technologies are pushing more new interaction opportunities into the explorative end of things.

4.2 SYNCHRONOUS – ASYNCHRONOUS

Dividing communication according to the immediacy or delay in reception and reply works both for co-present communication as well as mediated communication. Newsroom journalists remark aloud on their subject matter if they think someone at the neighbouring desk may find it relevant, and the reply may take place later, or not at all [17]. Mediated communication can also be synchronous or asynchronous, with a delay ranging from some seconds or minutes to days of delivery. As in the newsroom commentaries, picture messages may be part of a monologue, but responded to later when a suitable interpretation is thought of [10]. Spontaneity, especially as seen in instant messaging services is fragmenting communication but also extending the sense of social connectedness: the sense having a instant message channel open even if it is inactive [17]. In the MMS messages, this can be seen in messages that describe mundane situations and experiences but do not request direct replies or responses. With mobile phones, can such channels be considered open all day long?

The challenges are to develop new technologies as well as support and integrate the older technology platforms. The necessary communication may take place over a range of communication channels, and the study of only one channel is not sufficient; people may respond to a short message with a phone call, to an email with a photograph, and continue their internet chat session with a gossip over coffee.

4.3 CREATION – INTERPRETATION

Creativity and interpretation in co-experience relate to the ways in which the participants make things and experiences relevant and meaningful for each other. Information and communication tools are being introduced with the capacity to capture and send data wirelessly. For example, a picture, sound and text can replicate conventions of post cards, but new formats were sought as well. Creativity applies here both to usage and content. Creative use finds new possibilities for existing functionality. Creativity can also be the production of new content. Interpretation is then required in the interaction process. In the MMS study, the richness of the message content was much increased with the inclusion of sound and image, but not only because they provided a richer, multisensory description of reality, but because the elements together provided more possibilities for interpretation: emotion, mood and humour. Messages were created in response to previous themes visually, aurally and textually. Creating "performances" of our selves with new media allows more freedom in creativity and experimentation than real life. Technologies that were developed for "serious" communication turn out to have greater potential in sociable communication. In fact, in many cases there is no point in distinguishing tools from toys [16]. Studying innovative uses and solutions that users have created is now an accepted and essential part of new technology development.

5. CONNECTING CO-EXPERIENCE

Dewey [2] analysed experience and stated that the experience created by two people interacting is closer to art and drama than to sociology and psychology. In other words, it involves creativity and interaction.

Forlizzi and Ford presented a review and a model of user experience made relevant for interaction designers, in which they addressed the ways to talk about experience as well as the changing nature of the kinds of experiences people have. Experience flows between the states of subconscious, cognitive, narrative and storytelling, while learning and events like unexpected situations promote these changes. When experiences become meaningful, they pro-

mote storytelling. [3] Narration and storytelling imply social dimensions in experience. Meanings are communicated through storytelling, which suggests that meaningful experiences might be found in the kinds of stories that people tell of objects. Although the object is part of the story, and obviously related to the teller, these stories involve other people as well. Our dearest objects often symbolise people and relationships. [1] However, much of our interaction happens without conscious attention, and cannot directly be accessed through verbal accounts or stories.

Drawing the exact line between individual and social experiences is not easy. Problem solving has often been looked at from the individual's point of view, but learning and problem solving can happen collaboratively as well. As co-experiencing can be asynchronous, it can be difficult to tell whether something is an individual experience or whether it is a part of an asynchronous process. Human Computer Interaction (HCI) has been criticised for its cognition and individual oriented view on users and technology. Computer Supported Collaborative Work (CSCW) takes collaboration as its user. Still, even CSCW systems sometimes fail because of overlooking things such as the importance of social interaction in accomplishing apparently individual co-present work or tacit knowledge in paper-based manual systems. [8]

6. CONCLUSIONS

It can be seen that the division between individual and social experiences is not a simple one. The concept of user experience must grow to include also the co-experience dimensions of product use in social interaction. While consumer oriented, such holistic approaches have their applications in productive contexts as well.

To some extent, the "adoption of products" has been seen as something mysterious and beyond the control of the designer, which may or may not happen. The emergence of co-experience in social interaction must play some part in this adoption process. Co-experience is a process where participants together contribute to the shared experience in a reciprocal fashion, creating interpretations and meanings from their life context and allowing themes and social practices to evolve.

In research into user experience, the social elements of experience have often been neglected in favour of individualistic approaches. Co-experience is driven by social needs of communication and maintaining relationships as well as creativity in collaboration. To support co-experience, these aspects should be addressed in user studies and design.

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ARTICLE 4 CO-EXPERIENCE – USER EXPERIENCE AS INTERACTION†

Battarbee, Katja & Koskinen, Ilpo

ABSTRACT

User experience is becoming a key term in world of designing interactive products. The term itself lacks proper theoretical definition and is used in many different, even contradicting ways. This paper reviews various existing approaches to understanding user experience and describes three main approaches and their differences. A missing perspective is pointed out in all three, because their focus is only on the individual having the experience and neglects the kinds of experiences that are created together with others. To address this, a new elaboration called co-experience is presented. It builds on an existing approach but borrows from symbolic interactionism to create a more inclusive interactionist framework for thinking about user experiences. Data from a study on mobile multimedia messaging is used to illustrate and discuss the framework.

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INTRODUCTION

Usability experts know that while usability is important, it is not enough on its own to guarantee a product's success with customers. While helping people take advantage of the functionality, usability also needs to pave the road for pleasure. Usability techniques can be used to improve a given solution but they do not reveal if another kind of solution might deliver better and more enjoyable experiences.

Consequently, design has begun to apply hedonistic psychology (Jordan 2000, Hassenzahl 2003) and to design for user experience. For example, Jordan takes a hedonistic perspective by proposing that pleasure with products is the sum of sociopleasure, ideopleasure, physiopleasure and psychopleasure. He defines pleasure with products as "the emotional, hedonic and practical benefits associated with products" (Jordan 2000: 12). Hassenzahl (2003) shows that satisfaction, a part of usability, is the sum of pragmatic and hedonic quality. However, as Desmet (2002) notes, the problem with focusing on pleasure is that it ignores the unpleasant emotional experiences related to product use. Perhaps to overcome this deficiency, user experience has become the new buzzword in design (for example, see Kuniavsky 2003, Shedroff 2001, Garrett 2003). User experience is subjective and holistic. It has both utilitarian and emotional aspects, which change over time (Rhea 1992).

In this paper, we deal with what we see as a major problem in the user experience literature, which is its implicit individualistic bias. We refer to the mostly missing social quality of experience with the term "co-experience", and propose an interactionist perspective for studying co-experience. We show that with this concept, we are able to pay attention to things that are not addressed by existing theories of user experience. We illustrate this perspective by showing how people communicate emotions with each other with mobile multimedia technology.

THREE APPROACHES TO USER EXPERIENCE

Currently there are three main approaches to applying and interpreting user experience in design. These are the measuring approach, the empathic approach, and the pragmatist approach. The role of emotional experiences is important in all three, although, as they stem from different disciplines, they treat emotions differently.

The measuring approach is mainly used in development and testing. It builds on the notion that experiences can be measured via emotional reactions. Thus, the approach is narrow – the definition only includes those aspects of user experience that can be measured and by measuring understood and improved. There

are several alternative orientations within the approach. The first builds on the idea that people experience things as reactions in their bodies. People's bodies react to situations chemically and electrically, and experience this reaction in terms of emotions. As these reactions are often fleeting and not easy to verbalize, tools for monitoring those reactions, such as facial expressions or changes in galvanic skin response, can be recorded to understand when and where people get frustrated (Picard 1997). A second orientation is based on subjective reports (see e.g. Jordan 2000). For instance, Desmet (2002) has developed a testing tool to elicit emotional responses to products such as cars. His tool, PrEmo, uses animated cartoon characters to describe 14 different emotional responses. By selecting all that apply, the user creates an emotional profile. Universal evaluation criteria for user experience do not exist, though some have been proposed for interaction design (Alben 1996). Rather, the "soft and emotional experiences" need to be translated into "experience goals" relevant to each project, and included in the testing of products and prototypes (Teague & Whitney 2002).

The empathic approach also claims that experience is emotional in nature, but that the kinds of experiences that products should elicit should be connected to the needs, dreams and motivations of individuals (Dandavate et al. 1996, Black 1998). Designing for user experience begins with creating a rich, empathic understanding of the users' desired experiences and only then designing concepts and products to support them. The term "design empathy" has been around since the late 1990's to describe the role of the designer/researcher (Leonard & Rayport 1997, Segal & Fulton Suri 1997, Koskinen et al. 2003). Design empathy makes use not only of the emotions of the users, but also those of the designers. In order to become not merely informed but also inspired, designers must both observe and feel for the users (Mäkelä & Fulton Suri 2001, Kankainen 2002). The methods used in the empathic approaches aim to provide an understanding of the users' experiences with qualitative methods, but they also assist users in constructing for designers descriptions of their experiences, dreams, expectations and life context to the designers (Dandavate et al. 1996). Typically these methods combine visual and textual data, self-documentation, and projective tasks, of which several are used in parallel. This approach aims to inspire designers rather than produce testable hypotheses through measurement and conceptual elaboration.

The pragmatist approach borrows much of its perspective from pragmatist philosophy (cf. Dewey 1934). Recently, Forlizzi and Ford (2000) presented a model of user experience in interaction. This model is theoretical in nature, and shows that experiences are momentary constructions that grow from the interaction between people and their environment. In their terminology, experi-

ence fluctuates between the states of cognition, sub-consciousness and storytelling depending on our actions and encounters in the world. Experience is something that happens all the time: sub-conscious experiences are fluent, automatic and fully learned, cognitive ones require effort, focus and concentration. Some of these experiences form meaningful chunks and become demarcated as "an experience" – something meaningful that has a beginning and an end. Through stories they may be elaborated into "meta-experiences" that are names for collections of individual experiences. Even more recently, Wright, McCarthy and Meekison (2003) focused on what is common to all experience, describing four strands: the compositional, sensory, emotional and spatio-temporal strands, which together form experience. They also describe sense-making processes such as anticipating, interpreting and recounting.

These three approaches propose divergent methodologies for studying user experience, but imply different things. The measuring approach focuses on emotional responses, the empathic approach on user-centered concept design, while the pragmatic approach links action to meaning. The measuring approach is useful in development and evaluation, but is more difficult to apply at the fuzzy front end of design (Cagan and Vogel 2001). The pragmatist approach concentrates on the embodied nature of experience and interaction.

The first two approaches, the measuring and the empathic, share one main problem. Both see emotions as driving forces of human conduct, an assumption contested by more situated views of interaction (Blumer 1969: 7, about plans, see Dourish 2002: 70–73). Of user experience approaches only the pragmatist perspective really accounts for the situated unity of action, emotion, and thought in the individual in a theoretical way. The pragmatist perspective is broader than the others in its scope; in fact, other models can be seen as its special cases. However, all these approaches are individualistic, thus missing a crucially important aspect of human experience. People as individuals depend on others for all that makes them truly human. Experiencing happens in the same social context – therefore it is necessary to account for this context and its effect on experience.

CO-EXPERIENCE: ELABORATING THE PRAGMATIST PERSPECTIVE

We use the term co-experience to describe experiences with products in terms of how the meanings of individual experiences emerge and change as they become part of social interaction. To explore co-experience more deeply, we expand the pragmatist model of user experience in interaction (Forlizzi and Ford 2000) and address the mention of meaning in more detail by building on three classic principles of symbolic interactionism. First, people act towards things

through the meanings they have for them. Second, meanings arise from interaction with one's fellows. Third, meanings are handled in, and modified through, an interpretive process used by the person in dealing with things he encounters (Blumer 1968: 2–6). These are the classic statement of symbolic interactionism, a sociological tradition that builds on the pragmatist philosophy of John Dewey, William James, and George Herbert Mead (Cf. Joas 1997). This perspective adds social interaction to the pragmatist model, maintaining that people come to define situations through an interpretive process in which they take into account others' non-symbolic gestures and interpretations.

The improved interactionist model for co-experience uses these meanings to explain how experiences migrate between the different levels of Forlizzi and Ford's model (for an elaboration, see Forlizzi & Battarbee 2004) – from the center of attention to the periphery or into stories and acts of personalization and back again. Such migrations happen in at least three general ways.

- *Lifting up experiences.* Often subconscious experience migrates to become "an experience" through a social process. People constantly lift things from the stream of events in everyday life and communicate them to others. For example, a person may describe something that has happened to him, and evaluate it as meaningful enough to be told to others.
- *Reciprocating experiences.* Quite often, once it has been lifted up in this way, recipients acknowledge and respond to experience. For example, they may reciprocate by telling about their own, similar experiences, or simply offer a sympathetic response (Mauss 1980, Licoppe and Heurtin 2001, Taylor and Harper 2002, Koskinen et al. 2002: Ch. 7). In doing so they show that the experience (as well as the person sharing it) is meaningful for them. This can be shown in various ways, for example, by appreciating the experience, or by taking sides with it. Experiences can be maintained, supported, and elaborated socially. Memories of relevant experiences may be retold in this way as well.
- *Rejecting and ignoring experiences.* Finally, experiences brought to the attention of others may also be rejected or downgraded by others. For example, something that is important for one person may be too familiar, uninteresting or even offensive for others. They may indicate this in various ways to soften the rejection, for example through humor or teasing, or by with varying degrees of topic change, direct response or inaction.

Similarly, people often elaborate "meta-experiences" together (see Forlizzi and Ford 2000). In this paper we do not focus specifically on meta-experience, for two reasons. First, the pragmatist model of Forlizzi and Ford already accounts for it. When people compare experiences, often collected over several years, they come to find similarities and differences, and classify them in stories. Ultimately, some stories may become key symbols of their identities (see Orr's 1996 analysis of technicians' "war stories"). Also, stories provide one of the main mechanisms for reconstructing memories (Neisser 1980, Orr 1996). Second, we see storytelling as just another form of social interaction. It is a significant form of social interaction when sharing experiences verbally, but not necessarily the dominant form for digital media. Although storytelling has well-studied forms and traits, it nevertheless is included in the more general approach of symbolic interactionism, thus making it a special case of the more general argument for all social interaction.

The following example (Figure 1) illustrates the strength of this framework. The figure is a mobile multimedia (MMS) message: a photo, audio and text message sent from one mobile phone to another during a pilot study in Finland in 2002 (the pilot study and further details of the messaging are described below under Data and Methods). It shows how Thomas, a father, lifts up a significant experience, the toddler Mikey's evening tantrum. Jani, a friend, reciprocates by saying that his experiences in babysitting Mikey have been similar, and Thomas should consider getting him a soccer ball of his own. Jani's comment could be taken as a rejection suggesting a disinterest in Mikey and his temper. In a subsequent reply Thomas reinstated the importance of the event, and furthermore, turned it into an opportunity to tease Jani. His reply contained a good audio sample of the howling and a picture of the boy, red in the face and tears streaming down his cheeks, and suggested similarities between Mikey and Jani. However, Jani's softened rejection was successful: there were no more reports on Mikey crying after that.

As this example shows, people may use technology to share meaningful experiences, to sympathize with them, to suggest that they are not particularly significant, or even to reject denial of their significance. These experiences would not occur to a user alone; identities, roles and emotions are resources for interpreting and continuing interaction (Blumer 1968). For instance, in our example, Thomas and Jani do more than share an experience: they actively interpret it, relate to it, reinterpret it, and in so doing, constitute a line of action and come to define their mutual relationship for a brief moment. The other recipients remain more or less neutral bystanders.

The interactionist perspective on co-experience claims that experience is a so-

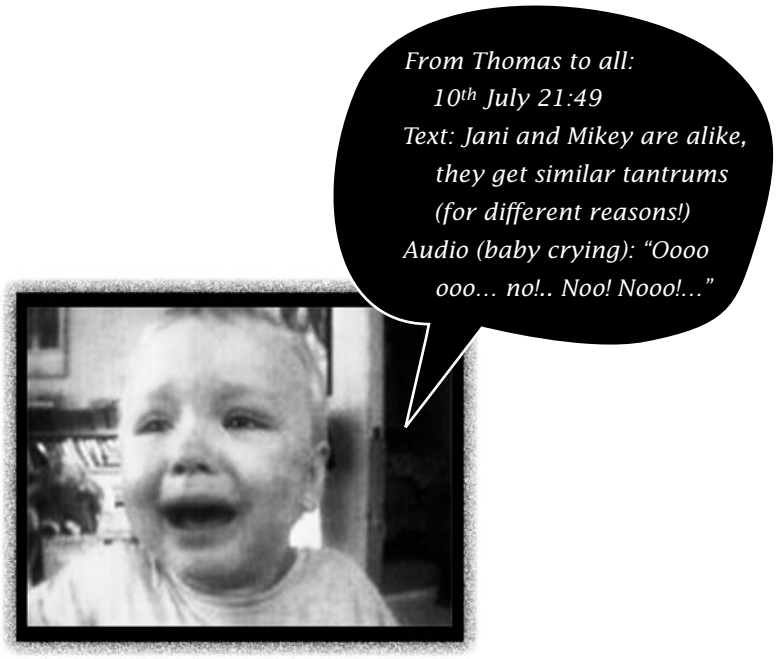

FIGURE 1 *A little boy's bad mood.*

cial phenomenon, and needs to be understood as such. Also, it claims that bodily and psychological responses to external phenomena do not necessarily lead to predictable emotional reactions, because of an interpretive social process in between (see Shott 1979). Thus, relying solely on emotion as an index of experience leads us astray. For these same reasons, empathizing with individuals does not explain co-experience. Empathy is necessary, but the focus must first be on interaction. When people act together, they come to create unpredictable situations where they must respond to each other's actions creatively. In the lifecycle of an experience (compare to Rhea 1992), we need to pay attention to co-experience, not just to individual aspects of experience. This is the crux of the symbolic interactionist perspective on user experience.

DATA AND METHODS

We illustrate our argument with data from *Mobile Multimedia*, a multimedia messaging pilot study organized with Radiolinja, a Finnish telecommunications operator. In *Mobile Multimedia* several groups of friends exchanged multimedia messages with each other for about five weeks in the summer of 2002. Each par-

ticipant was given a MMS phone (either a Nokia 7650 with an integrated camera or a SonyEricsson T68i with a plug-in camera). The service was free of charge (see Koskinen 2003). Out of the *Mobile Multimedia* pilot, three mixed-gender groups of 7, 11, and 7 members were selected for a detailed study to explore in more detail gender difference, terminal types, and the city–countryside axis. The qualitative study focused on the messaging of these groups.

During the pilot, the three groups sent over 4000 messages, which were analyzed quantitatively, and two samples of the messages were also analyzed qualitatively. The messages are published here with permission; the names of people and places have been changed. The data reveals how people themselves construct messages, and how others respond to them. Even though there is no access to what people did when they received the messages, we see their virtual response: exactly the same content of text, image and audio, as was received by the participant. (For other publications, see Kurvinen 2003, Battarbee 2003, Koskinen 2003).

FIGURE 2 *A pleasant evening.*

The study of co-experience is the study of social interaction between several people who lift up something from their experience to the center of social interaction for at least a turn or more. Since the focus is on how people give meanings to things, and how they understand them, the study setting needs to be naturalistic, i.e. to happen in the real world rather than in a controlled setting such as a laboratory (Blumer 1968, Glaser and Strauss 1967). Designers need to explore how interaction proceeds, and aim to describe its forms, before trying to explain it in terms of such structural issues as roles or identities. Rather, inference proceeds inductively (Seale 1999). Roles and identities may be made relevant in interaction, but they are resources people can use, rather than features that explain co-experience. In this paper, we aim to indicate the value of the concept by showing that experience has features that cannot be studied adequately with existing concepts of user experience. Here, we aim to illustrate co-experience as a sensitizing concept (Blumer 1968), rather than trying to provide a comprehensive analysis of the varieties of co-experience.

LIFTING UP EXPERIENCES INTO THE FOCUS OF SOCIAL INTERACTION

From the symbolic interactionist standpoint proposed in this paper, the key feature of experience is symbolization: what people select from experience to be shared with others. People communicate with each other for a variety of reasons, ranging from practical to emotional. In so doing, they place the things they communicate at the focal point of shared attention. In presenting things as "an experience," they invite others to join in; but these things remain open to negotiation, something that may or may not be picked up by others and made into something more meaningful than merely the scenic background of experience.

As an example of an ordinary message that illustrates this argument, we may take the simple pleasures of eating, drinking and socializing (see Figure 2). This message is part of a sequence of holiday reports between two groups of friend: the "land lovers" and the "sailors". Susse and her friends choose to describe their evening sentiments with a multimedia puzzle. The audio explains the picture and the text suggests that the key element is in fact still missing and remains to be imagined: the smell of hot pizza.

Susse may have tried to convey a realistic sense of what the experience of hot pizza is, but she is also acknowledging that it is impossible, with the smell (and the pizza itself) missing. However, she seems to trust that with the names of the ingredients, the "sailors" will get the idea – and share their sentiments as she as has shared theirs.

Sometimes experiences belong to larger themes, and can be called scalable (Forlizzi & Battarbee 2004). For example, an eagerly waited holiday trip to Paris is a complex experience that may last for weeks, and contain many larger and smaller, sometimes contradictory elements. Documenting such experiences requires more than one message, as in the case of the following monologue. Markku and his friends are driving to a weekend rock festival. Their first message (Figure 3) describes the mood inside the van. The second message (Figure 4) reports that they are still on their way, but something unexpected has happened – they were caught in a speed trap and fined. When experiencing strong emotions, the process of symbolization requires more effort. The description of the experience has to take into account the responses of others, such as anger, fear, disappointment, ridicule, or sympathy, and explore which interpretations are desirable and which are to be avoided.

What is offered here to the common attention is laughing at the experience and making fun of it, with only a side reference to the actual event and the emotional experience of being caught by the police and receiving a fine.

In principle, almost any detail of ordinary life can be meaningful enough for sending. In MMS, people document food, drink, children, pets, and spouses (see Koskinen et al. 2002, Lehtonen et al. 2003). In addition, people report events such as rock festival trips, events in summer homes, as well as moods, socially significant things, and emotionally relevant experiences. The reason for sending an image and audio is its topic rather than its artistic quality. The literature on experience tends to emphasize and focus on experiences that are emotionally strong and that stand out as memorable. However, the content created in Mobile Multimedia focuses predominantly on small, everyday and mundane matters, suggesting that in social interaction the strength of emotions does not correlate with the emotional satisfaction of the experience of communicating and sharing them.

RECIPROCATING EXPERIENCE IN SOCIAL INTERACTION

People do not merely compose MMS messages, they also acknowledge them in replies. In responding, recipients pick up the gist of the message and fit their response to it. Typically, they show that they either share the experience, or empathize with the sender on a more general level, as is suggested in theories of gift-exchange (Mauss 1980) applied to mobile communications (Licoppe and Heurtin 2001, Taylor and Harper 2002). Parents share pictures of their babies, expecting others to mirror their delight, but even in more ordinary cases, the expected response is a positive, reinforcing one. Of course, recipients may not

FIGURES 3–4 *Reporting on the speeding ticket incident.*

FIGURES 5–6 *A staged picture prompts staged responses.*

always produce a proper response, and this may prompt problems in subsequent interaction. For example, the sender may become embarrassed or hurt, and may even lose face (Gross and Stone 1964, Goffman 1967: 5–45). Between the need to maintain social interaction and support others, and the need to look out for personal gain and be selfish, the more likely people are to meet again, the more they will try to keep the interaction going and help everyone maintain face. This among socially connected people results in an in-built tendency to reciprocate experiences in human interaction – and in MMS.†

Most responses follow this logic. Sometimes people start with a parody, as in Figure 5. Replies to such messages (Figure 6) are usually not explicit congratula-

FIGURES 7–8 *A staged picture prompts staged responses.*

tions. Risto, however, makes a point of saying how much he enjoyed it. However, to really mean this, he needs to respond with a similarly overdone picture, a reflection of the first one. Pleased with his message, Risto re-uses the picture and shares it with other friends as well, this time with a new text (Figure 7). The response to Risto's message does not merely share the holiday mood, but also copies the response format almost perfectly (Figure 8).

† In conversation analysis terms, there is a preference organization at work here. For instance, an invitation elicits acceptance as a preferred response turn. Turning the invitation down is a dispreferred turn. Preferred turns are typically given directly, with no delay; hesitations, hedges, or justifications are typical of dispreferred turns (see Pomerantz 1984).

People may also align with negative experiences, as in the following instance, in which two young women share a mood. At first Maria lets Liisa know that she is experiencing something "typical", which seems neither exciting nor fun. Liisa sympathizes, and reciprocates the experience, sharing her own interpretation of what a "typical" experience is like (Figures 9–10).

This example demonstrates the power of the visual in MMS. Compared to emotions, moods are lower intensity and last longer. Because moods are not focused on any particular object, objects do not describe moods very well. Here, the focus is on the face. The MMS phones were often used for literal self-

FIGURES 9–10 *Exchanging pictures of mood.*

documentation – taking a picture of one's own face at arm's length – although collaboration was also frequent.

Through this exchange, Liisa and Maria indicate that they know each other and have shared similar experiences before: how else could they talk about "this" being "typical". The closeness is also expressed by the framing of the picture. Whether Liisa's response is sincere or a parody is hard to say. Maybe the interpretation is intentionally left for the recipient to decide, and to remain open for future interactions.

REJECTING AND IGNORING EXPERIENCES IN SOCIAL INTERACTION

For a number of reasons, experiences that are offered to the common awareness may also be rejected, downplayed or made fun of. A certain banality is almost built into MMS, which focuses on mundane experiences rather than, say, key rituals of life, or experiences with fine art. The banality may go overboard, and lose the recipient's interest. Also, sometimes the report may stretch the bounds of what is morally acceptable – for example, by being sexually explicit (see Kurvinen 2003). Recipients, then, may have many different reasons to interrupt or redirect the messaging, even when it may be difficult to do so without insulting the sender. How can they accomplish such actions without causing the sender to lose face?

The first thing to notice is that rejection may be active or passive – communication always offers multiple alternative possibilities for interpretation, and choosing one option may negate others. In the following sequence, Thomas offers a significant experience (getting engaged/married) for others to respond to (Figures 11–13). Predictably, he receives several congratulations and pictures of happy faces. However, Jani did not notice the engagement message until 25 hours later, and takes a different course of action. In his response, he teases Thomas indirectly for losing his freedom, proclaiming that he himself has no intention of getting "snatched", and thus inverts the value of Thomas's experience. In response, Thomas defends his case by returning the tease and peppering it with an insult. The communication between Thomas and Jani is a clever play on the possibilities of multimedia, as the joke is largely a visual play on the theme of hands.

Generally, a positive experience like the one sent by Thomas calls for an aligning response. Responses rejecting the intended value of such messages normally incorporate accounts and disclaimers that soften the impact of the rejection. Typical examples of such accounts and disclaimers are humor, excuses,

From Thomas:
16th July 2002
1:41 p.m.
It took 15 years ! But good things come to those who wait.

From Jani:
17th July 2002
2:11 p.m.
Screw your ring. Nobody snatches me, except miss universe.

From Thomas:
17th July 2002 4:25 p.m.
Well screw you! Just think that I've had more mornings with my woman than you with both of your hands ! Hah hah heh hee

FIGURES 11–13 *Two teases.*

justifications and hedges (Scott and Lyman 1968, Hewitt and Stokes 1975). With these devices, the communication channel is kept open despite the interactional problems posed by the rejection. This was also the case in the messaging around Figure 1, in which Jani indirectly indicated to Thomas that Mikey's tantrums were no longer a welcome topic. By advising Thomas to buy a ball for Mikey; Jani softened the message by suggesting that maybe Mikey had good reason to be upset, not having a soccer ball of his own. However, the tactic failed, and Thomas countered by comparing Jani with the baby – humorously, of course, but the comparison still turned his reply into a tease. No matter how nice, such rejections may still insult the original sender – or at least give him an opportunity to behave as if he were insulted.

CONCLUSIONS AND DISCUSSION

In this paper, we have introduced the notion of co-experience, and present it as an elaboration of Forlizzi and Ford's (2000) model of user experience in interaction. Our claim is based on a simple observation: people create, elaborate, and evaluate experiences together with other people, and products may be involved as the subject, object or means of these interactions. Social processes are particularly significant in explaining how experiences migrate from subconscious into something more meaningful, or lose that status. The concept of co-experience builds on the understanding that experiences are individual, but they are not only that. Social interaction is to the experiences of the individual the same as a sudden jolt is to a jar of nitroglycerine: it makes things happen. We claim that neglecting co-experience in user experience leads to a limited understanding of user experience – and a similarly limited understanding of design possibilities.

The concept of co-experience enriches design in several ways. Firstly, co-experience extends the previous understanding of user experience by showing that user experiences are created together and that they are thus different from the user experiences people have alone. Secondly, it suggests an interactionist methodology for studying user experience. It is important to see what the content is, what people do, or, in the case of Mobile Multimedia, what is in their messages. This alone, however, is not enough to make sense of co-experience. It is also necessary to study the interactions between people with and without technologies, and to put the messages into context. Third, co-experience opens new possibilities in design for user experience by focusing on the role of technology in human action (parallel ideas can be found in the concept of embodied interaction, see Dourish 2002). Co-experience focuses on how people make

distinctions and meanings, carry on conversations, share stories, and do things together. By understanding these interactions, opportunities for co-experience can be designed into the interactions of products and services.

To put this into design terms: user experiences can only be understood in context. New technologies are adopted in social interactions, where the norms for behavior (and product use) are gradually developed and accepted. These rules are never absolute or complete. For example, instead of merely responding to a suggestion, people may turn their response into a mock tease. There is therefore little point in creating an interface with a selection of the possible ways to reply to a message. Such an approach assumes that people are not creative, but act in terms of rules.

This takes us towards two possible extensions of the concept of co-experience. The first concerns the way in which technology guides action: people are creative. Sanders (2002, 2003) presents a view of what creativity means to everyday people. First, it is doing things with a product and being efficient with it. Second, it is about adapting, making the product one's own. Third, it may be about making something with one's own hands, and finally, it can be an expression of one's creativity, with possibly far-reaching innovations. The interest levels and levels of emotional engagement range from insignificant to passionate. Also, creativity is enabled and constrained by technological possibilities. For example, MMS technology allows recipients to include the people and things in their surroundings more easily in their remote interactions. However, it does not make complex forms of storytelling possible, or sharing the experience of fragrances. It "affords" mutual entertainment rather than precise communication. For such communication, a phone call provides a better instrument (see also Mäkelä et al. 2000, for recent discussion on affordance, see Hutchby 2001, Arminen and Raudaskoski 2003). MMS fits into a wireless technological framework in which people seamlessly switch from medium to medium to do different tasks.

The second point is methodological. Our *Mobile Multimedia* study relied on information from messages in a log, and thus missed phone calls, plain text messages, and face to face interactions. There are many similar technical challenges in studying co-experience. A suitable technique for analyzing co-experience requires not just log data, but also observations and interviews, as well as visual documentation. Also, comparisons between technologies need to be conducted to understand co-experience in relation to technology. In our experience, however, it is possible to study co-experience at various phases of the design process. Sometimes new products that are already on the market have qualities that make them suitable for field testing (Mäkelä and Battarbee 1999,

Koskinen et al. 2002). It is also possible to study co-experience with experience prototypes, by letting users explore the technology and its possible meanings together (Mäkelä and Fulton Suri 2001, Kelley 2001: 41–42, Buchenau and Fulton Suri 2000, Kurvinen & Koskinen 2003). Contrary to appearance models or technology prototypes, these are prototypes that primarily aim to give an insight into the experience of use. Blue-sky ideas built into robust prototypes are useful for discovering how new designs and technologies might work in real contexts (Tollmar et al. 2002). Experiences can also be communicated to some extent with scenarios (see Battarbee et al. 2002, Carroll 2000). Empathy is necessary for understand the experiences of others, and any study aiming to focus on co-experience needs to apply design empathy in its interaction-oriented approach and aim at creating an empathic understanding rather than a factual explanation (Segal & Fulton Suri 1997, Koskinen et al. 2003).

Co-experience aims to complement and broaden the ways in which user experience is currently seen in the design professions. It suggests that people's interactions and collaborations are relevant not just for sociology and computer-supported collaborative work, but also are relevant for studying user experience.

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ARTICLE 5 UNDERSTANDING EXPERIENCE IN INTERACTIVE SYSTEMS†

Forlizzi, Jodi & Battarbee, Katja

ABSTRACT

Understanding experience is a critical issue for a variety of professions, especially design. To understand experience and the user experience that results from interacting with products, designers conduct situated research activities focused on the interactions between people and products, and the experience that results. This paper attempts to clarify experience in interactive systems. We characterize current approaches to experience from a number of disciplines, and present a framework for designing experience for interactive system. We show how the framework can be applied by members of a multidisciplinary team to understand and generate the kinds of interactions and experiences new product and system designs might offer.

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CATEGORIES AND SUBJECT DESCRIPTORS: A.0 Introductory and Survey

GENERAL TERMS: Design, Human Factors

KEYWORDS: Experience, user-product interaction, ethnographic methods, interaction design, design theory.

INTRODUCTION

Understanding experience is a critical issue for a variety of professions, especially design. Design has had a fairly long history of attempting to support specific experiences when interacting with products. The growing popularity of ethnographic methods applied to design in both academic and business practice has allowed today's designers to mediate their implicit knowledge with that of the people they are designing for. In addition to ethnographic methods adapted from anthropology, methods from social and behavioral science have been adapted to explore the form, function, and content of the products made by designers. One by-product of this activity is the creation of new roles within multidisciplinary design teams (e.g., User Experience Designer, User Experience Researcher, Experience Modeler). Another by-product of this activity is the "hybridization" of research activities between members of a multidisciplinary design and development team.

What is unique to design research relative to understanding experience is that it is *focused on the interactions between people and products, and the experience that results.* This includes all aspects of experiencing a product – physical, sensual, cognitive, emotional, and aesthetic. The results of this investigation, when used to inform product design, greatly extend simple usability techniques in differentiating particular products in the marketplace [9, 12].

The term "user experience" is associated with a wide range of meanings, and no cohesive theory of experience exists for the design community. However, there is great interest in the subject, and there have been both initial efforts to create theories of user experience [3, 22, 35, 40] as well as more recent efforts to exemplify and categorize specific types of experiences as they relate to designed products [1, 2, 17, 48, 50]. Rather than increase the diversity, we need to better understand how the different approaches relate to each other. In practice, these theories must be made actionable through relevant tools, methods, and processes.

Understanding experience is complex. Designing the user experience for interactive systems is even more complex, particularly when conducted by a team of multidisciplinary experts. Many approaches exist, and many are informed by

the insights of different disciplines. Others are informed by implicit knowledge and are made explicit when they are tried out first hand. Integrating all these perspectives is a challenge. What is needed is a framework that articulates experience in a way that does not rely on the point of view of any single discipline, but provides a common design-oriented frame of reference for all the relevant actors involved in design.

In this paper, we discuss experience and its role in multidisciplinary research and practice. We characterize current approaches to experience from a number of disciplines. Some of the approaches take the perspective of the user, others attempt to understand experience as it relates to the product, and a third group attempts to understand user experience through the interaction between user and product. We argue that an interaction-centered view is the most valuable for understanding how a user experiences a designed product. Next, we introduce a framework for understanding the experience of interactive systems. The framework explains how product interactions unfold and how emotion and experience is evoked. We show how the framework can be applied by members of a multidisciplinary team to understand and generate the kinds of interactions and experiences new product and system designs might offer.

MODELS AND THEORIES OF EXPERIENCE

A number of models and theoretical approaches have been developed to help understand experience. These include contributions from design, business, philosophy, anthropology, cognitive science, social science, and other disciplines. These approaches examine experience from a number of perspectives. We have grouped these approaches as product-centered, user-centered, and interaction-centered.

Product-centered models provide straightforward applications for design practice. In general, they provide information to assist both designers and non-designers in the process of creating products that evoke compelling experiences. They describe the kinds of experiences and issues that must be considered in the design and evaluation of an artifact, service, environment, or system. These models most often take the form of lists of topics or criteria to use as a checklist when designing. For example, Alben provides a set of criteria for assessing the quality of experience of a designed product during conception, planning, and execution [3]. Jääskö and Mattelmäki provide a set of design guidelines for understanding experiences and applying them in user-centered product concept development [33].

User-centered models help designers and developers to understand the people who will use their products. They integrate a number of disciplinary ap-

proaches to offer ways to understand people's actions, and aspects of experience that people will find relevant when interacting with a product. For example, Hassenzahl provides a theoretical model to describe people's goals and actions when interacting with products. It broadens traditional goal- and task-based thinking to include fun and action-oriented modes of behavior [29]. Hudspith provides three dimensions grounded in philosophy to derive information about how people relate to products through utility, ceremony, and appeal [31]. Sonic Rim, a well-known US-based user research firm, defines the categories of "say, do, make" in research tools to learn of people's experiences with products and their expectations [52]. Cain, formerly of E-Lab and Sapient, developed similar user-based categories of "think, do, use" [13]. Mäkelä and Fulton-Suri use design to target people's motivations and actions, unfolding within particular contexts, as important in understanding user experience [40].

Interaction-centered models explore the role that products serve in bridging the gap between designer and user. Here, too, we see approaches from a number of disciplines. For example, the philosopher John Dewey has been instrumental in helping designers understand the qualitative and definitive aspects of experience [17,18]. Essentially experience is a totality, engaging self in relationship with object in a situation. Researchers and practitioners in a variety of disciplines have built on the foundations of Dewey's theory to create knowledge about how people engage with products and the world. Wright et al. [55] discuss experience from a design perspective as consisting of four threads: compositional, sensory, emotional and spatio-temporal. The threads contribute to actions (such as anticipating and recounting) that create meaning. Margolin, a design historian, provides four dimensions that clarify how people interact with designed products – categorizing operational, inventive, aesthetic, and social uses [41]. Pine and Gilmore differentiate between passive and active experiences, and experiences that are immersive as opposed to those that are absorbing [48]. Overbeeke and Wensveen focus on the aesthetics of interaction and the ways in which form and behavior support feedforward and feedback. Information in interfaces and action are coupled in six ways: time, location, direction, modality, dynamics and expression [47].

AN INTERACTION-CENTERED FRAMEWORK OF EXPERIENCE

Our framework takes an interaction-centered perspective, situated within a social context. It builds on the interaction-centered model presented in [22] as well as studies on collaborative aspects of user experience [4]. The framework focuses on interactions between individuals and products and the experiences

that result. Additionally, it stresses the importance of these experiences in the context of social interaction, in which people interpret particular events and create meaning. The framework describes user-product interactions (fluent, cognitive, and expressive), and dimensions of experience (experience, an experience, and co-experience) (Table 1).

TABLE 1 *Summary of a framework of user experience as it relates to the design of interactive systems. There are three types of user-product interactions, which, in a context of use, yield three types of experience.*

TYPES OF USER–PRODUCT INTERACTIONS	DESCRIPTION	EXAMPLE
Fluent	Automatic and skilled interactions with products	• riding a bicycle • making the morning coffee • checking the calendar by glancing at the PDA
Cognitive	Interactions that focus on the product at hand; result in knowledge or confusion and error	• trying to identify the flushing mechanism of a toilet in a foreign country • using online algebra tutor to solve a math problem
Expressive	Interactions that help the user form a relationship to the product	• restoring a chair and painting it a different color • setting background images for mobile phones • creating workarounds in complex software

TYPES OF EXPERIENCE	DESCRIPTION	EXAMPLE
Experience	Constant stream of "self-talk" that happens when we interact with products	• walking in a park • doing light housekeeping • using instant messaging systems
An Experience	Can be articulated or named; has a beginning and end; inspires behavioral and emotional change	• going on a roller coaster ride • watching a movie • discovering an online community of interest
Co-Experience	Creating meaning and emotion together through product use	• interacting with others with a museum exhibit • commenting on a friend's remodeled kitchen • playing a mobile messaging game with friends

USER-PRODUCT INTERACTIONS: FLUENT, COGNITIVE, EXPRESSIVE

There are three ways that we describe user-product interactions. *Fluent* user-product interactions are the most automatic and well-learned ones (Figure 1). These types of interactions do not compete for our attention; instead, they allow us to focus on the consequences of our activities or other matters. For example, one's morning coffee-making ritual or the ability to effortlessly ride a bicycle are examples of fluent user-product interactions.

Cognitive user-product interactions focus on the product at hand (Figure 2). These types of interactions can result in knowledge, or confusion and error if a product does not match anything in our past history of product use. Such experiences are often encountered while abroad and encountering foreign toilets, taps and kitchen tools. Cognitive experiences cause a change in the user (such as a skill or a solution) and often the context of use as a result.

Expressive user-product interactions are interactions that help the user form a relationship to a product, or some aspect of it (Figure 3). In expressive interaction users may change, modify, or personalize, investing effort in creating a better fit between person and product. These interactions may be expressed also as stories about product relationships. For example, restoring an old piece

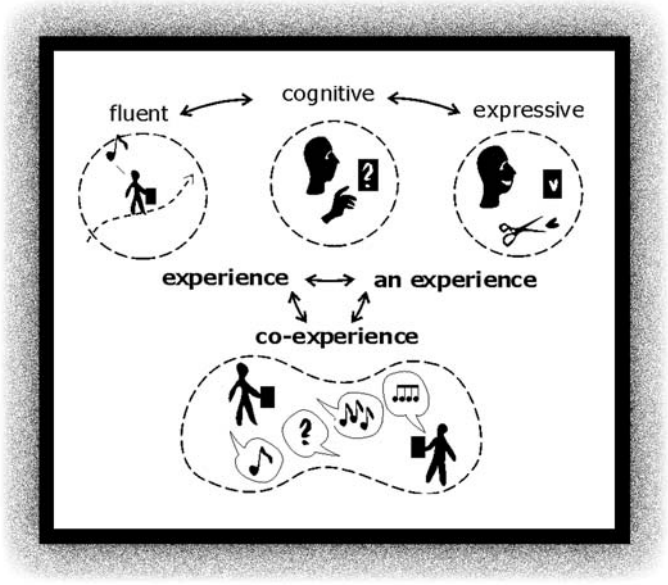

FIGURE 1 *The dynamics of experience in interaction for individuals and in social interaction.*

FIGURE 2 *Products for camping trips may include phones, maps, bike tools and cooking equipment. The trip is also an experience: preparations are ready, the trip begins. The experience of the trip accumulates from many smaller ones. In the process, experiences with products may change: a tent may start leaking, or a phone may save the day.*

of furniture, customizing cars or creating workarounds using a word processor are expressive user-product interactions.

TYPES OF EXPERIENCE: EXPERIENCE, AN EXPERIENCE, CO-EXPERIENCE

These user-product interactions unfold in a particular context, yielding what we characterize as three types of experience (Figure 1). The first, *experience,* is the constant stream of "self-talk" that happens while we are conscious. Experience is how we constantly assess our goals relative to the people, products, and environments that surround us at any given time. For example, walking in a park or doing light housekeeping are typical experiences.

An experience is more coalesced, something that could be articulated or named. This type of experience may be characterized by a number of product interactions and emotions, but is schematized with a particular character in one's memory and a sense of completion. An experience has a beginning and an

end, and often inspires emotional and behavioral changes in the experiencer. For example, a dinner party or a news hour seen on television could be classified as an experience.

Co-experience is a third way to talk about experience. Co-experience is about user experience in social contexts. Co-experience takes place as experiences are created together, or shared with others. People find certain experiences worth sharing and "lift them up" to shared attention. Shared experiences allow a range of interpretations by others, from the expected and agreeable to the unusual or even deviant. For example, one may reciprocate, reject or ignore an experience. [6] Therefore, expressing meaning is invited by, and the meanings are elaborated in, co-experience through social interaction [4].

Social situations greatly influence co-experience. For example, whether running out of gas when driving to the countryside with friends is viewed as an adventure or a disaster depends on how the friends decide to interpret the situation. One person might be upset, another might point out the humorous potential, and a third might agree. Other examples of social interaction influencing the user experience might include watching others interact with a museum exhibit before using it oneself, looking at a new digital camera in a store with a friend, and adopting abbreviated spellings from friends in mobile messaging.

Co-experience reveals how the experiences an individual has and the interpretations that are made of them are influenced by the physical or virtual presence of others. Other researchers have examined how mutual understanding and context for action shaped the flow and construction of experience, particularly when interacting with technology [19]. Interactive technology systems can play a large role in supporting co-experience, through providing mediated communication channels and the possibility to create, edit, share and view content with others. These systems enable co-experience by providing new channels for social interaction, but can also constrain it by disallowing particular actions or making them cumbersome.

When an individual interacts with a product (fig. 4), his or her experiences dynamically flow between fluent, cognitive and expressive interaction as they happen. Co-experience is the process of lifting up experiences to shared attention, where they become part of a social interpretation process that can influence what the experience comes to mean to the individuals and others.

EMOTION AND EXPERIENCE

Emotion is at the heart of any human experience and an essential component of user-product interactions and user experience. Standard theories of emotion

generally explain how we are disposed to act, the positive or negative valence of that disposition, and the bodily changes associated with emotional arousal. From a psychological standpoint, emotion has three basic functions: to shape our plans and intentions, to organize the procedures related to the plans, and to evaluate outcomes [14]. From a design standpoint, emotion shapes the gap that exists between people and products in the world. Emotion affects how we plan to interact with products, how we actually interact with products, and the perceptions and outcomes that surround those interactions. Emotion serves as a resource for understanding and communicating about what we experience.

For example, emotion can shape our plans and intentions for how we will interact with products. These plans, or mental representations of the actions we plan to take, provide a link between our physical and mental beings and the goal we intend to achieve. Plans can be short or long-ranging. Suchman noted that plans often change in the face of experienced emotion and the constant re-evaluation of a particular situation [53]. For example, we may have a friend visiting and suddenly find ourselves very hungry at six p.m. In such a case, emotion guides us to look for ways to feed the guest and ourselves – in an appropriate way. For some guests leftover pizza or a quick omelet does not seem proper. Our goal is to deal with the intensifying hunger in the proper way, and a plan is constructed (going to the supermarket for supplies or going to the Chinese restaurant instead).

Next, to achieve one's goal, emotion coordinates our activity with products and interfaces in the environment. The affordances of products give us clues about how to support our activity. The psychologist J.J. Gibson originated these ideas in his theory of affordances [27]. Some have associated the concept of affordances with product usability, but affordances can also be seen as the way people undertake cognition and action in the world to make meaning. If products make suitable activities available and easy at a given time, pleasure and positive product interactions result. If our plans and resulting activities are interrupted, negative emotion results, often startling us to devise a new plan.

Finally, emotion helps us to evaluate our outcomes and experiences in interacting with products. If the outcome is satisfactory, a sense of accomplishment results, and effort is reduced or a new goal is created. This type of outcome supports fluent experience; it has also been described as the flow state [15].

The concept of pleasure as the emotional outcome of a product interaction is one that has been discussed in design literature [34]. Pleasure that results from interacting with products may be any benefit that is perceived in the product. However, these theories fail to explain how negative emotions can turn into posi-

tive, often shared experiences – such as how hardships during a hiking trip make for a good story, or how parents may put up with a young musician's terrible trumpet playing with affection, while hoping that it will improve soon.

Emotion serves other roles in social interaction as well: exceeded social regard is pleasant, failed interaction expectations can be disappointing, embarrassing or even enraging. Clearly, social contexts play a role in how we feel, express, and modify our emotions, as well as the resulting meaning that is made. Emotional experiences change, often quickly, in the presence of other people, activities, artifacts, and environments. For example, a call from a friend may cheer a boring day, or a sad incident may bring the entire party down. Emotions mark the experiences that might be suitable or worth sharing with others [6]. We control what emotions we choose to show and communicate, in a way that tends to portray events and experiences as more positive or just more intense than they actually were [36]. We also aim to create emotional responses in others with our actions [37]. For example, we may comfort someone by providing intimacy, be it just being together, sharing values, or expressing commitment. This is a type of social interaction that is inherently emotional [5, 54].

SCALABILITY OF EXPERIENCE

Experiences and emotions are not singular events that unfold without a relationship to other experiences and emotions. To address this in design terms we define *Scalability of experience* as the infinite amount of smaller user-product interactions and emotional responses (relating to contexts, people, goals and actions at a particular moment) that build up to yield larger and larger experiences over time. Typically, as time passes the smallest experiences are forgotten, and only larger experiences, extremely emotional ones and experiences that connect to others are remembered (Figure 2). Scalability of experience is important to consider when using the framework. A small experience will be interpreted in a number of ways, and contribute to an evolving set of larger experiences.

For example, when doing research to inform the design of a wearable computer with web-based services to help users maintain a balanced healthy lifestyle [23], models of emotion and experience were used to help the research team think about how a person's relationship with the product might change over time. Users need to attain fluency with the product early on, to ensure that they will continue to use the product and not abandon it in frustration. This means that minimal time can be invested in learning the basic controls, and that use should be rewarding from the start. Over time, the product should enable cognitive experiences as users begin to learn about their diet, exercise, sleep,

and wellness habits, and make the necessary changes in behavior. Perhaps these experiences are associated with positive, longer-term emotional responses, as the user begins to foster a long-term relationship with the product. Finally, the product should foster co-experiences through the creation of a support group, and communication about the product through the assistance it has brought the individual who is using it. A similar study followed how people's interactions and experiences with small objects such as bags and keyrings changed over time Pand context of use [39]. people construct meaning with products by following product use through a number of real-world contexts, as well as witnessing the responses of others.

Scalability of experience can help to build an overall picture ranging from details of product interactions to the stories and meanings that people use to articulate their experiences. Continuing with the above health and wellness example, smaller experiences around the product could include trying it on the arm for the first time, installing the software, the sound and feel of a button, excitement upon seeing the first results, viewing the data with a friend, or feeling anxiety about the privacy of the data. In interactive systems the challenge is to understand the influence small experiences and emotional responses have on others, as well as the overall view. Each product interaction in an experience can be characterized by a particular fleeting emotional response, may coalesce into a particular emotional expression or mood, and is ultimately stored in memory as a particular aspect of an experience. Scalability of experience also relates to how people's experiences change in relationship to products over time. These changes are best understood with time-based investigations of products in a real or realistic context of use. Mapping smaller experiences inside bigger ones can be done afterwards by designers and researchers, or be the focus of an activity with participants, in order to understand relationships between small and large. Associated emotional responses are hard to understand, let alone quantify. New research methods are needed to better articulate the relationship between what we feel and what we do. A current trend, for example, is to use biometric data collected from wearable sensors to attempt to capture the most fleeting emotional experiences.

THE ROLE OF THE DESIGNER IN A MULTIDISCIPLINARY TEAM

Armed with the framework as a tool, how can designers make an informed contribution to a multidisciplinary team tasked with designing an interactive system? Designers can offer a unique perspective on what kinds of user-product

interactions and experiences a system might offer, and how these experiences might change over time. To do so, designers along with other researchers need a deep understanding of those they are designing for. Designers also need to become inspired by and apply information and knowledge about the aspects of how people use and make meaning with products to the design team.

Conversation analysis methods have been used to understand how people arrange their activities with, through and around products [30]. It focuses on common understanding as an achievement by the participants, how their actions proceed as turns, and how this makes both talking and listening active roles in a conversation.

Ethnographic methods have also been used to understand the needs of groups of people, and to generalize theories and ideas from detailed investigations. Cultural anthropology has defined a cultural ecology as the study of symbiotic relationship between people and their environment, in order to understand how people understand, use, and modify the environment in which they live [46]. Cultural ecologies provide a basis for understanding a particular culture. They take a material approach, focusing on products, services, and interactions in an environment to describe the behavior for a given group of people [28].

Nardi and O'Day use the term "information ecology" to describe an interrelated system of people, practices, values, and technologies within a particular local environment [45]. An information ecology is used to situate new technologies ethically and responsibly, and to understand technology as a catalyst for change. Bell uses the term "ecology" to qualitatively describe relationships between people and their environment, choosing to push the definition of environment beyond physical and biological limitations to include all the aspects of a specific experience [7]. According to Bell, cultural ecologies and the ethnographic research behind them help to "convey an experience, a sense, a glimpse, or a window into another world… a way of talking about deep cultural patterns that implicate everything we do. Knowing these stories, interests, and patterns makes it possible to design and develop products and services that fit (intuitively) into people's lives." [8].

Bell's approach seems highly relevant for understanding the quality of experience, because it offers a mechanism for examining all of the aspects of a particular experience that may be relevant to designing products. However, any approach that brings detailed knowledge of users must be considered along with the designer's understanding of products and contexts. The designer's view should be one of several perspectives within a multidisciplinary team. This concept has also been described as design empathy, 25]; one of a range of

holistic perspectives for solving a design problem [16, 49, 51]; and one of several perspectives a designer can assume, from being a creative, to a scientist, to a "bricoleur" [21].

USING THE FRAMEWORK

Multidisciplinary design teams can use the framework to understand and generate kinds of interactions and experiences that new product and system designs might offer. Once a set of user-product interactions and experiences has been generated, research can be conducted to better understand the people, contexts, and activities to provide solutions for the design problem.

Table 2 shows examples of research activities that can be used to learn about different kinds of experience within the framework. To illustrate we have selected similar case studies of design research and generative design, where similar research activities were carried out. For the more fluent aspects of experience, it is important to capture much of the user's interactions in context without disrupting them. For cognitive and expressive experience, it is important not only to capture interactions in context as they unfold, but also the articulation of experience after the fact.

Design teams seeking to understand experience must learn about the most basic interactions and experiences that the product will offer. What are the current issues in the context where the product will be placed? How can a new product improve the user's current experience? Will the new product be easily adaptable, learnable, and usable? Answers to these questions are best found in taking an objective perspective to the user's experience and interaction.

Design teams must also follow how an experience unfolds, and how it is coalesced, and articulated. What product stories are mentioned as memorable or important? What critical incidents come to light? What language is used to discuss changes in users and contexts of use? What emotional responses accompany these changes? Answers to these questions are best found by taking an objective perspective to the user's experience and interaction. Additionally, understanding the scalability of product interactions, experience, and emotions is particularly useful. The concepts in the framework offer ways to seek meaning in people's interactions, be they alone or together with others.

To understand co-experience design teams must look at all of the potential conditions for collaborating around, communicating about, or sharing a product. How do users collaborate physically and virtually to create shared emotions and experiences? What are the potential outcomes of collaborative product experience? Answers to these questions are best discovered by taking

both a subjective and objective view to collaborative experience, emotion, and interaction.

When designing interactive systems, it is critical to understand the social and collaborative aspects of interaction and experience. We have found that several of the more fruitful research methods include introducing concepts, products, and prototypes into the user's world through studies and participatory design activities. Prototyping includes any and all of the design representations of a potential solution for the purposes of learning subjectively and objectively about those who will use the product. While traditional knowledge gained from prototypes has focused on the product function and interface, we have found prototypes to be very useful for learning about what social interactions and co-experiences can potentially unfold.

CONCLUSION

Understanding experience is an exceedingly critical issue for those tasked with designing interactive systems. Understanding user experience – how people interact with products, other people and the resulting emotions and experience that unfold – will result in products and systems that improve the lives of those who use them. Interactive systems for work use can benefit from a more experience-oriented approach, but for new technologies with no immediate perfect use, the experience oriented approach is the only real way that user centered design can impact the technology push. By understanding experience, meaningful and experiential applications can be found for technology as well.

Our research has led to a common way to understand experience, and to understand how social interaction and collaborative product use influence the individual's product experiences and the meanings those experiences come to have. In this paper, we offer an understanding of the experiences of the individual and co-experience as a sensitizing concept to help in interpreting meaning from a social interaction perspective. This process needs to be visual, empathic, and emotionally driven to be ultimately successful in supporting inspiration and gaining insights into user experience.

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ARTICLE 6 POOLS AND SATELLITES – INTIMACY IN THE CITY†

Battarbee, K., Baerten, N., Hinfelaar, M., Irvine, P., Loeber, S. Munro, A. and Pederson, T.

This paper addresses the issue of mediating intimacy in order to support city communities. What is intimacy and how can it be mediated through the introduction of new technology in a community? It illustrates the discussion by describing two explorative information and communication technology concepts and scenarios.

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This leads us to the core question of our project:

> *How can we support intimacy within an urban environment / community by means of introducing new kinds of interactive systems?*

In response to this question, we describe in this paper two "intimate" devices, designed for community use within an urban context. The initial concepts were developed in September 2001 during the i3 Summer School. After examining what intimacy stands for and what its potential importance in interaction design could be, we focus on how it might be supported in urban environments. To illustrate this, we present two scenarios that explain the setting and use of our two "intimate" devices within an urban community context and discuss the concepts with regard to several evaluation criteria. Finally, we describe ways in which this work may be developed further.

Designing new interactive technologies for communities was the core theme of the i3 Summer School 2001, which took place at the Interactive Institute in Ivrea, Italy [13]. The "Intimate City" Atelier concentrated around designs for urban communities – taking the city of Ivrea as a case study. Communities have needs, which go well beyond the functional. This atelier was inspired by two related threads: intimate media and social navigation. Intimate Media [21] are objects for communicating our identities and keeping memories; social navigation is the process of using other people to find out what is going on and where to go. We used these two elements to try to look at ways to manipulate and influence new ways of interacting with our urban environment.

KEYWORDS:
community, interaction design, intimacy, city

INTRODUCTION

Every day new ICT (information and communication technology) appliances find their way into our work, public, domestic and personal spaces [9,19]. While such new technologies may allow us to move beyond physical limitations such as time and distance, the interfaces and physical manifestations of these appliances are becoming increasingly important. Where these various elements meet, interesting new patterns of interactions can evolve, not only between people and their devices, but between people as well.

BACKGROUND

INTIMACY

Intimacy relies on communication and a sense of closeness. Such feelings of closeness are seen as inherent in cognitive, affective and physical aspects of intimacy. They may be expressed through face-to-face conversation, non-verbal communication (by means of gestures), close physical proximity or touch. Intimate relationships may include feelings of [4]:

- commitment (feeling of cohesion and connection)
- affective intimacy (a deep sense of caring, compassion, and positive regard and the opportunities to express the same)
- cognitive intimacy (thinking about and awareness of another, sharing values and goals)
- physical intimacy (sharing physical encounters ranging from proximity to sexuality)
- mutuality (a process of exchange or interdependence)

INTIMACY, COMMUNITY AND TECHNOLOGY

Although a difficult concept to capture in words, many of the characteristics of intimacy, in terms of human relationships, can extend to other contexts as well. For example, there are simple objects in our everyday lives that invoke intimacy because they remind us of, support us in, promote or mediate intimate relationships. A personal diary, for example, can be viewed as intimate when used to record intimate aspects of a person's life. But it only becomes "intimate" *when it is used.*

Intimacy is a quality endowed through use, either by the context of use, or by the manner of use. A softly lit restaurant may be perceived as intimate in that it may be conducive to intimacy. In contrast, a crowded city space may not be seen as intimate in that it does not promote private interaction, although close examination may reveal myriad intimate interactions. The holding of hands, eye contact and the close proximity of people as they walk and talk may expose an intimacy, which is largely inaccessible to us.

> "To live in a city is to live in a community of people who are strangers to each other. You have to act on hints and fancies, for they are all that the mobile and cellular nature of life will allow you. You expose yourself in, and are exposed to by others, fragments, isolated signals, bare disconnected gestures, jungle cries and whispers

that resist all your attempts to unravel their meaning, their consistency." [18, p.15]

We have a need to break through this mass of disconnected signals, to create order, to form relationships and reach a sense of closeness. Intimacy may be invested in objects and places and this intimacy may be conveyed to others through context or manner of use. This provides a range of possibilities for how physical interventions may be used to invoke or convey intimacy within the space of an urban community.

A starting point for making use of information and communication technologies in this context is the communication element. After all, communication technology has been the key way in which computerisation has changed many of the ways in which we relate to one another. Although it is often blamed for increasing distance between people by eliminating face-to-face communication, this is not the whole truth. Many communication technologies provide people with alternatives, that may even increase communication and support face-to-face communication. Increasing and augmenting the possibilities for communication could work within an urban community as well – as communication is an indispensable aspect of community life and a prerequisite for intimacy.

In fact, communities can be characterised by people that share at least three things: *a set of common interests, frequent interaction* and *identification* [20]. This is valid for all kinds of communities whether they are traditional geographically based, or new kinds of virtual or on-line communities. In terms of interaction, communication technology certainly has the potential to support communities by providing new ways for interaction to take place. Besides allowing communication to take place through the media, its physical presence can – if well designed – also attract community communication around it.

As will become clear later, these observations and insights will prove valuable in our designs.

COMMUNITY AND SOCIAL NEEDS

The city as an environment often requires people to navigate both physically through the spaces of the city, as well as socially. We use other people as a resource in a number of different ways: indirectly, following trails of footprints, well-worn paths, seeing a graffiti on a wall, following where the crowds go. Or we may navigate more directly, asking people what's going on, receiving directions, etc. We are constantly using other people, their behaviour, the artefacts and the markings they leave behind as resources to make sense of the city and enjoy it [16].

> … this awareness of others and their actions make us feel that the space is alive and might make it more inviting. Here we are not relly interested in whether users navigate more efficiently, or find exactly what they need more quickly; instead, we want to make them stay longer in the space, feeling more relaxed, and perhaps be inspired to tryout new functionality or pick up new products and new information items or to tryout new services that they would not have considered otherwise. [6]

The social navigation approach can help in our conception of how to design intimate technologies for the city. It makes us aware of the feeling of closeness, of intimacy that people's traces can convey. These can be regarded as traces of community life that people can use to feel part of it, to feel in touch with their fellow community members. In sharing a common city, people interact with each other directly and indirectly to get around. By using technology to increase awareness of others and create enhanced and new methods of apprehending people and their traces, we might find ways to support intimacy in the city.

COMMUNITY AND TECHNOLOGY

The feeling of sharing a common identity makes people feel safe, supported and supportive. Traditionally, this takes place in the physical and social environment of the local milieu. However, today's electronic media and information technologies have the propensity to remove human activities from the physical world. Replacing the city, traditionally the cultural kernel of a society, with a virtual world, renders location and therefore identification with a city irrelevant. Already on the Internet, new "virtual" communities are cropping up, and as new kinds of communities form, others may fall apart. The "digital age" is moving away from the communal life of the city to the enclosed, but networked, life of home, work and technology.

What is interesting, for the purposes of this work, is that available technologies may be used in new, innovative ways for different, originally unintended purposes. The physical manifestation of many technological appliances in recent times has generally been as a desktop or laptop device, and the most revolutionary use seems to have been to enable people to coordinate their work at a distance, across space and time zones. However, this is changing now. Technological advance has made it possible for many devices to "disappear" into the background, into different elements of our environment [12]. Such calm technology may look like a bench, a normal wall, a normal building,

or even grass. This poses new challenges for designing meaningful interfaces, which enable us to interact with such technology. In our aim to enhance community life and increase intimacy with and within an urban community environment, such developments provide opportunities for new solutions to make that difference.

Some exemplary projects have succeeded in applying technology in such a community-oriented way rather successfully. The Presence project, for example, involved local elders in an Amsterdam suburb to design experimental objects to strengthen their feelings of safety and involvement in the restless environment [8]. One of the designs was the slogan bench – a simple wooden bench with a window in the back rest. Slogans such as "Methadone is OK but not in front of children" created and written by the elders themselves, would rotate inside the window, using old bus sign technology. Social gatherings and discussions sprouted up around the new pieces, which became a manifestation of local culture and identity.

The Presence prototypes are interesting examples of what may become "intimate technology" for the city. Maybe we do not need to mediate over distance, in fact, maybe what is needed is a very local mediation to allow us to leave our footprints, our mark on the environment for others, to create and display some traces of our lives for others to interact with.

MEDIATED INTIMACY

We may sometimes be aware of the intimacy of others but can we detect it amongst Raban's [4] disembodied cries and whispers? The fragmentation of modern people's lives is increasingly apparent. People often live and work at a distance from friends and family and rely on communication technology to support their relationships with others [21]. The challenge remains to find appropriate ways to mediate intimacy in communications and to bring it to the community, trusting the drive of social needs to assist in introducing the new technologies and allowing them to find their place in the community.

New technologies could, and should, find more expressive and experiential ways to allow people to interact with each other. We believe that intimacy can be supported by using technology to make instances of mediated communication both visible and open for a community to participate in. Feelings of empathy, mutuality, of caring and compassion, of respect for one another, of commitment and fulfilling other people's needs, may all be invoked. Perhaps this way we can draw people back to places of common experience, the major source of community narrative, the heart of the community culture.

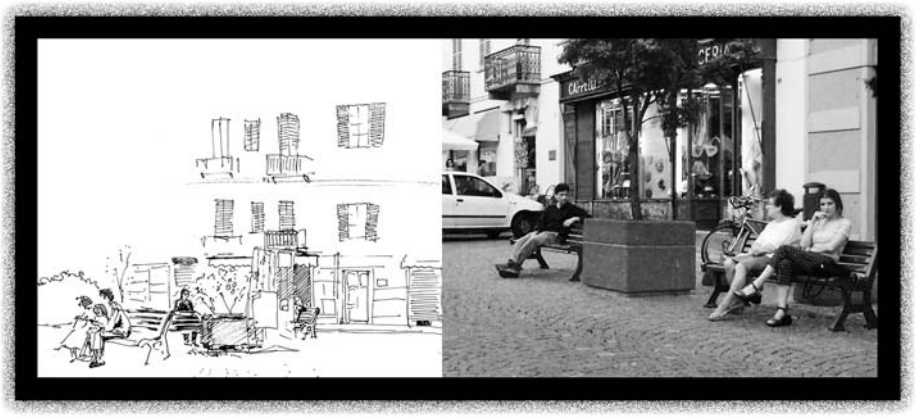


FIGURE 1 *The lively main piazza in Ivrea.*

DESIGN

The aim of our atelier was to design inter-active concepts to enhance intimacy in the city community. The process included a heavy emphasis on drawing inspiration from observations within the city of Ivrea and its surroundings and considering a wide array of possible concepts. This resulted in the eventual selection and presentation of two of our ideas that embodied best the criteria that had been decided on during the design process which are presented below.

OBSERVATIONS

> "What will be the twenty-first century equivalents of the gathering at the well, the water cooler, the Greek agora, the Roman Forum, the village green, the town square, Main Street, the mall?" [15]

The Ivrea city centre, like many Italian cities, has many squares. While some of them were very lively, others appeared rather dead and empty. This difference made us wonder about the reasons why people flocked together in a particular square.

FIGURE 2 *The large emply piazza.*

FIGURE 3 *The death announcement.*

FIGURE 4 *The love message.*

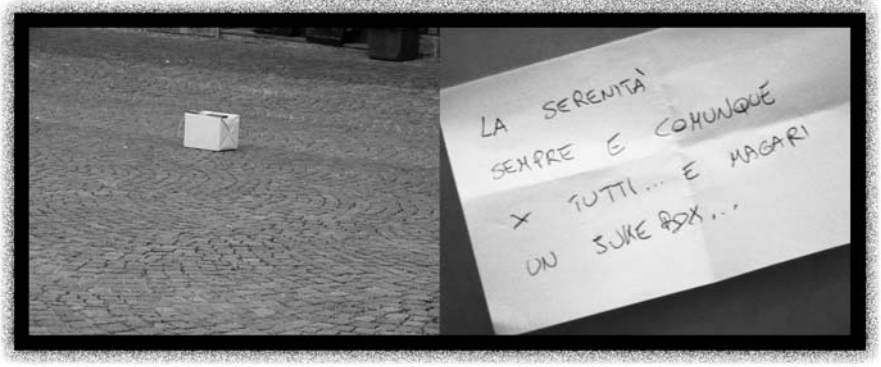


FIGURE 5 *The box and one message: "Peace forever and for everyone...and maybe a jukebox"*

> How and what kind of attractor could we introduce to one of the dead squares in order to liven it up as well and mediate intimacy somehow?

For several days we observed the main square, which had the highest degree of activity. We saw how people draw together people and how artefacts in the square facilitated this also. Benches among large potted plants provided a place for the elders to sit together and chat, to watch people walk by or to rock the baby carriages of their new-born grandchildren, for couples of all ages to sit together and flirt. At least three generations of people harmoniously shared a common place.

Being situated at the crossing of several streets, people walked across the square in many directions, avoiding and walking around the benches and plants, which divided the square into smaller areas for paths. Besides this, the main square was also framed by several "functional" buildings: the town hall on one side, a bank on another, several small cafes with terraces on the other sides. All of these influences together make it virtually impossible for community members not to interact with each other. The square, in that sense, was a facilitator for occasional social interaction and potential intimacy.

Further down the shopping street was another square, not nearly as lively as the one described above. Parts of it were being renovated and covered in scaffolding. Although in itself a beautiful square, framed on three sides by an impressive galleria, a theatre, a library, and some cafes and shops on the side of the shopping street, it lacked the inviting atmosphere. What kind of artefacts could we introduce to breathe life into this piazza?

We also observed the pervasive presence of references to everyday aspects of life on many walls in the city. For example, when fellow community members have passed away, it is announced by posting black and white notices on designated walls, very similar to obituaries in newspapers. The most emotionally evocative of these was the notice for a young woman, printed especially in colour with a red rose and a photograph of her smiling at the camera.

On a happier note, a private house proudly advertised the birth of a baby boy by affixing a little wreath of flowers next to the door with a short message announcing the birth of "Andrea" on the pale blue ribbon. The most memorable of many intimate messages throughout the city was perhaps that by the anonymous man, in love with a girl called Sonia. He had confessed his love by writing neatly *"Ti amo Sonia"* with black marker all over the city, including a mailbox. The presence, and acceptance of, references to all stages of life, could be felt strongly throughout the city.

INTERVENTIONS

A first attempt to spur inspiration was to ask the people of Ivrea themselves: *"What would you like to see on this square?"* This question we wrote on a box, strategically placed near the shopping street on the empty square. The few responses we received lead to a cascade effect of ideas.

One response in particular, i.e. that of a jukebox, brought forth the idea of using the square as an interface, using for example people's movements as input and sound, light and music as output, exploring the square as an interactive space. The importance of the square as a social nexus became evident as well as the possibility of augmenting the real, familiar environment with a new level of connectivity. Physical and virtual environments differ in the way they afford and constrain [17] human activities. By designing environments in which these two worlds are linked tightly to each other, people might be able to make better use of the unique advantages that both worlds offer, and this we wanted to apply to spaces such as the piazza.

In our final design concepts, we decided to focus on two of the social needs as our drivers, i.e. the inherent need of a community to communicate and the need to play. As a requirement for intimacy, both concepts have a communicative aspect – one places emphasis on personally meaningful and emotionally rich visual communication, the other proposes playfulness and exploration in interaction.

SELECTION CRITERIA

After several rounds of developing and discussing ideas, criteria for evaluating ideas for the final concepts emerged. The primary requirements the designs were supposed to reflect were

- *Intimacy* supporting intimate experiences or communication
- *Interactivity* providing means of inter-action for people, not just pieces of art
- *Meaningfulness* providing the possibility to add personal content and be personally involved
- *Openness to participation* supporting the passive observers' experience as well

CONCEPT DESCRIPTIONS

The two final concepts we designed merge various ideas about intimacy within a *community* and it is in this light that we explore the aspects of *communication*

and *play or playfulness*. Although both designs explore to a certain extent the concept of communication, in one of them it plays a more central role. Our first concept, the Pool of Memory allows people to transfer messages to a central location, the piazza square, within the city. Our second, more playful concept of the Satellites explores interactions that may bring people together through the use of technology. Both fit well into our search to put technology to use in order to *counter* further community alienation and distancing, an effect in many cases often strengthened by many ICT appliances.

THE POOL OF MEMORY

As a metaphor for our design we chose the age-old attractor, around which most community life originally developed – a source of water. We took the circular motif of the village well and transformed it into a shallow pool, to be placed strategically at the center of the square. Neither the functional necessity of fresh drinking water nor its primal attraction have changed over time. Because people have always gathered and talked around such places, we hoped that the *Pool of Memory* would attract the people of Ivrea and stimulate their conversation.

The Pool of Memory is a visual community messaging system that allows input from several, even remote, locations and output to a central place and the remote input locations. The visual messages are short videoclips containing sound. In public places however, playing back sound is more problematic than displaying an image, and thus we consider the visual to be of greater overall importance than the sound. The short audiovisual messages are played in order of creation. To allow people to construct sequences of narrative, new messages can be connected to previous ones, creating chains of messages. Recording a message takes place in front of a small panel mounted in a public place. For our "problematic" piazza these could be the pillars of the galleries for this purpose. This could also positively alter the flow of people on and around the piazza. Instructions for use would be:

- Step up to the panel, and wait for the screen to sense your presence. It will automatically switch from playback to recording mode. To start recording a new message, press the record button.
- You may enter the reply mode and browse existing messages by scrolling the jog dial. To respond to a particular message push the record button during the message to start recording.
- To not respond to any of the messages wait for the screen to return to recording mode. Once you stop using the jog dial, the screen will return to recording mode.

- After recording, preview the message and accept it for sending, otherwise message will be deleted.
- The recorded messages flow together at a central location, the Pool of Memory. It is a large circle of seat-height walls with a drinking water fountain in the middle. The videoclips circulate slowly on screens around the inner rim of the structure, casting their reflections onto the water surface.

As one can easily notice, the pool serves many functions to the community this way: it provides a place for people to sit and socialise, it has a drinking water fountain, and it allows personal messages to be viewed both from within close range as from a further distance while passing by.

THE SATELLITES

The satellite is, in essence, a playful exploration of modes of communication. Its round, biomorph product shapes have

been chosen to invite people to playfully interact with them. The device consists of two parts that communicate with each other from different locations. One end can see but cannot hear, the other end can hear but cannot see. Asymmetrically limiting communication modalities was a deliberate design choice in order to awaken curiosity and creative thinking, to stimulate discovering different, new ways to interact with other people. At the same time the concept can be seen as a silent reference to the distancing effect and narrowed communication of many ICT devices.

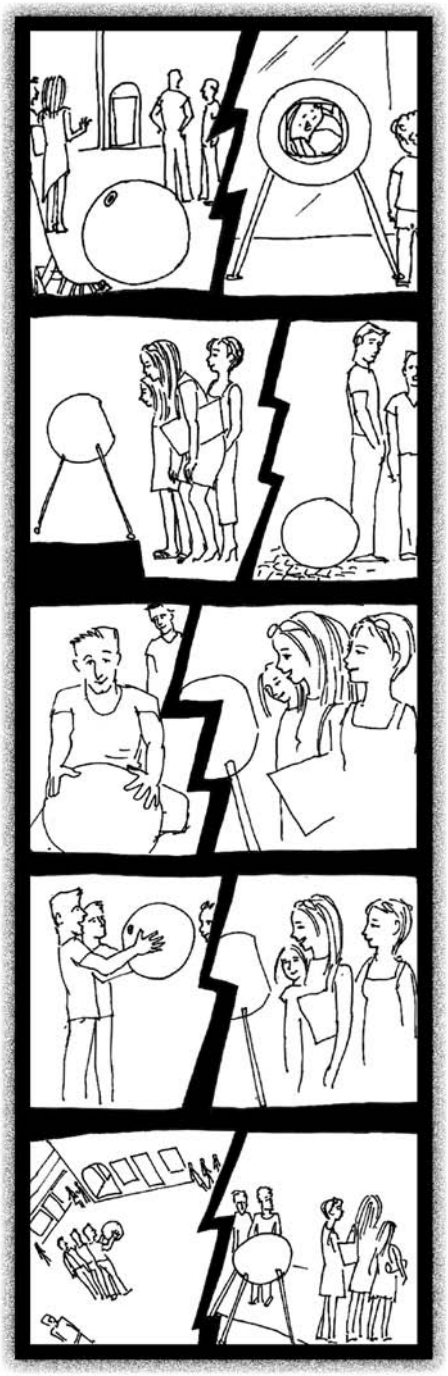
The *wireless satellite* has a round friendly shape in a large "huggable" size. It captures video and sends it to the *ground control.* The ground control is also round, but rests on legs and is immobile. It displays the video input from the satellite and records the sound input of the viewers, broadcasting it back to the satellite. The aim of this is to explore the concept of communication, how it is initiated, how the under-standing of the asymmetry of modality is processed and what this might lead to. When effective communication cannot be the functionality, will the playfulness suggested by the object shape take over and influence people's behaviour?

The satellite concept also addresses the issue of openness. The main experience is that of using the system, but the way in which people have to interact with it will draw attention from passers-by and initiate their curiosity. It is a perfect example of giving people the opportunity to make use of social navigation. Also the concept allows the person to communicate without actually disclosing her/his identity or being the entertainer or clown. The social hedonistic needs are ad-

It's Riccardo's lunch break. He is on his way back from a nice long lunch when he remembers that it's his and Sonia's three-month anniversary today … Not remembering would be nothing short of a crime! On the spur of the moment he steals a small rose from a restaurant's flower bed and spins with it to the recording panel on a nearby wall. Holding the rose in his hands, in front of the camera, he confesses: "Ti amo, Sonia."

Sonia and Maria have a lunch break together. Maria is 8 months pregnant and likes to shop for baby clothes in the city centre, close to home – she can't walk very far now. They are to meet at Sonia's work-place, and Maria crosses the square on her way. She glances at the images in the pool and stops: surely that one looks very much like Riccardo, hiding behind a flower? How sweet! Sonia should see this for herself… She calls Sonia and asks her to come over to the square instead – there is something she should see for herself.

Sonia giggles … that's so like Riccardo! Isn't he the best! Well … she really should reply somehow … maybe a flower for a flower? Maria and Sonia go to the side of the square to the nearest recording panel. They find Riccardo's rose message, and to record her reply, Sonia holds up a rose from her dress to the camera, with plans to say something mysterious and appreciative, but Maria is rolling her eyes and the funny expression causes Sonia to burst into happy laughter.



The satellite is on the ground in a busy square, camera pointed up at people, emitting sounds from a different part of the city. The ground control is on the other side of the city centre, displaying the live video and recording sounds.

Two sisters, and the best friend of the older sister are touring the shops for something nice for an upcoming party. They glance at the fish-eyed image, and then look again – hehey, what good-looking guys are right close by! They start joking to each other and laughing.

One of the guys hears sounds of female laughter and thinks he also heard the word "handsome" and looks around at a red ball on the ground, where the sounds seem to be coming from.

Hey, guys, this looks like some kind of camera, he says and squats down to take a closer look at the ball. He hears squeals of surprise and muffled laughter coming from the loudspeaker.

Oh no! he is looking at us! The girls laugh in surprise. They can't believe he actually heard them, however did that happen.

The guy holds the ball up looking in to the camera. He asks the camera: can you hear me? The girls see his mouth move and figure out what he might be asking. They tell him that they can only see him, not hear him.

The guy assures the girls he is heartbroken, not to be able to see the sources of such lovely voices. His mates laugh and also take a look at the camera. They want to know where the girls are.

The girls wink at each other and ask the guy to show them where they are. The guy obliges, sweeping a look at the local cafe and shops with the camera in the ball.

The girls take off, giggling, leaving the guys talking to the camera. Sure they know where that cafe is – who knows, they might go that way for ice creams later. That would be a laugh if the guys are still there.

dressed in the fact that people can interact with each other, cooperate and perform tasks, but they can also turn it into a game (of hide and seek for example).

DISCUSSION

THE CONCEPTS

The Intimate City can serve as a good example for the new kinds of interaction situations that, by necessity, appear as information appliances become mobile, ubiquitous and personal. One user vs. one computer, the interaction situation formerly assumed to be default within the HCI community, should no longer be viewed as the default situation.

Although the concept of the satellite has many similarities with the traditional HCI setup of a person-to-person communication device, it also deliberately tries to involve more people than merely the direct users. It does so by disturbing the modal symmetry of communication. It is a communication device of low usability in the functional sense. It is quite unusable for efficient messaging between individuals. It will possibly evoke slight frustration or surprise as well as curiosity. It is also placed in a public space, on the ground, to be seen by many potential participants. Its shape is suggestive of play (especially in a country obsessed by soccer). The asymmetry can be seen as a potential bridge over personal disabilities of mobility, of hearing and of sight, providing a platform for cooperation between individuals.

The Pool of Memory furthers the idea of "multi-user interaction". This is achieved by distributing the input devices across several locations in the city, as well as by placing the output device in a square where it is at the heart of the action. The concept allows active, meaningful interaction between those who create messages and those for whom the messages are intended – knowing that there is also another audience, the rest of the community. It also allows observers to be a part of the experience: seeing and hearing the messages, seeing people creating messages, possibly discussing the content with others. Without force, but relying on curiosity, the concept hopefully invites and provokes people to actively take part in this visual communication process.

The complex interaction pattern that the Pool of Memory affords serves as a good example of Emergent Interaction [2] where most participants share some parts of the interaction while other parts are more tuned to individual preferences. The use of visuals makes the channel also more emotionally rich, and the limitations of a short video clip can become the strict form that allows the participants to be playful and inventive in creating content. The active partici-

pants can experience affective intimacy in sharing messages. The observing, passive participants can see these messages, experiencing cognitive intimacy by being aware of what others are sharing.

THE DESIGN PROCESS

The design process of these concepts was unusual because of its duration, setting, aims and participants. It took place at a summer school, it was done by a group of nine people from different countries and different backgrounds during nine afternoons in the Italian town of Ivrea. The most interesting aspects of the process have been described previously: the intensive observations of the town and the interventions for design inspiration. Before arriving at the final concepts, many different avenues of ideas were explored, which sparked a firmer, further understanding of what we wanted the intimacy in the community to be.

INTIMACY AND INTERACTION DESIGN

The experience of the individual, while taking into account its place within the larger social context, should be central to good interaction design. How individuals interact with a device may be objectively evaluated according to …

> " … how well they understand how it works; the way it feels in their hands; how they feel about it while they are using it; how well it serves their purposes; the way it fits into the context in which they are using it; and how well it contributes to the quality of their lives. If these experiences are engaging and productive, then people value them." [1]

Retrospectively seeing these constraints as incomplete, Alben [1] suggests the need for closer, empathic partnerships with the community, conducted beyond the design studio, in the context of community members' lives. What Alben suggests is missing is "intimacy". The concept of empathic design is not new, however. Several advocates of leading design consultancies call empathy the tool with which designers internalise the require-ments of the users and can put their creativity to work for others [3, 5]. Empathy, an emotional understanding, is achieved precisely by leaving the design office and becoming – if briefly – immersed in the lives, environments, attitudes, experiences and dreams of the future users.

In order to achieve this, so called "cultural probes" have been used to penetrate the hidden nature of individuals' experience and have revealed rich data otherwise unavailable [7]. Gaver and colleagues' investigations were not carried

out in order to objectively frame a design problem, but to form "a more impressionistic account of their beliefs and desires, their aesthetic preferences and cultural concerns" in order to design speculative futures. They stress the importance of intimacy in this relationship:

> "The probes were our personal communication to the elders, and prompted the elders to communicate personally in return." [7]

We believe that the attitude of the design process is reflected in the final concepts: if mutual exchange, respect, and sharing of values and experiences takes place in the process, it is possible to incorporate these into the design of concepts as well.

EVALUATION

How can intimacy as a community experience then be evaluated? Merely measuring the frequency of communication does not suffice. And if objective criteria alone cannot be used to inform the design of inti-mate devices, we must also accept that objective criteria alone cannot be used to evaluate them. Evaluation of intimate devices must extend beyond Alben's objective assessment of individual experience, to examine the design process and the degree of intimacy it supports with and within the community.

Evaluation of an intimate device should focus on the characteristics, which promote or support, intimate relationships, either between the artefact and the individual, or between members of the community. Factors such as closeness, self-disclosure, commitment and affective, cognitive and physical intimacy should be considered, although not all need be present [4]. However, the presence of reciprocity between individuals is necessary, as unsolicited self-disclosure can be perceived as intrusive.

Some factors relating to intimacy may be seen to relate to Alben's objective criteria. For example, how something feels or looks may evoke feelings of intimacy. Hofmeester, Kemp, and Blankendaal [10] investigated the issue of sensuality in inter-face design, a quality that may be conducive to intimacy. They used a range of semantic differentials (such as soft/hard warm/cold attractive/repulsive) to measure perceptions of personal communications devices. Similar metrics might be used to determine perceptions of intimacy in the evaluation of intimate devices.

The evaluation of how a concept works in a community needs to be evaluated by members of a community together. This means it is more resource-consuming than the traditional testing of person-product interaction and stresses

the importance of qualitative experience-oriented, and contextual research in the early concept design stages.

These concepts could be prototyped and placed in a community for a time to see how they become adopted. This may require a long term co-operation commitment from the designers. It often happens that the results of a research project are prototyped and tested in a community, but then taken away, as in the projects Living Memory [11] and Presence [7,8]. The final sign of success for a community concept is that it remains actively used and maintained even after the designers pack up and go home.

CONCLUSIONS

In our designs for the intimate city we have tried to combine the unique physical characteristics of the city environment with the communication and media possibilities that modern ICT can provide. The piazza, the streets and the city walls merely receive new furniture. By breathing new function-ality and meaning of life into and around these spaces, we support interactions that can be not only intimate between individuals, but also supporting the community as a whole.

The call for interaction design is to learn from the different social needs that people have and incorporate them into the design: to provide interaction that is playful, respectful and intimate in reflection of its content. This kind of understanding would have wide applications ranging from personal services, designed environments, inclusive design and teleworking while most importantly promoting the under-standing of people as social beings who need a community, and need to feel part of and take part in it, regardless of age, gender or other aspect.

> "The form of social space is encounter, assembly, simultaneity … Social space implies actual or potential assembly at a single point, or around that point" [14]

These new intimate ICT-products have the potential of becoming such points around which life proliferates. Among benches, potted rose bushes, drinking fountains and cafe tables we want these new products to become placeholders for community life.

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2003 THIRD CONFERENCE ON DESIGNING PLEASURABLE PRODUCTS AND INTERFACES

APPENDIX: A HISTORICAL TIMELINE

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	EVENTS, INVENTIONS, ART, CULTURE	DESIGN & BUSINESS	COMPUTING & TECHNOLOGY	RESEARCH ON PEOPLE AND USER EXPERIENCE
1900	zeppelin, escalator			
1901	safety razor, vacuum cleaner			
1902	air conditioner, neon lights			
1903	the first airplane flight	The first Harley Davidson motorcycle with the motor integrated in the frame design.		
1905	Einstein's Relativity Theory			
1907	Water lilies by Claude Monet (impressionism). bakelite	Peter Behrens becomes artistic advisor for AEG in Germany. He refuses to replicate other materials or styles in the design work, and goes about to design a corporate identity for AEG.		

	EVENTS, INVENTIONS, ART, CULTURE	DESIGN & BUSINESS	COMPUTING & TECHNOLOGY	RESEARCH ON PEOPLE AND USER EXPERIENCE
1908		The Table fan by Peter Behrens		
1909	Three Women by Pablo Picasso (kubism) bakelite plastic			
1910	first talking motion picture	Peter Behrens designes the AEG factory and turbine hall in Berlin.		
1911	(dadaism begins)			*Taylor:The Principles of Scientific Management*
1913	bra, modern zipper	Model T Ford – Henry Ford introduces the moving assembly line		
1914	World War I begins.			
1916	stainless steel, first radio with tuner			
1917	Fountain by Marcel Duchamp	De Stijl is formed.		
1918	World War I ends.	Red-blue chair by Gerrit Rietveld.		
1919		Walter Gropius founds the Bauhaus school		
1923	Cathode ray tube			
1925		Interantional Exhibition of Modern Decorative and Industrial Arts in Paris. Thonet's bentwood Vienna café chair becomes a success.		
1926	Polyvinylchloride (PVC, vinyl)	Market segmentation: coloured cars by GM		
1927	First television broadcast in England, first successful talking motion picture "The Jazz Singer"	In New York, Macy's exposition of "modern products" bring the industrial design profession to common knowledge		
1928		Kamden Table lamp by a Bauhaus student is produced in large numbers.		

	EVENTS, INVENTIONS, ART, CULTURE	DESIGN & BUSINESS	COMPUTING & TECHNOLOGY	RESEARCH ON PEOPLE AND USER EXPERIENCE
1929	The crash of the Wall Street Stock Market	Dreyfuss and Loewy both open their industrial design consultancies. Loewy streamlines the first piece of industrial machinery. Le Corbusier designs his classic chaise longue.		
1930		Chrysler Building, New York, the monument of Art Deco	The differential analyzer at MIT is the largest computational device in the world.	
1931	The Persistence of Memory by Salvador Dali (surrealism)			
1933	FM (frequency modulation) radio, stereo records.	The Paimio Sanatorium by Alvar Aalto: Everything is designed from door handles to employee daycare facilities. Douglas DC1, first streamlined monocoque airplane		
1934	Hitler becomes Fuhrer of Germany	The Chrysler Airflow, the first "streamlined" car, tested in wind tunnel.		*Dewey: Art as Experience*
1935	polyethylene plastic, canned beer	Russell Wright's "Modern Living" becomes the first popular modern furniture in the US		
1936	Modern Times by Charles Chaplin. Acrylic plastic.			
1937	Guernica by Pablo Picasso	The KitchenAid mixer receives its classic form.	Alan Turing invents the idea of the "Universal Machine", developing the concept of computability.	*The term "symbolic interactionism" is first used by Blumer*
1938	ballpoint pen, turboprop engine, freeze-dried coffee and teflon, polystyrene made practical	The S 1 steam engine design marks Loewy as the streamline designer.		

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1939	Gone with the Wind and Wizard of OZ (first colour movie) by Victor Fleming. World War II begins. Nylon.	Loewy also redesigns Lucky Strike packaging	The ABC computer at Iowa State University is perhaps the earliest calculator.	
1940				*Human factors research moves on from anthropometrics towards studies of decision making*
1941	Citizen Kane by Orson Wells			
1943			Colossus, a giant decyphering computer is built in Bletcheley Park, England and is a secret until 1970.	
1944	The invasion of Normandy, the largest logistics operation to date.			
1945	The bombings of Hiroshima and Nagasaki. WW II is over. United Nations is formed.		The first time the term "bug" and "debugging" are used for computers.	
1946	microwave oven		ENIAC is unveiled	
1947	Roswell incident of UFO landing	The first beetles are produced	The precursor to the transistor	
1948	frisbee, velcro and the Wurlitzer jukebox. The long playing vinyl record.	Eames Fiberglass Chairs. Polaroid Model 95 camera becomes a success. Kaj Frank rethinks kitchenware with Kilta.	The transistor. The "Manchester Baby" – the first real computer is built.	
1950	The first credit card: Diners			
1951	Super glue, power steering, video tape recorder	Arne Jacobsen's chair Myran.	"Whirlwind" – a computer for real time processing. Routines and re-usable modules are introduced to programming and the first text book is begun.	*Loewy: Industrial Design*

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1952	Finland finishes paying reparations to the Soviet Union. John Cage's composition 4'33" (of silence). A computer is on the cover of TIME magazine.	The Lamb Handle: a patented, ergonomically researched handle for knives	Grace Hopper introduces the idea of a compiler and the general concept of language translation in programming.	
1953	First commercial colour television broadcast			
1954	oral contraceptives, solar cell. McDonalds started.	Raymond Loewy designs the Greyhound bus. Timo Sarpaneva's glass sculptures win the Grand Prix at the Triennale di Milano.		
1955		Sarpaneva creates the Iittala logo I		*Dreyfuss: Designing for People*
1956		Paul Rand designs a brand strategy for IBM and the famous logo. Eero Saarinen creates his Tulip chair.	The first conference on Artificial Intelligence.	
1957	Buddy Holly: Peggy Sue	ICSID – International Council of Societies of Industrial Design is formed. Sottsass begins work at Olivetti Computers.	The first progamming language and compiler, FORTRAN, is used. First error message.	*Human Factors and Ergonomics Society is formed*
1958	Elvis: Love me tender		LISP, a non-numeric programming language for processing strings of symbols is taken into use.	
1959	Internal pacemaker, Barbie doll	Xerox 914 Copier – a precursor to copier designs of today. A jury of 100 designers vote the Olivetti Lettera 32 typewriter by Nizzoli as the best product of the past 100 years.		

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1960	Psycho by Alfred Hitchcock	Sarpaneva's cast iron pot with removable wooden handle wins silver at Triennale di Milano. Jacqueline Kennedy wears Marimekko dresses and propels it to international success.	COBOL, a business oriented programming language, is launched. The era of vacuum tube computers is over.	
1961		Arne Jacobsen's Egg armchair	First commercially available integrated circuit	
1962	The first audio cassette. Lawrence of Arabia by David Lean. Campbell Soup Can (Cream of Chicken) by Andy Warhol	Shell's new logo by Raymond Loewy is so successful, the company's name is dropped from the design	First laser diode makes optical data storage for computers possible	
1963	Bob Dylan: Blowin' in the Wind			
1964	Dr. Strangelove by Kubrick		The first "mouse" is developed by Englebert	
1965	Russian cosmonaut takes a space walk. Roddenberry creates pilot episode of Star Trek.	Height of popularity for the Tunturi "pappa" moped		
1967	The Beatles: Sgt. Pepper's Lonely Hearts Club Band (the first LP designed as an album)	Pastilli chair by Eero Aarnio		*Garfinkel: Studies in Ethnomethodology.*
1968	Kubrick: 2001: A Space Odyssey (introducing HAL, the computer)	Tapio Wirkkala's Ultima Thule glass series.		*Blumer: Symbolic Interactionism*
1969	Nokia introduces the phones for the world's first international mobile phone network NMT. Apollo 11 lands on the moon	Sottsass' bright red portable typewriter Valentine for Olivetti brings colour to the office. The Jumbo jet – complete with designer interiors.	Work on ARPAnet begins – what is to become the internet	
1970				*Scandinavian participatory design activities are in full swing*

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1971			First floppy disks and commercial microchips launch the personal computing era. First liquid crystal display.	
1972	The Godfather by Francis Ford Coppola			
1973	"Television ate my family" said the first reality tv-show's teenage son about the fame and criticism that followed "An American Family".		First computer with a graphical user interface, the Xerox Alto	
1974	ATM machines, post-it notes. Autobahn, a 22 min hit with synthesized music by Kraftwerk.	Finnish design education changes: The Institute of Industrial Arts becomes the University of Industrial Arts Helsinki		
1975	One Flew Over the Cuckoo's Nest by Milos Forman. Jaws by Steven Spielberg. The Vietnam war is over.		First personal computer, the Altair. First laser printers	
1976	The Apple II becomes a market success, both Apple Corp. and Microsoft Corp are founded.			*The first design management conference organised by the DM institute. Design for Need conference in London calling for a social design responsibility.*
1977	The Voyager is launched off, destined to fly the the solar system. Star Wars by George Lucas.			
1978			First "killer app" on the computer: spreadsheet software Visicalc. The compact disk (CD) standard.	

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1979	Sony Walkman, cellular phones, rollerblades. Apocalypse Now by Francis Ford Coppola. Alien by Ridley Scott.	Guggenheim Museum, New York	First proper word-processign software: WordStar. The Cray supercomputer.	*Gibson: The ecological approach to visual perception (coins the term: affordance)*
1980	Airplane by Jim Abrahams and David Zucker.		First portable, self-contained computer from Osborne	*Ethnographers are brought in to a few US design firms*
1981	Raiders of the Lost Ark by Steven Spielberg. Das Boot by Wolfgang Petersen.	Memphis reintroduces radical design	First computer virus attacks via floppy disk.	
1982	First movie that has computer-generated visual effects: Tron. Blade Runner by Ridley Scott. E.T. by Steven Spielberg.			
1983		The Swatch watch	Introduction of the IBM PC with useful software.	*As computer terminals become common in offices, the need for better ergonomics of also computers increases.*
1984			The first Apple Macintosh computer is launched. The mouse and the icon become the major tools for computer interaction.	*Computer supported collaborative work emerges as a field of its own*
1986	Aliens by James Cameron. Platoon by Oliver Stone.	disposable camera		*Shneiderman: Designing the user interface: Strategies for effective human-computer interaction. Holman: Advertising and Emotionality.*
1987		TKO, the Finnish industrial designers' association begins to elect the designer of the year		
1988			First internet computer virus.	*Norman: The psychology of everyday things*

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1990		Juicy Salif citrus squeezer by Philippe Starck. OXO GoodGrips presents 10 kitchen tools.	the world wide web/ internet protocol and HTML language	
1991	Nokia introduces the first commercial GSM-phone. Terminator 2 – Judgement day by James Cameron.			*First two doctorate degrees at the University of Art and Design Helsinki.*
1992	Reservoir Dogs by Quentin Tarantino	Renault introduces the Twingo		*Rhea: A new perspective on design: Focusing on customer experience*
1993	Philadelphia by Jonathan Demme.		The pentium processor	*Nielsen: Usability Engineering Rheingold: The Virtual Community: homesteading on the electronic frontier*
1994		Ron Arad's Bookworm shelf for Kartell.	Netscape lauches the first commercial graphical internet browser	
1995	Toy Story by John Lasseter (first full length movie entirely by computer animation)			*Smart Products Research Group is started at University of Art and Design Helsinki*
1996	Trainspotting by Danny Boyle. JenniCam, the first live videocast from a girl's apartment will continue for over 7 years. The tamagotchi virtual pet is launched in Japan.		FutureWave introduces FutureSplash to becoe Macromedia Flash 1.0	*Jensen: The Dream Society. Walton: Good Experiences: Thoughts on Designing for Both Mind and Soul.*
1997		Pepsi does a brand overhaul: the new "blue" Pepsi brand. Young finnish designers form Snowcrash and take Milan by storm.		*Segal & Fulton Suri: The Empathic Practitioner: Measurement and Interpretation of User Experience. Beyer & Holtzblatt: Contextual Design*

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1998		Volkswagen launches the New Beetle. Swatch and Mercedes launch together the Smart car. Apple launches the first bondi blue iMacs. Block lamp by Harri Koskinen.	The search engine Google is launched. First DVD-ROM drives become available to computer users.	*Pine & Gilmore: Welcome to the Experience Economy. Black: Empathic Design: User focused strategies for innovation*
1999	The Matrix by Andy and Larry Wachowski.	DoCoMo launches i-mode internet service for digital phones in Japan, vastly successful.	Napster brings peer-to-peer computing to the public attention	*Moggridge: Expressing Experiences in Design. Sanders & Dandavate: Design for Experiencing: New Tools. First seminar on Pleasure-Based Design, Delft. First conference on Design and Emotion, Copenhagen. Hummels: Engaging contexts to evoke experiences. Hummels: Engaging contexts to evoke experiences.*
2000	The "dot-com bubble" bursts on the US stock market with global repercussions			*Jordan: Designing Pleasurable Products. Forlizzi & Ford: The Building Blocks of Experience. Buchenau & Fulton Suri: Experience Prototyping. Branaghan: Emotion, Motivation, Usability*
2001	Bombing of the World Trade Center two towers, New York. Spirited Away by Hayao Miyazaki.	Chrysler presents the PT Cruiser. Apple launches the iPod		*Shedroff: Experience Design I. Second Conference on Affective Human Factors (was Pleasure-Based Design), Singapore*
2002		Nokia launches its camera phone in Europe.		*Desing + Emotion 3rd interatinal conference, Loughborough. Desmet: Designing Emotion*

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2003	First space probes find evidence of water on Mars. The Lord of the Rings trilogy is completed by Peter Jackson.			*Third conference on Designing Pleasurable Products and Interfaces, Pittsburgh. Wright, McCarthy, Blythe, Overbeeke: Funology*