

Social Theory as a Thinking Tool for Empathic Design

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Figure 1a

Showing a personal SMS message to a friend is a way of communicating trust and friendship. See Alex S. Taylor and Richard Harper, "The Gift of the Gab?: A Design-oriented Sociology of Young People's Use of Mobiles," *Computer Supported Cooperative Work* 12:3, (2003): 267-96.

Figure 1b

When faced with buying wine in the supermarket, we often choose the bottle of wine from a nearly empty shelf, assuming it's the best one. See Thomas Erickson and Wendy A. Kellogg, "Social Translucence: An Approach to Designing Systems that Support Social Processes," *ACM Transactions on Computer-Human Interaction* 7:1 (2000): 59-83.

Figure 1c

In a people study about baby care (see section 5), dads with new-born children who were breast-fed, said they felt that their bond with the child was rather remote, because they didn't have any role in the breast feeding. In case of bottle-feeding, moms and dads would often feed the child in turns, or even together.

Figure 1d

Sometimes my dad gives me a ride to the bus station. When we are in a hurry, I jump into the back seat of the car. My dad doesn't like that: He says it makes him feel as if he's a taxi driver.

Figure 1e

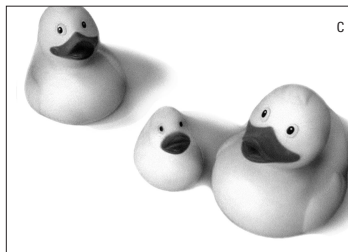
The table arrangement in a restaurant influences how guests will interact during dinner and with whom. See William W. Gaver, "Affordances for Interaction: The Social is Material for Design," *Ecological Psychology* 8:2 (1996): 111-29.

Figure 1f

In a previous people study, a senior couple explained that every week, their friends would put six eggs up for raffle during their dancing classes. It was an exciting event, and all the people would bring their empty egg boxes, just in case...

Introduction

Recent societal issues and socio-technological developments, including the mass adoption of real-time social media services,¹ have made "the social" (i.e., the relationality inherent in human existence) an essential topic for design. Despite the fundamentally social nature of life, most existing models intended to generate perspectives of users in design still focus on the individual. To support designers in doing empathic design, we set out to find a possible conceptual framework that could serve as a "thinking tool" of the social. A model that sensitizes designers toward both relationality and individuality in building creative understanding of users for design. In this paper, we review a number of possible frameworks and describe our experiences in applying these frameworks in new product development (NPD) practice.



- 1 Contagious, "Most Contagious 2009," Contagious, www.contagiousmagazine.com (accessed December 19, 2009).
- 2 David Benyon, Phil Turner and Susan Turner, "Designing Interactive Systems: People, Activities, Contexts, Technologies" (Harlow: Pearson Education Ltd, 2005).
- 3 Examples are: Richard Buchanan, "Design Research and the New Learning," *Design Issues* 17:4 (Autumn, 1999): 3-23; Alison Black, "Empathic Design, User Focused Strategies for Innovation," *Proceedings of New Product Development, IBC Conferences*, (1998): 1-8; and Jane Fulton Suri and Matthew Marsh, "Scenario Building as an Ergonomics Method in Consumer Product Design," *Applied Ergonomics* 31 (2000): 151-7.
- 4 Katja Battarbee and Ilpo Koskinen, "Co-experience: Product Experience as Social Interaction," *Product Experience*, ed. Hendrik N. J. Schifferstein and Paul Hekkert (San Diego: Elsevier Ltd, 2008), 461.
- 5 Jane Fulton Suri, "Empathic Design: Informed and Inspired by Other People's Experience," *Empathic Design, User Experience in Product Design*, ed. Ilpo Koskinen, Katja Battarbee and Tuuli Mattelmäki (Edita: IT Press, 2003), 51; Ilpo Koskinen and Katja Battarbee, "Introduction to User Experience and Empathic Design," *Empathic Design, User Experience in Product Design*, ed. Ilpo Koskinen, Katja Battarbee and Tuuli Mattelmäki (Edita: IT Press, 2003), 37; and Elizabeth B.-N. Sanders and Uday Dandavate, "Design for Experiencing: New Tools," *Proceedings of the First International Conference on Design and Emotion* (Delft: Delft University of Technology, 1999): 87-91.
- 6 Carolien E. Postma, Kristina Lauche and Pieter Jan Stappers, "Dialogues: A Framework for Bridging the Gap Between People Research and Design," *Proceedings of Designing Pleasurable Products and Interfaces* (2009): 25-34.
- 7 Fulton Suri, "Empathic Design: Informed and Inspired by Other People's Experience," 51; Koskinen and Battarbee, "Introduction to User Experience and Empathic Design," 37; Sanders and Dandavate, "Design for experiencing: New Tools," 87-91.

In this paper we use "the social" to denote the idea that human activity is fundamentally social, as opposed to individual. Figure 1 presents six cases from daily life. A closer look at these cases reveals that the social plays an important role in each of these six cases, and that the social is more than just another flavor of context: The social permeates our lives. This idea has been at the core of computer-supported cooperative work but is only peripheral in design and design research.² The suggestion has been made in the design research literature that design teams need to establish creative understanding of the social to develop products and services that delight users.³ However, most frameworks of user experience in design place the individual at the center and merely hint at the social, leaving design teams rather empty-handed, or at least ill-informed. Therefore, a theoretical framework is needed to sensitize designers toward the social in designing for user experience.⁴

Our work is situated in the context of empathic design in NPD practice.⁵ Empathic design approaches often suggest that members of a design team (who may or may not be educated in design) adopt the role of people researchers and directly interact with users to ensure that the user perspective is included in design. However, in NPD practice, this interaction is not always feasible because people research is often outsourced or conducted by experienced people researchers. Alternatively, design teams might be engaged in analyzing and structuring the user experience data that have been gathered in people research.⁶ Such an approach means that designers need conceptual tools that enable them to think about the social without having to become social scientists themselves. To guide multi-disciplinary design teams in making sense of user data for design, we searched for a thinking tool of the social. We dove into social theory, aiming not to develop a new model of the social, but to find a theoretical framework that design teams in practice could use as a thinking tool of the social in analyzing and structuring user experience data.

The paper proceeds in three parts. First, we explain the context of our search and identify search criteria. Second, we review five types of existing frameworks: special effect theories, relational frameworks, catalogues, metaphors, and scaffolds of context. In the third part, we focus on activity theory as having the best fit with design teams' needs, and show how we used it within an empathic design project in industry.

Criteria for Assessing Frameworks for Empathic Design in Practice

Empathic design is a relatively new branch of user-centered design approaches that support design teams in building creative understanding of users and their everyday lives for NPD.⁷ The approach is considered most valuable in the fuzzy front end of NPD, when product opportunities need to be identified and product

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- 8 Koskinen and Battarbee, "Introduction to User Experience and Empathic Design," 37.
- 9 Tuuli Mattelmäki, Design Probes, Doctoral Thesis (Helsinki: University of Art and Design Helsinki, 2006).
- 10 Elizabeth B.-N. Sanders, "Generative tools for codesigning," in *Collaborative Design*, ed. Stephen A. R. Scrivener, Linden J. Ball and Andree Woodstock (London: Springer-Verlag, 2000), 3.
- 11 Froukje Sleeswijk Visser and others, "Contextmapping: Experiences from Practice," *CoDesign* 1:2 (2005): 119-49.
- 12 Marion Buchenau and Jane Fulton Suri, "Experience Prototyping," in *Proceedings of Designing Interactive Systems* (New York: ACM Press, 2000): 424-33.
- 13 Katja Battarbee, Co-experience, Doctoral Thesis (Helsinki: University of Art and Design, 2004); Marc Steen, *The Fragility of Human-Centered Design*, Doctoral Thesis (Delft: Delft University of Technology, 2008).
- 14 Esko Kurvinen, Prototyping Social Action, Doctoral Thesis (Helsinki: University of Art and Design Helsinki, 2007).
- 15 Carolien E. Postma and others, "Doing Empathic Design: Experiences from Industry" (under review, 2011).
- 16 Jane Fulton Suri, "The Experience Evolution: Developments in Design Practice," *The Design Journal* 6:2 (2003): 39-48; Peter Wright and John McCarthy, "Empathy and Experience in HCI," in *Proceedings of Human Factors in Computing Systems* (New York: ACM Press, 2008): 637-46; Froukje Sleeswijk Visser, Remko Van der Lugt and Pieter Jan Stappers, "Sharing User Experiences in the Product Innovation Process: Participatory Design Needs Participatory Communication," *Creativity and Innovation Management* 16:1 (2007): 35-45.
- 17 Postma, Lauche and Stappers, "Dialogues: A Framework for Bridging the Gap Between People Research and Design," 25-34.
- 18 Hugh Beyer and Karen Holtzblatt, *Contextual Design: Defining Customer-centered Systems*. (San Francisco: Morgan Kaufmann, 1998).
- 19 Veesa Jääskö and Tuuli Mattelmäki, "Observing and Probing," in *Proceedings of Designing Pleasurable Products*

concepts developed.⁸ Empathic design uses a variety of methods and techniques, including design probes,⁹ generative techniques,¹⁰ context-mapping,¹¹ and experience prototyping.¹² These methods and techniques are typically design-led (as opposed to research-led) in that they focus on understanding and transforming users' experiences.¹³ The idea is not to find the ultimate truth about people and their environment, but to build an understanding that enables designers to propose possible new futures.¹⁴

Based on a literature review, Postma, Zwartkruis-Pelgrim, Daemen, and Du identified four principles of empathic design:

1. Addressing people's rationality and their emotions in product use in a balanced way by combining observations of people's actions with interpretations of their thoughts, feelings, and dreams.
2. Making empathic inferences about prospective users, their thoughts, feelings, and dreams, and their possible futures of product use.
3. Involving users as partners in NPD, so that researchers and designers can continually develop and check their creative understanding in dialogue with users.
4. Engaging the design team members as multi-disciplinary experts in people research, thus encouraging researchers and designers to join forces in designing and conducting people research to ensure that the users' perspectives are included in NPD.¹⁵

The first two principals have implications for the qualities of the intended thinking tool of the social. The third and fourth principles determine the context in which the thinking tool of the social will be used. In NPD practice, direct interaction between users and all members of a design team is often not feasible. People research is often either outsourced or conducted by experts who may not be part of the design team; or it happens long before a design team is formed. As a result of these approaches, the user experience data need to be conveyed to the design team. The "rich" and "personal"—qualities of user data that are required for building creative understanding—are often lost in this process.¹⁶

A possible solution to sharing rich user data in design research practice is to engage the design team in analyzing and structuring the data after they have been pre-structured and pre-analyzed by the people researchers. By reading, interpreting, and explaining users' stories, team members make the data their own and build creative understanding of users' experiences.¹⁷ To facilitate this process for designers, we searched for a conceptual framework as a thinking tool of the social.

Five criteria formed the starting point of our search. The first criterion was informed by empathic design's objective that understanding users' experiences should drive the development of

Footnote 19 *continued*

and Interfaces (2003), 126-31; Froukje Sleeswijk Visser, Bringing the everyday life of people into design, Doctoral Thesis (Delft: Delft University of Technology, 2009).

- 20 Benjamin B. Bederson and Ben Shneiderman, *The Craft of Information Visualization: Readings and Reflections* (San Francisco): Morgan Kaufmann, 2003); Ben Shneiderman, "Foreword," in *Human-computer Interaction and Management Information Systems: Foundations. Advances in Management Innovation Systems*, Volume 5, ed. Ping Zhang, Ben Shneiderman and Dennis F. Galletta (Armonk): M. E. Sharpe, Inc., 2006), ix.
- 21 Postma, Lauche and Stappers, "Dialogues: A Framework for Bridging the Gap Between People Research and Design," 25-34; Sleeswijk Visser, *Bringing the Everyday Life of People Into Design*.
- 22 Michael A. Hogg and Graham M. Vaughan, *Social Psychology*, fourth edition (London: Pearson Prentice Hall: 2005).
- 23 Ibid.
- 24 Hall (1966) introduced the term "proxemics" to refer to the study of how people unconsciously structure their immediate surroundings. One type of spatial organization is "informal space," or "interpersonal distance." Interpersonal distance is one way people use to establish and maintain a desired level of involvement in social interaction, e.g., in greeting, caressing or conversing. Hall distinguished four distance zones, ranging from very close to the individual to further away: An intimate zone, a personal zone, a social zone, and a public zone. Which zone people adopt depends on the context of the social encounter; the setting, social relationship and environmental conditions. In some situations, people are not able to adopt their preferred social distance, for example, in an elevator or crowded train, which may lead to discomfort. See John R. Aiello, "Human Spatial Behavior," in *Handbook of Environmental Psychology*, ed. Daniel Stokols and Irwin Altman (New York: John Wiley & Sons, 1987), 359; and Robert B. Bechtel, *Environment and behavior: An introduction* (Thousand Oaks): Pearson Prentice Hall, 1997).

people-centered products and services. Sensitizing design teams to the social is not enough, however; designers also need to obtain a sense of how their designs relate to the social in envisioning possible futures of product use and in developing products and services that fit into people's social lives. Therefore, the framework needs to address the social in relation to the materiality of product use.

The second criterion was informed by the constraints of empathic design in NPD practice, in which not every design team member is experienced in people research. Because we potentially want to engage all team members in analyzing and structuring user data, the framework should provide experienced people researchers with (new) perspectives of the social, while also offering designers "handles" for the social. Such "handles" include Beyer & Holtzblatt's work models in the contextual design approach.¹⁸ They provide a limited set of concrete themes or perspectives along which findings from people research can be organized. However, their models fall short as a thinking tool of the social in empathic design because contextual design mainly focuses on examining the rational domain.¹⁹ Moreover, contextual design does not offer a theoretical framework that designers (and researchers) may use as a thinking tool in interpreting and explaining social practices.

Three further criteria were taken from Bederson and Shneiderman's classification of theories and frameworks.²⁰ They identify five categories: (1) descriptive frameworks that identify key concepts; (2) explanatory frameworks that explain relationships and processes; (3) predictive frameworks that help predict performance of people, organizations, or economies; (4) prescriptive frameworks that provide guidelines based on best practice; and (5) generative frameworks that support generating new ideas by providing ways of seeing what is missing and what needs to be done. The thinking tool we propose requires a framework that is descriptive of the social and material, explanatory of relationships and processes, and generative in terms of facilitating the identification of patterns and trends in user data and of opportunities for NPD. The framework also might be prescriptive in that it suggests ways of studying user experience data; however, these ways should not interfere with designers' established practices and cultures to such a degree that they keep designers from using the framework.²¹

Examination of Possible Frameworks

On the basis of the criteria identified, we examined frameworks in the literature and tried out candidate frameworks in NPD projects in industry. We began our search in social psychology and environmental psychology literature and then expanded the search to the human-computer interaction (HCI) and computer-supported cooperative work (CSCW) literature, where social frameworks are commonly used in studying collaborative work. Frameworks that, in terms of the criteria, appeared to be useful as a thinking

Table 1 Overview of the criteria that evolved in the search process.

Group	List of Criteria
	1. The framework needs to address the social in relation to the material;
	2. The framework needs to provide experienced people researchers with (new) perspectives of the social, and offer designers handles to the social in analyzing and structuring user experience data;
Relational frameworks	2.1. The framework needs to provide handles of the social in terms of variables or ingredients that design teams may use as anchor points in reading and interpreting user data;
	3. The framework needs to point out key concepts of the social and material that design teams need to pay attention to in building creative understanding of users' experiences;
Special effect theories	3.1 The framework needs to be holistic in scope to support design teams in building broad understanding of users' experiences in the early phases of NPd;
	4. The framework needs to offer design teams ways of interpreting and explaining user experience data by revealing relationships and processes of the social and material;
	5. The framework needs to facilitate seeing patterns and trends in user data, supporting design teams in generating user insights and identifying opportunities for design.
Metaphors of the social	5.1 The framework needs to support teams in taking user experience data to a higher level of understanding for identifying themes, patterns and trends in the data;
Metaphors of the social	6. The framework needs to offer multiple levels of description and explanation to support analysis of user experience data in different phases of an empathic design process;
Catalogues of the social	7. The framework needs to be generally applicable to support design teams in transforming as well as understanding users' experiences;
Metaphors of the social	8. The framework should allow for use in a half-day session;

Footnote 24 *continued*

Tajfel and Turner (1979) introduced Social Identity Theory, a theory of social change that has been very influential in social psychology. The theory focuses on how social context affects self-concept and social behavior. People describe themselves differently and sometimes also behave differently in different social contexts, for example, in front of colleagues at work, or with family at home. Social identity theorists distinguish two different classes of identity: personal identity and social identity. Personal identity is the individual's self-concept derived from his/her attitudes, memories, behaviors and emotions. Social identity is the individual's self-concept derived from perceived membership of social groups. People have as many personal identities as they have interpersonal relationships that they feel engaged in. And they have as many social identities as groups they feel they belong to. The

tool of the social in empathic design were tried out together with multi-disciplinary design teams in industry. The researchers' and the teams' experiences in applying these frameworks led to new criteria, which in turn focused the search process.

The frameworks included in our study can be categorized into five groups: (1) special effect theories, (2) relational frameworks, (3) catalogues of the social, (4) metaphors of the social, and (5) scaffolds of context. An overview of the groups and our findings in terms of new search criteria is presented in Table 1 and discussed in the following paragraphs. The sequence in which the groups are discussed more or less delineates our search process.

Special Effect Theories

The first category covers special effect theories that highlight one or a few concepts regarding behavior in social or material contexts. We found many of these theories in environmental psychology and in social psychology, ranging from mini-theories, which apply to specific phenomena, to more general theories, which apply to classes of behavior.²² An example of a mini-theory is the Ringelmann effect, which holds that an individual's effort in a task decreases when group size increases.²³ Two examples of more general theories are proxemics and social identity theory.²⁴

- personal or social identity that is most salient at a given time shapes our concept of self and corresponding behavior. See Hogg and Vaughan, *Social Psychology*, fourth edition.
- 25 Benyon, Turner and Turner, "Designing Interactive Systems: People, Activities, Contexts, Technologies."
- 26 Carolien E. Postma and Pieter Jan Stappers (2006), "A Vision on Social Interactions as the Basis for Design," *CoDesign*, 2:3, 139-55.
- 27 Situated action studies the relation between acting individuals and their changing environment. The term "situated action" was first introduced by Lucy Suchman in her book "Plans and Situated Actions" (1987) to stress the emergent, improvisatory character of people's activities. The book is a critical response to the information-processing paradigm, which models people as cognitive systems that pursue action after having set goals and having developed plans. Suchman, taking an ethnomethodological stance, argued that the structure of activity is not planned, but evolves in response to real-world situations that are inherently dynamic. Suchman does recognize the existence of plans, but merely as one of several resources within the situation that may shape an activity. Goals, she argues, are defined in retrospect. Suchman uses the example of canoeing in explaining the idea of Situated Action: "In planning a series of rapids in a canoe, one is very likely to sit above the falls and plan one's descent. (...) But, however detailed, the plan stops short of the actual business of getting your canoe through the falls. When it really comes down to the details of responding to currents and handling a canoe, you effectively abandon the plan and fall back on whatever embodied skills are available to you." See Lucy A. Suchman, *Plans and situated actions: The problem of human machine communication* (New York: Cambridge University Press, 1987); and Bonnie Nardi, "Studying Context: A Comparison of Activity Theory, Situated Action Models and Distributed Cognition," *Context and Consciousness: Activity Theory and human-computer interaction*, ed. Bonnie A. Nardi (Cambridge: MIT Press, 1996), 69.

In HCI and design, special effect theories have been successfully used to envision how products and services might affect social practices and to confirm findings from people research.²⁵ In a design project about teens' cliques, for example, the people researchers consulted literature about group structures to determine whether they had overlooked roles in teens' cliques.²⁶ In a project about baby care, the people researchers used literature about parenting styles to develop criteria for segmentation of families. However, we found that special effects theories were not particularly helpful thinking tools of the social in developing a broad understanding of users' experiences as a starting point for identifying opportunities for product and service development, because they only address part of human behavior in context. This finding led to a new search criterion: *The framework should be holistic in scope to support design teams in building broad understanding of users' experiences in the early phases of NPd* (criterion 3.1).

Relational Frameworks

Relational frameworks describe the nature of the relationships between people and their environment. They are generic frameworks in the sense of conceptual approaches or theoretical perspectives. Three examples of relational frameworks are situated action,²⁷ behavior settings theory,²⁸ and Gibson's theory of affordances.²⁹ In addition, actor network theory and Battarbee & Koskinen's framework of co-experience may be seen as falling into this category.³⁰

For social scientists, relational frameworks have provided new perspectives on studying and interpreting human behavior. Stressing the improvisational nature of human action, situated action invited researchers to study the moment-by-moment organization of an activity in real settings. Behavior settings theory introduced the idea of environmental units that direct human behavior and prompted researchers to identify and study relations between extra-individual patterns of behavior and settings that are specified in time and place. The concept of affordances provided a lens to look at relations between properties of an environment and individuals' history, abilities, and intentions.

For designers, however, these relational frameworks are generally more difficult to apply because they typically do not offer "handles" of the social. They provide only very limited guidance as to what aspects of behavior and environment should be considered in studying social phenomena because the frameworks do not specify variables or ingredients of the social. That designers seek this guidance is nicely illustrated by the shift of meaning of Gibson's concept of affordances in HCI and design, where an operational redefinition has evolved that sees affordances as "opportunities for action suggested by an object," which is far removed from its original meaning. We therefore concluded that *the thinking tool of*

- 28 Behavior Settings theory focuses on the relationship between extra-individual behavior and environmental units. From detailed field observations Barker (1968) found that human behavior is not randomly distributed across time and space; “the inhabitants of identical ecological units exhibit a characteristic overall extra-individual pattern of behavior,” he argued (Barker, 1968). In a school class, for example, teacher and students behave “school class.” In the supermarket people, including the teacher of the school class, behave “supermarket.” And during a meeting of the teachers of the school, the teachers behave “staff meeting.” Barker called the physical-behavioral units “behavior settings.” Behavior settings are “stable, extra-individual units with great coercive power over the behavior that occurs within them.” See Roger G. Barker, *Ecological Psychology: Concepts and methods for studying the environment of human behavior* (Stanford: Stanford University Press, 1968).
- 29 Gibson proposed an ecological approach to perception. In his book *The Ecological Approach to Perception* (1979), he described a new paradigm for understanding human activity in context, focusing not on the actor and (part of) his/her environment as independent things, but rather on the relations between actor and environment. He introduced the term “affordances” to mean the full set of potential actions that an environment holds in store for a particular actor. For example, a ladder affords an adult to climb up and down, but it does not afford a baby to climb up and down. Information about affordances is available to the actor’s senses. The actor’s attunement to particular affordances is determined by his/her needs and intentions, personal history and context. See James J. Gibson, *The ecological approach to visual perception* (Boston: Houghton Mifflin, 1979); and Gerda Smets, Vormleer: De paradox van de vorm (Amsterdam: Uitgeverij Bert Bakker, 1986). Several people have elaborated on Gibson’s concept of affordances for understanding the social. Gaver, for example, introduced the term “Affordances for Sociality” to

the social should provide “handles” of the social, which are the variables or ingredients that design teams may use as anchors in reading and interpreting user data (criterion 2.1).

Catalogues of the Social

“Catalogues” in this case means the maps of people’s behavior in their social and material contexts. Such maps often are developed on the basis of personal experience and/or empirical research. Seminal work in this regard is the concept of pattern language proposed by Alexander, Ishikawa, and Silverstein.³¹ The book offers a typology of solutions that architects might incorporate in the development of towns and buildings. The typology is presented as a system of patterns that describe relationships between people and their surroundings and that were developed based on years of experience with building and planning. Each pattern, in essence, reports a problem, the context in which the problem occurs, and a solution to the problem. For example, in the context of designing a family home, Alexander et al. suggest that architects may address the problem of creating quiet and private spaces for parents by designing the family home in such a way that the continuum of spaces where children live and play does not include the parents’ realm.³²

In HCI and CSCW, social scientists have seized the idea of a pattern language as a way to structure and document ethnographic field data and to produce guidelines for design that transcend the particularities of the data, but that are still grounded in the real world.³³ Crabtree, Hemmings, and Rodden, for example, have developed a framework for identifying patterns of social action and technology use in domestic settings.³⁴ Martin, Rodden, Rouncefield, Summerville, and Viller have used patterns from ethnographic user research to inform the development of computer systems.³⁵

For our goal of developing patterns for considering the social in empathic design, we had neither decades of experience from practice nor extensive field data to rely on. In addition, because patterns are context-specific, they might not be helpful in envisioning radically new situations of product and service use in empathic design. A framework for the social in empathic design needs to be generally applicable to various situations of product and service use, including situations that do not yet exist.

A possible solution to both issues is to take a “top-down” approach, rather than a “bottom-up” approach in developing patterns. Kelley, Holmes, Kerr, Reis, Rusbult, and Van Lange’s “An atlas of interpersonal situations” is a good example of a pattern language that was developed using a top-down approach.³⁶ They developed patterns by describing and analyzing common social situations using one theoretical framework: interdependence theory. The resulting atlas presents both the framework and the patterns. Kelley et al.’s atlas does not address the social in relation to the material, but the idea of combining both a framework and patterns

Footnote 29 *continued*

refer to the possibilities offered by the physical environment for social activity. An example of affordance of sociality is the table setting presented in figure 1. See Gaver, "Affordances for Interaction: The Social is Material for Design," 111-29. Valenti and Good used Gibson's ecological approach to perception as a framework for studying social interaction. They introduced the term "Social Affordances," meaning the possibilities for action that people offer one another, and the role of other people in pointing out new affordances. People may, for example, afford one another comforting, fighting, or play. See Stavros S. Valenti and James M. M. Good, "Social Affordances and Interaction I: Introduction," *Ecological Psychology* 3:2 (1991): 77-98.

- 30 Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (Oxford: Oxford University Press, 2005); Katja Battarbee and Ilpo Koskinen, "Co-experience: User experience as interaction," *CoDesign* 1:1 (2005): 5-18.
- 31 Christopher Alexander, Sara Ishikawa and Murray Silverstein, *A Pattern Language* (New York: Oxford University Press, 1977).
- 32 Ibid.
- 33 John Hughes and others, "Patterns of Home Life: Informing Design for Domestic Environments," *Personal and Ubiquitous Computing* 4:1 (2000): 25-38.
- 34 Andy Crabtree, Terry Hemmings and Tom Rodden, "Pattern-based Support for Interactive Design in Domestic Settings," in *Proceedings of the 4th Conference on Designing Interactive Systems* (New York: ACM Press, 2002): 265-76.
- 35 David Martin and others, "Finding patterns in the fieldwork," in *Proceedings of the 7th Conference on European Conference on Computer Supported Cooperative Work* (Norwell: Kluwer Academic Publishers, 2001), 39-58; David Martin and others, "Patterns of Interaction: A Pattern Language for CSCW," www.comp.lancs.ac.uk/research/projects (accessed August 4, 2010).
- 36 Harold H. Kelley and others, *An atlas of interpersonal situations* (Cambridge UK: Cambridge University Press, 2003).

is interesting because it provides both the perspectives and the handles to the social that we are looking for: It offers a thinking tool of the social that enables design teams to envision radically new situations of product and service use that go beyond the scope of the context-specific patterns, as well as concrete examples of the social in terms of patterns that help design teams think about the framework. Such patterns could be developed once a suitable framework has been found.

As a new search criterion, we conclude that *the framework needs to be generally applicable to support design teams in both understanding and transforming users' experiences* (criterion 7).

Metaphors of the Social: The Theatrical Metaphor

The third category is metaphors. Metaphors are used for understanding one concept in terms of another. In the field of design, two important uses of metaphor may be distinguished: (1) metaphor as an expressive tool,³⁷ of which the desktop metaphor in computing is a well-known example; and (2) metaphor as a generative instrument, which means transferring the structure of one concept to the other to develop new ways of seeing both concepts.³⁸

The latter sense of metaphorical thinking is also used in social sciences in interpreting and explaining social phenomena. Taylor and Harper, for example, used Mauss's metaphor of gift-giving to interpret their observations of teenagers' text messaging practices.³⁹ Other examples of metaphors used as generative instruments in social sciences are game metaphors, such as the prisoner's dilemma and the theatrical metaphor.⁴⁰ For us, Goffman's use of the theatrical metaphor is of particular interest.

Goffman, a sociologist and important contributor to symbolic interactionism, is renowned for his dramaturgical analysis of social encounters.⁴¹ In "The presentation of Self in everyday life," he used the theatrical metaphor as a framework in analyzing and explaining the structure of social encounters, viewing the world as a stage, people as actors, and social interaction as drama.⁴² The metaphor prompts questions such as: Who is the performer, and who is the audience? What is front stage, and what is back stage? What does the décor look, hear, smell, and feel like? What are the plot outline and the run time of the performance? Which tools of expression are used in the performance, and for which goal? What are the (social) roles of the performers? What are the performers' motivations, emotions, beliefs, and attitudes in relation to the performance? How are the performers' behaviors on stage different from their behaviors backstage?

Examining metaphors on the basis of literature suggests that Goffman's framework would be an excellent thinking tool of the social for empathic design: The framework is holistic in scope; identifies key concepts and ingredients of the social and material (e.g., "front stage-back stage" and "tools of expression"); and

Figure 2

In a user insights session about social presence, Goffman's theatrical metaphor was used to structure observations and findings from people research. The metaphor raised interesting discussions about the scope of the project. But did not support the design team in building broad understanding of users' experiences of social presence, as the designers' observations and findings from people research did not deliver the kind of detail required by the metaphor.



- 37 Thomas J. L. Van Rompay, *Expressions: Embodiment in the Experience of Design*, Doctoral Thesis (Delft: Delft University of Technology, 2005).
- 38 Donald A. Schön, D. A., *Displacement of Concepts* (London: Tavistock Publications, 1963); Herman P. Casakin, "Assessing the Use of Metaphors in the Design Process," *Environment and Planning B: Planning and Design* 33:2 (2006): 253-68.
- 39 Taylor and Harper, "The Gift of the Gab?: A Design-oriented Sociology of Young People's Use of Mobiles," 267.
- 40 Daniel Rigney, *The Metaphorical Society: An Invitation to Social Theory* (Landham: Rowman & Littlefield Publishers, Inc., 2001).
- 41 Joel M. Charon, *Symbolic Interactionism: An introduction, an interpretation, an integration*, eight edition (Englewood Cliffs): Pearson Prentice Hall, 2004).
- 42 Erving Goffman is considered to be an important contributor to Social Interactionism, a major sociological perspective that focuses on the process of meaning making in social interaction. In "The presentation of Self in everyday life," Goffman uses the metaphor of theatrical performance as a framework in explaining and analyzing the structure of social encounters between people. He views the world as a stage, people as actors and social interaction as drama. "The world is not, of course, a stage, but the crucial ways in which it isn't are not easy to specify," Goffman (1959) maintains. Key factor in this structure, Goffman argues, is the process of developing and maintaining a shared understanding of a situation, including Self (i.e., impression management). "Each person in everyday social intercourse

reveals relationships and processes (e.g., "performance" and "script"). It is already widely used as generative instrument in social sciences, and we thought it might be used as generative instrument in design thinking as well. However, when we tried out the metaphor as thinking tool of the social in projects in industry, we found otherwise.

We applied the theatrical metaphor as thinking tool of the social in user insight sessions in three different NPD projects in industry. The aim of the sessions was to build creative understanding of users' experiences as a starting point for developing opportunities for design. In the first project, the team members used the metaphor to structure their observations and findings from people research (see Figure 2). In the second project, the team members used the metaphor in reviewing their interpretations of user experience data. In the third project, the team used the metaphor in developing scenarios based on their analysis of user experience data.

Our experience with the theatrical metaphor as thinking tool showed that it raised interesting discussions of the social, but it was not a helpful thinking tool in the early, exploratory phases of NPD. Three important findings from the cases informed our further search: First, the metaphor did not support broad exploration of users' needs and contexts. The NPD teams were concerned with drawing the big picture, which contains many performances, before choosing a particular focus for their projects. However, the theatrical metaphor already required the teams to focus on one specific performance or action in the user data and to analyze this performance in detail, leaving off the radar other potentially interesting parts of the user data.

Second, the metaphor did not support the need to identify patterns and trends in the data. The teams needed to develop a higher-level, a more general understanding of the user data to generate user insights and develop opportunities for design. But the theatrical metaphor led the teams to delve into the complexity of the social within the boundaries of one case.

presents himself and his activity to others, attempts to guide and control the impressions they form of him, and employs certain techniques in order to sustain his performance, just as an actor presents a character to an audience,” he explains. See Erving Goffman, *The presentation of Self in everyday life* (New York: Anchor Books Doubleday, 1959); and Joel M. Charon, *Symbolic Interactionism: An introduction, an interpretation, an integration*, eighth edition (Englewood Cliffs: Pearson Prentice Hall, 2004). Important concepts of the metaphor include:

- Performance – In their performance, the performers consciously or unconsciously project their roles and their definition of the situation to the audience. The audience observes the performance and makes inferences about the performers (e.g., their motives, emotions, beliefs, attitudes) and the performers’ definition of the situation. The roles of performer and audience may switch continuously.
- Location – Front stage is where the performance takes place and both performers and audience are present. Back stage is where the performers are present, but the audience is not. Here the performers can relax and behave out of character. The waiter of a restaurant (i.e., performer), for example, may be very polite and charming in front of the customer who complains about the food (i.e., audience). But once back in the kitchen (i.e., back stage), the waiter and his colleague may imitate the customer and make fun of him. Note that the back stage in one performance could be the front stage in another performance. In the example, the waiter and his colleague in the kitchen also perform in front of each other.
- Script – Prescribes the performance: What happens to whom, when, where, how and why? How is tension built up? When does the scenery change?
- Tools of expression – Vehicles for conveying signs that the performers, either or not consciously, use in their performance. There are three types of tools: appearance tools, e.g., clothing, posture, age; behavior tools, e.g., facial expressions, attitude and gestures;

Third, the theatrical metaphor required too much time to understand and apply in the context of a user insights session. The team members of the third project indicated that they preferred not to use the metaphor because they thought it was too difficult to grasp within the time frame of an insights session. Similarly, in the first project, the metaphor often put team members out of their depth in a way that paralyzed the creative process. Three new criteria were drawn from these findings:

- *The framework needs to offer multiple levels of description and explanation to support analysis of user experience data in different phases of an empathic design process* (criterion 6).
- *The framework should support teams in taking user experience data to a higher level of understanding for identifying themes, patterns, and trends in the data* (criterion 5.1).
- *The framework should be applicable within a limited time, such as a half-day session* (criterion 8).

Scaffolds of Context: Activity Theory

Our search concluded with activity theory (AT). AT is a framework for describing and explaining the structure, development, and social-cultural context of people’s activities. The framework points out concepts of the social and the material that we need to take into account in developing an understanding of the what, how, and why of people’s behavior in their social-cultural context.⁴³ It spurs questions such as: What is the activity? Who are the people involved in the activity? Why do they do the activity (i.e., what is their objective)? What actions and operations do they do in pursuing the objective? What tools do the people use in achieving the objective? How do these tools mediate their activity? What roles do the people have in pursuing the objective? How do the people work together in the activity; what are their rules, norms, and procedures? How does the activity develop over time?

Activity Theory in a Nutshell

Although called a theory, AT is best described as paradigm of human activity.⁴⁴ AT has its roots in early twentieth century Russia, where its first foundations were laid by Lev Vygotsky in developing his cultural-historical psychology.⁴⁵ AT was further developed into a conceptual framework by his colleague, Alexei Leont’ev.⁴⁶ Only in the early 1980s, after seminal work on AT had been published in English, did the conceptual framework become known internationally. In 1987, Yrjö Engeström presented a framework of human activity in a social-cultural context that builds on Leont’ev’s AT.⁴⁷

Two fundamental ideas lie at the heart of AT: (1) “Unity of consciousness and activity,” which is the idea that the human mind can only be understood in the context of people’s interaction with

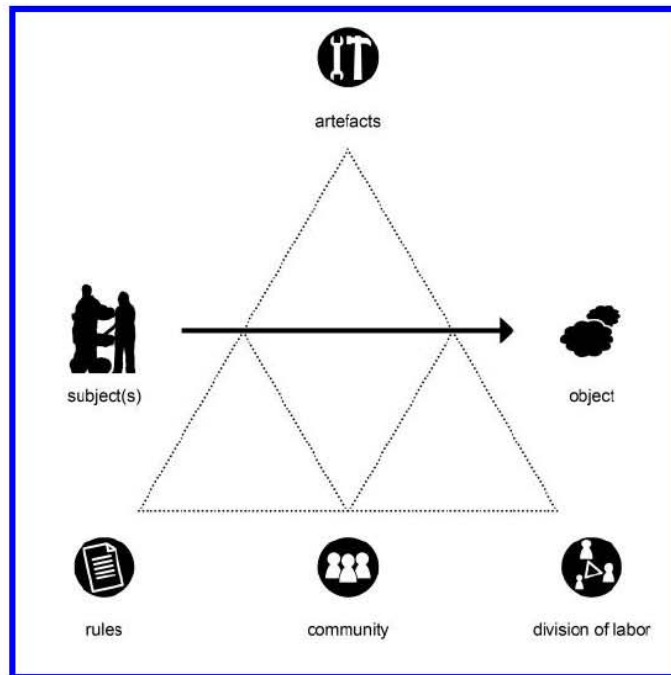
Figure 3
Engeström's model of an activity system
(adapted from Yrjö Engeström, "Expansive
Learning at Work: Toward an activity theoreti-
cal reconceptualization," 133-56.)

Footnote 42 *continued*

and setting tools, e.g., stage props,
physical lay-out and scenery.

- Social role— Each performer has a particular social role, e.g., the role of "father," "manager," or "teacher." Social roles involve one or more parts, or "routines." A part is a pre-established pattern of action that is unfolded during a performance. The performer may play the same part on different occasions.

- 43 Kari Kuutti, "Activity Theory as a potential framework for human-computer interaction research," in *Context and Consciousness: Activity Theory and human-computer interaction*, Bonnie A. Nardi (Cambridge: MIT Press, 1996), 17.
- 44 Benyon, Turner and Turner, "Designing Interactive Systems: People, Activities, Contexts, Technologies."
- 45 Lev S. Vygotsky, *Thought and Language* (Cambridge: MIT Press, 1962).
- 46 Aleksie N. Leont'ev, *Activity, Consciousness, and Personality* (Englewood Cliffs: Prentice-Hall, 1978).
- 47 Yrjö Engeström, *Learning by Expanding: An Activity-Theoretical Approach to Developmental Research*, (Helsinki: Orienta-Konsultit, 1987); Yrjö Engeström, "Expansive Learning at Work: Toward an Activity Theoretical Reconceptualization," *Journal of Education and Work* 14:1 (2001): 133-56; Victor Kaptelinin and Bonnie Nardi, *Acting with Technology* (Cambridge: MIT Press, 2006); Kari Kuutti, "Artifacts, activities, and design knowledge," in *Design Integrations: Research and Collaboration*, ed. Sharon Poggenpohl and Keiichi Sato (Chicago: Intellect Ltd., 2009), 67.
- 48 Kaptelinin and Nardi, *Acting with Technology*; Victor Kaptelinin, Bonnie Nardi and Catriona Macaulay, "The Activity Checklist: A Tool for Representing the 'Space' of Context," *Interactions* 6:4 (1999): 27-39.



the world; and (2) "social nature of the human mind," which means that human interaction, or "activity," is situated in and shaped by social and cultural context.⁴³ AT thus transcends dichotomies between mind and world and between individual and social.

Figure 3 shows Engeström's model of an activity system.⁴⁹ The activity system is the basic unit of analysis in AT. The model includes six components: subject (an individual or group), object (or objective), mediating artifacts, rules, community, and division of labor. The upper half of the triangle basically represents the material context of an activity and the lower half the social context. The horizontal arrow in the center of the model symbolizes human activity. The activity system is framed by five basic concepts: object-orientedness, activity hierarchy, internalization and externalization, mediation, and historicity and development. The concepts each address one part of the activity system. AT argues that all five concepts need to be considered in developing understanding of an activity system. We use the example of baby care to explain the five concepts in greater depth. In this example, the subjects (i.e., the people engaged in the activity) are first-time parents Mark and Laura, and the activity is caring for their baby, Roos.

The first concept is *object-orientedness*. Human activity is always directed toward an "object." Objects motivate and direct activities; they appeal to the subjects' needs and desires. Originating from its German and Russian roots, the term "object" incorporates two meanings—namely the (physical) object one is seeking to

transform in the activity (e.g., the stone that a sculptor is shaping) and the objective that one is aiming to achieve (e.g., the sculpture that the artist has in mind while shaping it).⁵⁰ Mark and Laura's object of baby care is a healthy and happy baby Roos. Mark and Laura's community of baby care includes their parents, their close friends Bram and Marije, the daycare center, and the child health center. The concept of object-orientedness helps us to develop understanding of the ultimate "why" of their actions in caring for baby Roos.

Note that from an AT perspective, exploratory design research should not be about uncovering people's latent needs, but about following objects that motivate people's activities. This perspective may shed a different light on the development of tools and techniques that are frequently used in empathic design, such as design probes,⁵¹ generative techniques,⁵² and experience prototyping.⁵³

The second concept is *activity hierarchy*. An activity can be deconstructed into actions and lower-level operations. Actions (similar to "tasks" in HCI) are directed toward goals (e.g., constructing a sentence to convey a message). Actions and goals are conscious. Operations, meanwhile, are routinized or automated behavioral routines and are typically unconscious (e.g., typing, or switching gears when driving). Caring for baby Roos involves both actions and operations, including singing a lullaby, changing her diapers, taking her to the health center, and getting up at night to feed her.

The levels of an activity are not fixed. Actions may become automatic operations, and operations may become conscious actions. In the case of Mark and Laura, for example, changing diapers used to be a conscious action, but then it gradually turned into a routine operation with practice. At one point, the operation of changing diapers had become a conscious action again when Mark had mistakenly bought diapers that are fastened in a different way.

The third concept is *internalization and externalization*. AT distinguishes between internal, mental activities and external activities and argues that one cannot be understood without the other because they transform and influence one another.⁵⁴ External activities become internalized when people learn to do an activity in the head without using any physical aids. To illustrate, Mark and Laura initially needed to figure out what made Roos cry. After a few weeks, they started to recognize and distinguish her cries and immediately knew what action to take. Internal activities are externalized when an activity is too difficult to do without physical aids, when the activity does not turn out right, or when people need to coordinate the activities in working together. For example, Roos was ill and wouldn't stop crying, despite all efforts to comfort her.

49 Engeström, "Expansive Learning at Work: Toward an Activity Theoretical Reconceptualization," 133.

50 Victor Kaptelinin, "The Object of Activity: Making Sense of the Sense-Maker," *Mind, Culture and Activity* 12:1 (2005): 4-8; Yrjö Engeström and Frank Blackler, "On the Life of the Object," *Organization* 12:3 (2005): 307-30.

51 Mattelmäki, *Design Probes*, Doctoral Thesis.

52 Sanders, "Generative tools for codesigning," 3-12.

53 Buchenau and Fulton Suri, "Experience Prototyping," 424-33.

54 Vygotsky, *Thought and Language*.

- 55 Kaptelinin and Nardi, *Acting with Technology* 2006; Kaptelinin, Nardi and Macaulay, "The Activity Checklist: A tool for representing the 'space' of context," 27-39; Kuutti, "Activity Theory as a potential framework for human-computer interaction research," 17; Engeström, "Expansive Learning at Work: Toward an Activity Theoretical Reconceptualization," 133-56; Nardi, "Studying Context: A Comparison of Activity Theory, Situated Action Models and Distributed Cognition," 69-102.
- 56 Susanne Bødker, "Applying Activity Theory to Video Analysis: How to Make Sense of Video Data in Human-computer Interaction," in *Context and Consciousness: Activity Theory and Human-computer Interaction*, ed. Bonnie A. Nardi (Cambridge: MIT Press, 1996), 147; Kuutti, "Activity Theory as a Potential Framework for Human-computer Interaction Research," 17; Bonnie Nardi, "Activity Theory and Human-computer Interaction Research," in *Context and Consciousness: Activity Theory and human-computer interaction*, ed. Bonnie A. Nardi (Cambridge: MIT Press, 1996), 7.
- 57 Examples are: Patricia Collins, Shilpa Shukla and David Redmiles, "Activity Theory and System Design: A View From the Trenches," *Computer Supported Cooperative Work* 11:1 (2002): 55-80; Morten Fjeld and others, "Physical and Virtual Tools: Activity Theory Applied to the Design of Groupware," *Computer Supported Cooperative Work* 11 (2002): 153-80; and Kristina Lauche, "Collaboration Among Designers: Analysing an activity for system development," *Computer Supported Cooperative Work* 14 (2005): 253-82.
- 58 For example: Mervi Hasu, *Critical Transition from Developers to Users*, Doctoral Thesis (Helsinki: University of Helsinki, Department of Education, Center for Activity Theory and Developmental Work Research, 2001); and Sampsa Hyysalo, *Uses of innovation: Wristcare in the practices of engineers and elderly*, Doctoral Thesis (Helsinki: University of Helsinki, Faculty of Behavioral Sciences, 2004).

At first, Mark and Laura did not understand what was wrong; they again needed to figure out why Roos was crying and what action to take.

The fourth concept is *mediation*. People's activities are mediated by artifacts, the division of labor, and rules. All three form more durable structures that persist across activities, time, and place. The durable structures shape activities and at the same time are developed and transformed in activities. They reflect the experiences of others who have pursued similar objectives or goals. Artifacts, or "tools," are thinking tools as well as physical tools that the subject uses in pursuing his/her object. Mark and Laura's tools of baby care include a comforting lullaby, Roos' bedroom, her favorite teddy bear, and a playpen. Rules refer to implicit and explicit norms and conventions that govern the relationship between the subjects and their community. For example, the child health care center, which is part of Mark and Laura's community of baby care, advised Mark and Laura to build up a strict day routine for the baby that follows a sequence of four actions: feeding, playing, sleeping, and taking time for yourself. Mark and Laura are now trying to develop and adhere to such a routine. Division of labor is the organization of the subjects and their community in terms of roles and responsibilities. Laura usually brings Roos to bed. She tries to establish a bedtime routine by feeding Roos upstairs just before bedtime. Mark thinks it is too much trouble to feed Roos upstairs, so he leaves this up to Laura. In the meantime he does some household activities.

The fifth concept is *historicity and development*. Activities change and develop over long periods of time, and understanding an activity requires tracing how the activity has developed in the past. Contradictions (or tensions) within or between activity systems are sources of change and development.⁵⁵ In Mark and Laura's case, a contradiction between subjects and community led to a change of action: Mark and Laura changed Roos' sleeping routine after friends pointed out that Roos may get used to sleeping in her parents' bedroom and may not learn to sleep on her own.

AT as Thinking Tool of the Social for Empathic Design

Prominent researchers in HCI and CSCW, including Suzanne Bødker, Kari Kuutti, Victor Kaptelinin, and Bonnie Nardi, have propagated AT as a framework for HCI research and interaction design.⁵⁶ AT has been used in a number of cases to analyze ethnographic data and formulate design requirements for social computing.⁵⁷ Some colleagues of Engeström have also used AT to study design practice and the effect of products on people.⁵⁸ In both design research and design practice, however, AT is still relatively unknown. Yet our examination of the literature suggests that AT could be a very powerful thinking tool of the social for doing empathic design in NPD practice:

- AT addresses the social in relation to the material (criterion 1). Unlike most theories in psychology, the framework accounts for artifacts. And unlike many approaches in the human factors discipline, the framework addresses social practice, as well as individual behavior.⁵⁹ Using AT could therefore help design teams to get a sense of how the products they design relate to people's social practices.
- The framework identifies components of the social and the material (e.g., division of labor and rules) that design teams can use as anchors in reading and interpreting user experience data (criterion 2.1). As studies in HCI and CSCW have demonstrated, AT also provides experienced people researchers with (new) perspectives of the social in analyzing and structuring user data (criterion 2).⁶⁰
- AT provides a comprehensive framework that emphasizes key concepts of the social and the material that design teams need to pay attention to in structuring and analyzing user experience data (e.g., mediation and object-orientedness) (criteria 3 and 3.1).
- The framework offers design teams ways of interpreting and explaining user experience data by revealing relationships and processes, such as the dynamic levels of an activity, historicity and development, and internalization and externalization (criterion 4).
- AT supports design teams' efforts to take user experience data to a higher level of understanding and to identify themes, patterns, and trends in the data. The idea of contradictions can also help to identify opportunities for product and service design (criteria 5 and 5.1).
- AT offers three levels of description and explanation (i.e., activity level, action level, operation level), supporting design teams in building broad understanding of users' experiences in the early phases of NPD, as well as more in-depth understanding in later phases of NPD (criterion 6).
- Design teams can apply AT in building creative understanding of various activities and contexts, including future situations of product and service use (criterion 7).

The only criterion that AT does not meet is that of allowing for use under the time constraint of a half-day session (criterion 8). AT is often considered hard to learn and difficult to put into practice.⁶¹ Given this reputation, we cannot expect design teams in practice to understand and use AT in a way that social scientists do. Thus, the framework needs to be translated into more intuitive ways of building creative understanding of users' experiences for design. In the next section, we present an example of how we applied AT in an NPD project.

59 Frank Blackler, "Knowledge, Work and Organizations: An Overview and Interpretation," *Organization Studies* 16:6 (1995): 1021-46; Yrjö Engeström, "Activity theory as a framework for analyzing and redesigning work," *Ergonomics* 43:7 (2000): 960-74.

60 Examples are: Bødker, "Applying Activity Theory to Video Analysis: How to Make Sense of Video Data in Human-computer Interaction," 147-74; Collins, Shukla and Redmiles, "Activity Theory and System Design: A View From the Trenches," 55-80; and Phil Turner, Susan Turner and Julie Horton, "From Description to Requirements: An Activity Theoretic Perspective," *Proceedings of the International ACM SIGGROUP Conference on Supporting Group Work* (New York: ACM Press, 1999), 286-95.

61 Nardi, "Activity Theory and Human-computer Interaction Research," 7; Benyon, Turner and Turner, "Designing Interactive Systems: People, Activities, Contexts, Technologies."

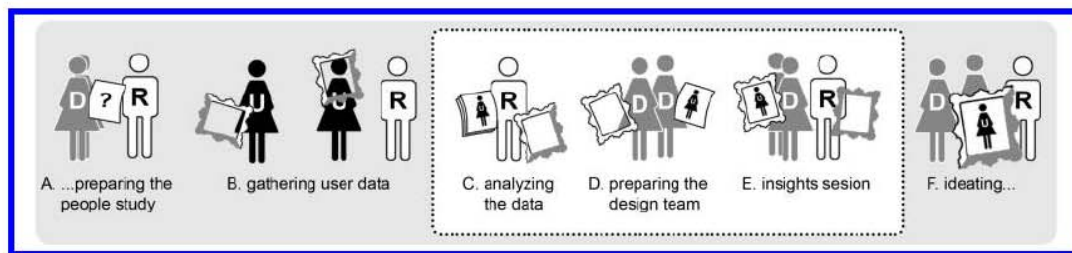


Figure 4

The empathic design process that we followed in the baby care project. The people researcher (puppet marked by "R") gathered user experience data in dialogues with parents (U) during the first half of the process. In the second half of the process the people researchers analyzed and structured the user data. The people researchers facilitated the process with the help of representations (frames), such as probes, generative tools and preparation kits.

Activity Theory as a Thinking Tool of the Social in an NPD Project

We translated and applied AT as a thinking tool of the social in an NPD project focused on baby care. Undertaken at Philips Research Europe, the project was intended to develop new technologies and product concepts for baby care, based on rich understanding of the lives of parents with babies. The design team consisted of six experienced designers with backgrounds in electrical engineering, computer science, psychology, and industrial design. The first author of this paper and one team member participated in the role of people researcher.

Figure 4 presents an outline of the empathic design process that we followed in the baby care project. The next subsection describes phases C (i.e., analyzing the data), D (i.e., preparing the design team), and E (i.e., insights session) of the process. In these phases, AT was used in building creative understanding of parents and baby care.⁶²

Use of Activity Theory in the Baby Care Project

In the analysis phase (phase C in Figure 4), we (i.e., the people researchers) used AT as a thinking tool in structuring and analyzing user data. Initially we had followed an affinity diagramming approach in structuring and interpreting the user data: We annotated the data with observations and comments, put the annotated data on cards, and grouped the cards to identify themes.⁶³ When groupings started to overlap in multiple ways, we decided to use the AT framework instead.

First, we formulated high-level activities (e.g., establishing a routine for the baby) and lower level actions (e.g., getting the baby to sleep) on the basis of the previous groupings. Then, we developed models of the activity and actions for each family by sorting the annotated data using Engeström's model of an activity system, as shown in Figure 5.⁶⁴ Patterns and contradictions were identified within and between activity systems. Finally, a preliminary typology of families was developed based on the parents' rules of baby care (i.e., "parenting styles"). Theories of parenting styles helped us to further specify the criteria for segmentation.

62 For a description of the whole empathic design process, see Postma, Lauche and Stappers, "Dialogues: A Framework for Bridging the Gap Between People Research and Design," 25.

63 Nandini P. Nayak, Debbie Mrazek and David R. Smith, "Analyzing and Communicating Usability Data: Now That You Have the Data What Do You Do?," *ACM SIGCHI Bulletin* 27:1 (1994): 22-30; Karen Holtzblatt, Jessamyn Burns Wendell and Shelley Wood, *Rapid Contextual Design: A How-to Guide to Key Techniques to User-centered Design* (San Francisco: Morgan Kaufmann, 2005).

64 Yrjö Engeström, *Learning by Expanding: An Activity-Theoretical Approach to Developmental Research*.

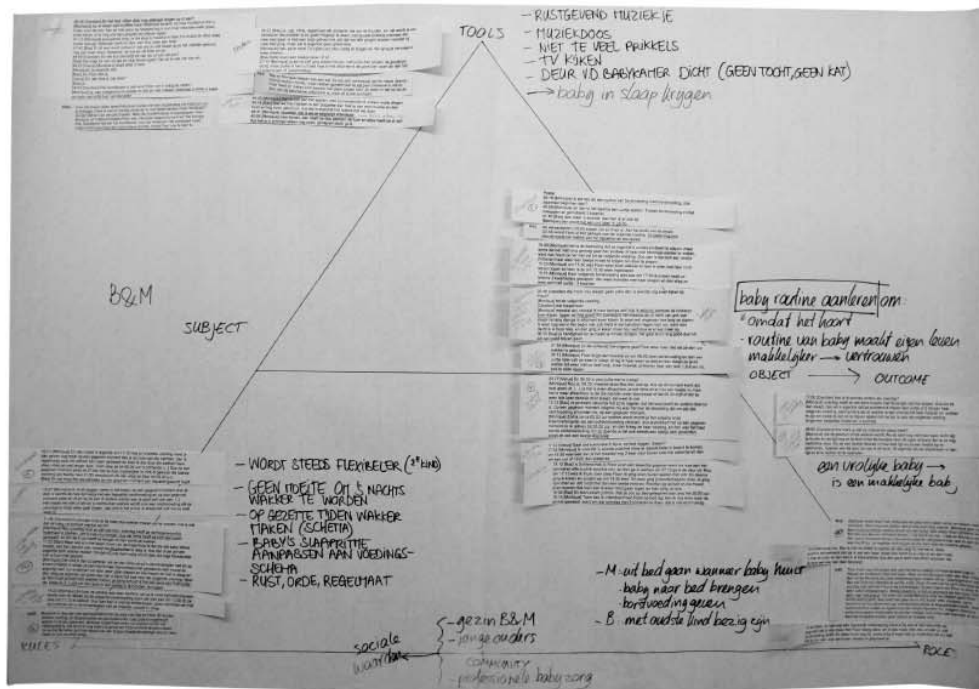


Figure 5
The people researchers developed models of the parents' activity and actions by sorting the annotated user data using Engeström's model of an activity system (Figure 3).

Figure 6
The people researchers developed preparation kits for sharing the user experience data with the design team (left). The designers worked on the preparation kits individually, and then participated in a joint insights session in which they shared their observations and findings from working on the kits (center), and created maps of parents' current situations on posters (right).

In the communication phase (phases D and E), we used the AT framework as a thinking tool for sharing the user data with the designers, who in turn implicitly used the framework in reading and interpreting the user data. We developed three different preparation kits for sharing the user data with the design team. Each kit reflected one parenting style (see Figure 6). The kits contained small chunks of raw data (i.e., quotes, photos, and audio fragments), our initial research findings, and five exercises. Yellow cards invited the designers to collect their observations and findings from working on the preparation kits.

AT was incorporated into the preparation kit in three ways: (1) by composing a set of raw data that covered all components of the activity systems; (2) by adding preliminary findings that hinted at patterns and contradictions within and between the activity systems (e.g., "Nadia and Friso have different opinions about baby care" or "Jolanda only puts baby Eric to bed when he's tired"); and



(3) by developing exercises that addressed concepts and components of the activity system. For example, in one exercise about mediation, the designers were asked to compare the things (or “artifacts”) that used to help them fall asleep when they were young with the things that helped the baby fall asleep. Each of the five exercises in the kit addressed different concepts and components of AT.

The designers worked on the preparation kits individually for five days (phase D). A week later, the team members participated in a collective insights session aimed at developing shared understanding of baby care as a starting point for identifying opportunities for technology and concept development. During the session, the designers first discussed their observations and findings from working on the preparation kits. Then they created maps of parents’ current situations by structuring their observations and findings on posters, and labeling groups of findings with themes. Finally, they used the maps in generating ideas about possible futures of baby care.

Findings from Using Activity Theory in the Baby Care Project

Trying out AT as a thinking tool of the social in the baby care project revealed four important findings. In this section, we discuss these findings and the implications for future projects.

Finding 1 – AT gave the designers, as well as the people researchers, a platform for structuring, discussing, and sharing the rich user experience data. In the analysis phase, using AT as a thinking tool in structuring and analyzing the user data did not lead to many new or different insights from the affinity diagramming approach. However, we in the people researcher role felt that the framework greatly enhanced the analysis process. We identified three advantages of using AT: First, the basic concepts of the framework provided fresh perspectives on how the data could be structured and interpreted. For example, the concept of activity hierarchy raised questions of where baby care and the actions involved in it begin and end. The concept of object-orientedness required considering the parents’ long-term objectives of caring for their babies. And the idea of contradictions prompted us to discuss the essence of the dilemmas of baby care that parents face in everyday life. Second, the framework provided a structured approach to organizing the user data. Having structured the data using Engeström’s model of an activity system facilitated identifying patterns and trends in the user data, and sharing the user data with the design team. And third, AT offered a structure for bringing in special effect theories, enabling us to specify findings and insights.

In the communication phase, the design team implicitly used AT as a thinking tool in reading and interpreting the user data. The first success was that nearly all the designers worked on the preparation kit. During the insights session, the components of the

activity system model were frequently used as anchor points in discussing and structuring observations and findings. Components were reflected in themes that were generated by the design team, such as “Rituals help us to handle things we don’t like” (artifacts). And in discussing the themes, team members noticed, for instance, how parents’ communities could play a central role in positioning their future product.

Finding 2 – It was difficult to implement and use AT in an integral way. We agree with Kaptelinin that the strength of AT is in its integration of concepts and components: When a design team uses only part of the framework (e.g., the components of AT) and simply ignores the rest, the team’s chances of overlooking opportunities and constraints for design are likely to increase.⁶⁵ But implementing and using AT in an integrated way was difficult in the baby care project.

In the analysis phase, one concept was not used, and one principle was used differently. As people researchers, we did not use the concept of internalization and externalization. Internalization and externalization processes were touched upon in parents’ stories about baby care, but detailed analyses of these processes were not needed at this stage for understanding the overall “what” and “why” of baby care, and thus were omitted to save time. We expect the concept of externalization and internalization to be more useful in later stages of NPD, when product or service concepts are developed.

The concept of historicity and development was used differently. Rather than conducting a longitudinal field study, which would not have been possible given the constraints of the project, changes of activity systems were traced through how people experienced them. However, the design team was able to learn about development of baby care in later phases of the project, when people studies were conducted that involved the same parents who had participated in the exploratory people study.

In the communication phase, only one of five concepts of AT surfaced in the designers’ observations and findings—namely, the idea of contradictions within and between activity systems. One designer observed that a couple had different parenting styles (or rules): “Gert is rational. He reads books about baby care. Jolanda is more intuitive, non-scientific,” he explained. And, looking at the division of labor, another designer noted, “Laura has difficulties sharing tasks with Mark.” The other four concepts, however, were not explicitly addressed in the designers’ findings and discussions. Either the designers did not use these concepts in generating findings, or they used them implicitly.

In future projects, designers and people researchers could collaborate in a similar way as in the baby care project to ensure that the concepts and components of AT are integrally used in building creative understanding. However, the risk of this approach is that

65 Victor Kaptelinin, “Computer-mediated Activity: Functional Organs in Social and Developmental Contexts,” *Context and Consciousness: Activity Theory and Human-computer Interaction*, ed. Bonnie A. Nardi (Cambridge: MIT Press, 1996), 45.

designers might start using only part of the framework (e.g., the components of the framework) in the belief that this one part is the framework. A more profound approach would be to introduce the components and the concepts of AT as inseparable parts of a whole. This means that AT needs to be translated as an integrated system for design, and not as a set of individual components and concepts, as done here. The challenge is to find such a translation of AT for design.

Finding 3 – The structure of the preparation kit did not support drawing “the big picture.” In evaluating the insights session, the team applauded the overall process followed in sharing the user experience data. The team members were happily surprised by both the quality and number of themes they had generated, in comparison to their normal professional practice. They thought the themes were “concrete” in that the themes provided clear starting points for ideation. Most of the critical comments concerned the preparation kit. The team members explained that the components of the activity system had been useful in organizing the raw data in the kit, but that it had been difficult to “get the full picture” of the families and baby care because the components had been revealed over time. The “full picture” had emerged only in discussing and structuring observations and findings during the insights session. In future projects, the team members would prefer an overview of the families and baby care as an introduction to the preparation kit.

Finding 4 – Emotions are at the forefront of empathic design but are rather obscured in AT. A more general concern that as people researchers we noticed was the framework’s lack of attention to the emotional domain. Empathic design stresses that rationality and emotions both need to be addressed in building creative understanding, but in AT, emotions are only implicitly addressed in the concept of object-orientedness.⁶⁶ When introducing AT as a thinking tool in future projects, the role of emotions in object-orientedness must be further explicated to ensure that they are sufficiently addressed in the analysis and communication of user data.

Conclusion

This paper reported our search for a theoretical framework that people researchers and designers could use as a thinking tool of the social in structuring and analyzing user experience data in empathic design practice. We examined a variety of frameworks on the basis of existing literature and then experimented with candidate frameworks in NPD practice.

We identified eight criteria for assessing the usefulness of frameworks for empathic design practice. Although the list of criteria is not exhaustive, it does help us to draw attention to aspects that researchers and designers need to consider when selecting a framework for analyzing user experience data.

66 Kaptelinin and Nardi, *Acting with Technology*.

The search process yielded five groups of frameworks: special effect theories, relational frameworks, catalogues, metaphors, and scaffolds of context. We found activity theory, as a scaffold of context, to be the best fit between design teams' needs and the frameworks' offerings. AT is different from many other frameworks we studied in that it transcends dichotomies between mind and world, and between individual and social. Moreover, AT provides "handles" of the social, as well as perspectives of the social, enabling designers and experienced people researchers to join forces in analyzing user experience data.

Testing AT as a thinking tool of the social in NPD practice, we found that it provides designers, as well as people researchers, with a platform for structuring, discussing, and sharing user experience data. The study also revealed two findings that pose important challenges for future research. First, AT addresses emotions merely implicitly, whereas emotions are at the forefront of empathic design. Thus, the role of emotions in AT needs to be further explicated when using AT as a thinking tool in future empathic design projects. And second, we translated AT for design in terms of a set of individual concepts and components, but the actual strength of AT is in its integration of concepts and components. In future projects, the framework needs to be translated as an integrated system so that designers can use the framework to its full potential.

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