

Residential co-design: Families Join the Design Caravan

Veerle Van Rompaey

University of Leuven
Dept. of Communication Science
E. Van Evenstraat 2A
3000 Leuven Belgium
+32 16 323202

veerle.vanrompaey@soc.kuleuven.be

Kathleen Charliers

University of Leuven
Dept. of Communication Science
E. Van Evenstraat 2A
3000 Leuven Belgium

kathleen.charliers@soc.kuleuven.be

Bart Van Der Meerssche

Alcatel Bell
Research and innovation
Fr. Wellesplein 1
2018 Antwerp Belgium
+32 3 240 7350

Bart.Van_Der_Meerssche@alcatel.be

Marc Godon

Alcatel Bell
Research and innovation
Fr. Wellesplein 1
2018 Antwerp Belgium
+32 3 240 7365

Marc.Godon@alcatel.be

Mariek Vanden Abeele

University of Leuven
Dept. of Communication Science
E. Van Evenstraat 2A
3000 Leuven Belgium

mariek.vandenabeele@soc.kuleuven.be

Hans De Mondt

Alcatel Bell
Research and innovation
Fr. Wellesplein 1
2018 Antwerp Belgium

+32 3 240 4421
Hans.De_Mondt@alcatel.be

ABSTRACT

This paper discusses the methodology and research findings of the EnComPAs (Enabling Community Communications – Platforms and Applications) project. This European project is a Celtic -labeled project. Research divisions of major telecom companies and universities in four European countries (Finland, Belgium, Spain, and France) are involved.

The EnComPAs project aims to investigate how communities (i.e. families) interact with others in their everyday life and how this interaction can be supported or facilitated by communication technologies. Unique in this respect is that these new communication technologies are designed by the user (i.e. the families) together with a multidisciplinary research team consisting of communication sociologists, product designers and engineers applying a qualitative methodology.

Lab-based research discards the context in which the user uses communication technologies. It is clear, however, that the design of communication technology evolves beyond the boundaries of the laboratory setting. More and more engineers and product designers feel the need to investigate the uses of these technologies in the natural setting. In order to fully understand the ways in which communication technology is modeled by everyday family life the research is thus conducted inside the family home.

The main focus of this paper will be on the methodological issues associated to this type of research. How can we design communication technologies in a multidisciplinary team involving users, sociologists, product designers and engineers? Results indicate that the co-design technique offers rich information and stimulates families and researchers to stretch the boundaries of their imagination. For example, families create constructions of reality and

develop ways in which they want to be connected to other people through artifacts. This helps generate rich ideas for future communication technologies.

Keywords

Participatory design, creative co-design, user-centered design

INTRODUCTION

There is a broad body of research in communication sociology that investigates the adoption and use of new media applications. But much of it takes a negative position (Maignan & Lukas, 1997). For example, children need to be safeguarded from indecent Internet material; while this is not disputed, it is sometimes taken to imply that if television programming may be bad for your children, new media applications are even worse. There is also a fear that new technology will cause a further retreat into the family home (privatization) and isolation from other family members (individualization). In fact, research has shown that the Internet can be a positive social instrument, bringing people together through chat boxes and e-mail (Maignan & Lukas, 1997; Papacharissi & Rubin, 2000) but also there are indications that increases in its use may lead to a retreat from family life and 'real' social contacts (Kraut, Patterson, Lundmark, Kiesler, & Mukophadhyay, 1998).

One of the major problems with such research is that it is mostly conducted when these new applications are already introduced in everyday life. This means that the adoption and use of finished products and tools are investigated. As a result, the dialogue between designer and end user is often restricted to 'user testing' at the end of a project.

While designers developed media applications, marketers looked into ways to sell the goods (Facer & Williamson, 2004). Due to major design mishaps this situation was not sustainable. Research then turned to the laboratory, seeking to obtain closer user involvement in the design process and focusing on how human-computer interaction could be optimized. The roots of usability research lie in cognitive ergonomics, more specifically workplace design. Therefore the usability lab is an excellent tool to measure human performance in a controlled environment.

Having had performance optimization as its original goal, much current usability testing still uses task-based scenarios to simulate real-life use. The product being tested is mostly the finished article, or a working prototype of a proposal. User tests work well for products requiring incremental improvement, but are considered far too ineffective for disruptive innovations. Due to the conditions, this type of innovation is rarely perfectly defined initially; the design team has to translate opaque user needs into well-defined product behavior.

In the last decade, the practice of usability testing has evolved to a less strict way of gathering data as a response to these problems. The focus is shifting more and more from performance to identifying user needs and trying to satisfy them. Techniques like satisfaction questionnaires (Brooke 1996, Harper & Norman, 1993), thinking-aloud (Wright & Monk 1991) and co-discovery (thinking-aloud in pairs of test participants) yield qualitative data rather than quantitative data. Techniques to present product proposals to test users, rapidly and without the need to actually build them, are bound to this. Paper prototyping (Snyder, 2003) and wizard-of-oz tests (Kelley, 1984) prove very efficient in mimicking a real-life product without the enormous development time and manpower put into a working prototype. Nevertheless, these techniques lack thorough user involvement. Users are not invited to cooperate throughout the entire development cycle; they are used merely as intermittent evaluators.

It's also clear that lab-based research discards the context in which the user uses media applications. Even so, this context greatly influences the use of media applications (Van Rompaey, 2002; Mackay & Ivey, 2004), indicating that the design of media applications has to evolve beyond the boundaries of the laboratory. More and more design teams feel the need to test the use of new media applications in the natural setting. This has created a shift in usability research. As such, they recognize that the end user should be an active participant in the process of media application development. Therefore, multidisciplinary research teams are created, mostly consisting of engineers, product designers, and social scientists (anthropologists and sociologists). (Westerlund, Lindqvist, & Sundblad, 2003a).

Perceiving the user as an active rather than passive recipient in the design process has bridged the gap between users and designers. This implies building a second bridge, one between designers and social scientists, who can deliver an insight in contextual factors, enriching designs that are driven by the user and its context.

Interesting research has already been done about the use of media applications in the home (Jordan, 1990; Morrison & Krugman, 2001; Venkatesh, 2004). It gives an insight into how people use media applications and how they relate to each other by using them. However, this research all focuses on individual end-users (the television viewer, the computer user, the internet user, and so on) or on a single media appliance in the home. Recently, sociologists place more emphasis on the users' primary habitat (i.e. the family) and on the multimedia environment (Morley, 2000; Livingstone & Bovill, 2001; Van Rompaey, 2002; Mackay & Ivey, 2004).

In order to assess psychological impact and sociological attitudes of these new social media applications, existing measurement instruments must be adapted. They need to take account of the fact that researching social relationships can only be successful when carried out in the natural setting. This raises some questions, such as:

- How do we adapt measurement instruments used in previous research?
- What changes to the instrument are caused by designing in the natural setting?
- How do we align different research goals and disciplines?

The Interliving project (Westerlund, Lindqvist, & Sundblad, 2003a;2003b) already extended the research by using a multidisciplinary research team to investigate the development of media applications in co-design with the user. The aim of the project was to develop technology for intergenerational communication in families. In line with this research the multidisciplinary research team for the EnComPAs project consists of three communication sociologists, two product designers and three engineers.

METHOD

Method Triangulation

While designing new social media applications it is very important to get insight into psychosocial features that influence design. Values and experiences related to the families in the team may need to be investigated. Previous research (Van Rompaey, 2002) has already indicated that the 'traditional' interview technique does not produce sensitive information about the psychosocial structure of the family. With this technique, data about the media-

structure of the family is gathered, but certain psychosocial aspects remain unclear. Perhaps this is because such questions were seen as being threatening.

New and different research techniques are needed. Therefore, in the EnComPAs project, we try to triangulate with different data sources, to get a better understanding of the position of our subject. Using co-design technologies, conventional ethnographic research methods may be extended using novel techniques such as cultural probing, paper prototyping and creativity techniques. This can give research about the users more validity.

The question remains of how to integrate these methodologies and, especially, how to analyze the abundant data produced. From the point of view of the designer it is important to get a grasp on how to propose technical solutions based on this type of research. In the next section we will discuss the research design that we used for the EnComPAs project.

Participating families

Communities are created as a part of everyday life, and on many levels - amongst friends, colleagues and siblings. The EnComPAs research focuses on families. For the purposes of the project, families are defined as consisting of two parents (regardless of sexuality and marital status) with their (biological or non-biological) children residing in the same home. This is for the following reasons:

- This kind of family is the largest early adopter of new media applications (Gunter & Wober, 1989; Gray, 1992; Livingstone, Holden, & Bovill, 1999).
- Children are a very important factor in the acquisition and use of new media applications (Hellman, 1996; Van Rompaey, Roe, & Struys, 2002).
- In Flanders most children live in two-parent households (29,7% of all households in 2004) (NIS, 2004).

Twelve Flemish families were selected to participate in the project. They were chosen because they had previously participated in research into the implications of ICT on family life (Van Rompaey, 2002). They all consist of two parents (in one case a lesbian couple), with various numbers of children, ranging in age from four to twenty-three years (table 1). This has been done deliberately since it creates different levels of abstraction and creativity in designs.

age	gender		Total
	male	female	
< 12	3	4	7
12-18	6	5	11
> 18	6	3	9
Total	15	12	27

Table 1: Frequency table of age and gender of the participating children

Research design

During the spring of 2005 the families were submitted to four research phases:

- Phase 1: Contextual investigation (family + communication sociologist)
- Phase 2, Part 1: Participatory design (family + communication sociologist + product designer)
- Phase 2, Part 2: Participatory design (family + communication sociologist + product designer + engineer)
- Phase 3: Family events (12 families + research team)
- Phase 4: Friendly user tests (to be defined)

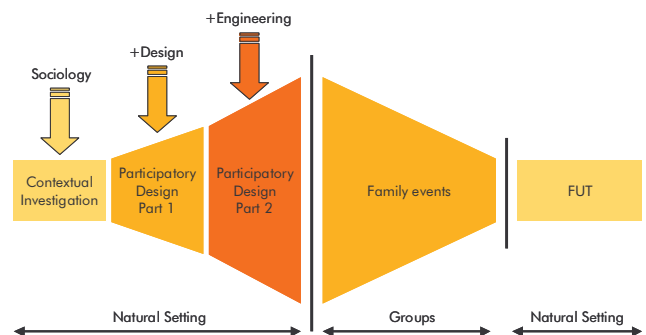


Figure 1: The EnComPAs research design

Contextual Investigation

The first phase of our project consisted of a contextual investigation conducted by communication sociologists in the family home. The families were asked to document their everyday life. For this purpose a box of cultural probes (see figure 2) was designed. Cultural probes are materials that help people to gather information about their everyday life. Each is accompanied by an assignment. The EnComPAs cultural probing box consisted of a digital photo-camera, small plastic bags, coloring pencils, paper, glue, scissors, a home media inventory, a photo-sharing account, mood stickers and an experience booklet. These were all linked to different creative assignments. One of the assignments was to make photographs of your everyday

life. On their photo-sharing account the families could post their photos as well as comment on photos of the other family members. They could also invite friends to come and have a look at their photo site and leave a comment. Family members were also asked to collect ‘evidence’ of their everyday life in the small plastic containers. They could tag each of these containers with an appropriate mood sticker.



Figure 2: Output of the Contextual Investigation (top left: drawing in experience booklet; top right: evidence of everyday life in plastic bag; bottom left & right: evidence of everyday life)

Participatory design

Co-design means actively integrating end users into the product design process by putting them in the role of designer and stakeholder. In the EnComPAs project co-design consisted of two participatory activities. To motivate the families and draw on their creativity, a storytelling technique was used. In the story, the family receives a letter from the year 3025; in this letter the “Board of Wise Men” requests the family to help them solve a major societal problem: the people of 3025 have great difficulties in communicating with each other. They challenge the family to create new tools and technological applications to help solve this. It is emphasized that even the wildest ideas are possible in 3025: there are no technological constraints.

In the second phase (Participatory design Part 1), the product designer introduced himself as a delegate from the Board of Wise Men who wished to help organise the co-design activity. The communication sociologist observed

this. The aim was to stimulate the family into creating a prototype showing how they wished to communicate with others in the future.

First, a large sheet of paper was put on the table and the family members were invited to start sketching their ideas. After 10 to 15 minutes they were asked to present their individual concepts to the rest of the group. A second sheet of paper was then put on the table. This sheet was used to synthesise design elements from the individual concepts into a common ‘family’ design. The designer then asked the family to transform their design into a 3D prototype. He provided them with simple tools for building the models, such as scissors, paint, cardboard, glue and staples. Finally, the family presented its invention to the camera. They were told that this presentation would be shown to the board of wise men. They also gave a list describing three most remarkable features regarding their design.



Figure 3: Participatory design Part 1 (top left: natural setting; top right: 2D ideation; bottom left & right: 3D prototype)

In the third phase (Participatory design Part 2), the aim was to take the families one step further: having inventing a ‘futuristic’ application on the theme of ‘communication’, we asked the families to be even more creative. Using brainstorming, we tried to explore what is really on people’s minds, and to encourage them to dream up as many ideas as possible to satisfy their individual or family needs. The aims of this phase were twofold; to see whether it is possible to discover needs using a creative brainstorming method, and to investigate how people interpret those general needs into more concrete wishes (or how people envision products or services that would satisfy their needs). This second aim can be made clear by example. We know that people have a need for social contact. Knowing this is one thing, but just how do they express this need? Do they want a machine to cuddle their relatives whom are far away? Do they want a third eye,

with which they can constantly follow their loved ones? Or do they just want a watch with which they can make regular phone calls? With this phase of the participatory design we wanted to bridge the gap between conceptual needs and concrete products or services. To achieve these goals, one additional research discipline was included into our participatory research design: engineering.

The brainstorm itself was constructed according to the 'COCD idea finding model' (Byttebier, 2002). The first stage was problem definition. The story from the previous design activity was used again: each family received another letter from 3025. In it, the Board of Wise Men expressed their gratitude to the family for the previous work they did by giving a gift: 'magic paper'. Magic paper can do anything you want, but the Board of Wise Men lacked the creativity to come up with inspiring things to do with it. So they ask the family for help.

The magic paper is colourful, shiny and able to stick to surfaces. It was presented by the engineer, a representative to the Board of Wise Men. He informed the family that you can cut it into different shapes and sizes, and that each little piece has microscopic computers built in. The representative gave examples of how it might be used: "If you put a little sticker on your heart, and your wife does this as well, she can feel when you are getting stressed or angry, and she can comfort you by petting her sticker".

Now, the family went on to the second stage, the idea generation (or divergence) stage of the COCD model. As ideas emerged, they were written down on a large sheet of paper. During this stage, the representative took the role of referee and corrected people if and when they broke the rules. As the brainstorm began slowing down, the representative used the "deck of cards" technique to help keep things going. (This involves using cards with photographs designed to stimulate new mental associations.)

After about an hour in the divergence stage, the pool of raw ideas was examined by all members in the idea evaluation (convergence) stage. Ideas were sorted according to how inspiring and how realisable they were, and colour coded. The categories went like this:

- Already known ideas that are possible today were called "NOW" ideas, and coloured blue.
- Ideas which were new, inspiring, and still feasible now were "WOW" ideas, and coloured red.
- Amazing ideas that require further technological research to be realised were "HOW" ideas, and coloured yellow.

Next, each member was asked to mark his or her five favourite blue, red and yellow ideas. The ideas that were chosen the most by all participants were given a definite end colour (according to the COCD-rules REF?) and put on a poster. The end result of the brainstorm was fifteen ideas (five of each colour) from each family. This is a list of products or services people long for in the near and far future.



Figure 4: Participatory design Part 2

Family Events

The fourth research phase consisted of three one-day family events, with four families in each. At these, families made an exhibition stand for the prototype and ideas they made in the design sessions. Each family also made a presentation to the other families.

The family events also served as family graduation day: their creative efforts were honoured with the degree of 'telecommunication experience designer'. From now on, they were considered equal members of the research team. During the preparation, the team had distilled seven product concepts from the design sessions, a team member showing these concepts as inspiring cartoons. The cartoons were put on display, and individuals were asked to pick out those which most appealed to them. People (no longer grouped in families) were then collected around the three most popular concepts, and asked to list their strengths and weaknesses. They were also asked to consider how they might improve the design of the product so that weaknesses could be turned into strengths. A plenary presentation of each group's findings rounded off the activity.



Figure 5: Family Events

(top left & bottom left: discussing the seven concepts;
top right & bottom right: presenting family prototype and
brainstorming ideas)

RESULTS

Methodological discussion: Bias –non-bias

The Encompas participatory design process developed organically as the project progressed. At the onset we just settled on a rough outline of each phase. This was the only effective way to move ahead, given a multidisciplinary team that was not accustomed to working together. A preparatory meeting lasting a full day preceded each phase. Each phase's script was given a dry run at one of the researcher's home. This proved invaluable for fine-tuning the match between the experience offered to the families and the research objectives.

A recurring discussion point at each preparatory meeting was something we called the 'biasing contradiction'. This is the inherent conflict between the communication sociologist's goal of unbiased information gathering and the engineer's wish to stretch the families' creative envelope, in pursuit of innovative design. We resolved this using 'segmentation'. Each research phase is considered as being a segment, and the level of (biased) creativity is increased over consecutive segments. So while the contextual investigation phase adhered to the best practices of unbiased sociological research, the paper prototyping drew upon the individual's creativity. During the brainstorming session, we intervened in family dynamics by introducing the techniques for a successful brainstorm, such as postponement of judgment, encouragement of wild

ideas, building on each other's ideas and using visual creativity techniques.

Ironically, 'segmentation' is the first principle proposed by TRIZ, the theory of inventive problem solving (Altshuller, 2005), which is frequently used in engineering circles for solving technical contradictions.

Creativity techniques

One of the main creativity techniques used was story telling. This carried several benefits:

- Stories make the assignment less stressful, as participants are designing for a fictional third party, and not a real individual.
- Introducing a challenging societal problem to the story gives a clear goal and motivates the participants.
- The story helps people to step away from reality and stretches their creativity. If they were simply asked to "design new communication technology", they would be likely to stay close to known media, and the current way of using it. This gives little information on the internal factors which drive their designs. The use of a story offers the possibility to indirectly infer information about those factors without asking direct questions.
- The contextual story helps introduce outsiders, such as production designers and engineers, into the family. So, the participants are less reserved with 'the stranger'.

Brainstorming techniques were also central to the research. The sessions in the family home may sound quite similar to those used with company employees to come up with new product ideas; however, they were clearly distinct for two reasons (later on we will discuss how we made our brainstorm 'creative').

- We didn't approach family members in the same way as would be done in the professional environment to avoid bias. People in their family home are not employees! Hence the session has to be disconnected from economic and company driven goals, in order to avoid influence or bias in the responses. For example, if we had said to the participants: "Our company wants to know which needs their customers (i.e. the participants) have, and what products would satisfy these needs", we'd be likely to end up with very different results. Factors like social desirability, self-perception, self-consciousness, and so on would bias the outcome. Who would admit that he or she

truly longs for a bag of chips that never empties? Or who would admit to really wanting a device to make bad things happen to other people?

- The second reason for not choosing the ‘professional company approach’ was to help the participants stretch their ideas beyond existing technologies and possibilities. We had to create an atmosphere in which people wouldn’t take into account the current constraints. We wanted to emphasise that “every idea is a good idea” – whether it is easy to realize or will always remain impossible. For people who aren’t used to brainstorming and haven’t incorporated the basic rule of “write down every idea, however stupid it may seem”, this creative approach helps stretch ideas beyond the easily imaginable.
- The participatory context of the brainstorm session was an important influence. All who were present participated. Allowing the researchers to participate created an easy atmosphere in which all individuals were equal – family members didn’t feel observed or judged by the researchers.

Leading families through this research trajectory transformed them from lay users into telecommunication experience designers. They themselves mentioned that they were astonished by their own creativity and ideas. Due to the research techniques the ideas were externalized with a high level of visibility. As well as designing a telecommunication application we designed a transformation (Pine & Gillmore, 1999)

Furthermore, we created an experience which was shared between families. This provided them with immediate topics of conversation when introduced to each other at the family events, and those topics were all relevant to the research. This can be an interesting build-up when conducting workshops in user research. Rather than inviting total strangers it might be better to prepare and educate the participants up front.

CONCLUSION

Although co-design is still in its infancy as a user research activity, very promising results were obtained from this first experience. New avenues of research have been stimulated as a result, and considerable data has been produced which can be used to guide and inform it. While it is too early to say what the eventual commercial or human value of this research will be, the fact that is founded on a genuine investigation of the needs and desires of its end users is a heartening one.

ACKNOWLEDGMENTS

First and foremost we would like to thank all 13 families who participated in this research, including Marc Godon’s family that was so kind as to serve as a pilot family to prepare the family visits. Secondly a great big thanks goes out to our colleague Daniel McBrearty for proof-reading this paper.

REFERENCES

1. Altshuller, Genrich (2005). 40 Principles Extended Edition: TRIZ Keys to Innovation. MA: Technical Innovation Center.
2. Brooke, J. (1996) SUS-A Quick and Dirty Usability Scale, in Jordan, P., Thomas, B. and Weerdmeester, B. (eds.). *Usability Evaluation in Industry*. Taylor & Francis.
3. Byttebier, I. (2002). *Creativiteit Hoe? Zo!*. ISBN 90-209-5017-7, Lannoo, Tielt, 2002, <www.lannoo.com>.
4. Facer, K. & Williamson, B. (2004). *Designing technologies to support creativity and collaboration. A handbook from NESTA Futurelab*. <http://www.nestafuturelab.org/research/findings/handbooks/01_01.htm>.
5. Gunter, B., & Wober, M. (1989). The uses and impact of home video in Great Britain. In M. Levy (Ed.), *The VCR age. Home video and mass communication* (pp. 50-69). Newbury Park, CA: Sage.
6. Gray, A. (1992). *Video playtime: the gendering of a leisure technology*. New York: Routledge.
7. Harper, B. D. & Norman, K. L. (1993). Improving User Satisfaction: The Questionnaire for User Interaction Satisfaction Version 5.5. *Proceedings of the 1st Annual Mid-Atlantic Human Factors Conference*, (pp. 224-228), Virginia Beach, VA.
8. Hellman, H. A. (1996). A toy for the boys only? Reconsidering the gender effects of video technology. *European Journal of Communication*, 11(1), 5-32.
9. Jordan, A. B. (1990). A family systems approach to the use of the VCR in the home. In J.R. Dobrow (Ed), *Social and cultural aspects of VCR use* (pp. 163-179). Hillsdale, NJ, US: Lawrence Erlbaum Associates, Inc.
10. Kelley, J.F., (1984) "An iterative design methodology for user-friendly natural language office information applications". *ACM Transactions on Office Information Systems*, March 1984, 2:1, pp. 26-41.
11. Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukophadhyay, T. & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist*, 53(9), 1017-1031.
12. Levine R., Locke C., Searls D., Weinberger D. (1999). *The Cluetrain manifesto, the end of business as usual*.

- Perseus Publishing.
<<http://www.cluetrain.com/book/95-theses.html>>.
13. Livingstone, S., & Bovill, M. (2001). *Children and their changing media environment. A European comparative study*. Mahwah, New Jersey: Lawrence Erlbaum Associates.
 14. Livingstone, S., Holden, K. J., & Bovill, M. (1999). Children's changing media environment. Overview of a European comparative study. In C. von Feilitzen, & U. Carlsson (Eds.), *Children and the media. Image, education, participation*. (pp. 39-51). Göteborg : The UNESCO International Clearinghouse on Children and Violence on the Screen at Nordicom.
 15. Mackay, H. & Ivey, D. (2004). *Modern media in the home*. Rome: John Libbey Publishing.
 16. Maignan, I., & Lukas, B. A. (1997). The nature and social uses of the internet: A qualitative investigation. *The Journal of Consumer Affairs*, 31(2), 346-371.
 17. Morley, D. (2000). *Home territories. Media, mobility and identity*. London: Routledge.
 18. Morrison, M., & Krugman, D. M. (2001). A look at mass and computer mediated technologies : understanding the roles of television and computers in the home. *Journal of Broadcasting & Electronic Media*, 45(1), 135-161.
 19. NIS (2004). FOD Economie, KMO, Middenstand en Energie - Afdeling Statistiek, 2004. *Private huishoudens - België en Gewesten (1991-2004)* <http://statbel.fgov.be/figures/d24_nl.asp. 9 mei 2005>.
 20. Papacharissi, Z., & Rubin, A. M. (2000). Predictors of Internet Use. *Journal of Broadcasting and Electronic Media*, 44(2), 175-196.
 21. Pine & Gillmore (1999). *The Experience Economy: Work Is Theatre & Every Business a Stage*, Harvard Business School Press
 22. Snyder, C. (2003). *Paper Prototyping: The Fast and Easy Way to Design and Refine User Interfaces*, Morgan Kaufmann
 23. Van Rompaey, V. (2002). 'Media on/Family off? An integrated quantitative and qualitative investigation into the implications of Information and Communication Technologies (ICT) for family life.' Leuven: Audience Research Centre, PhD dissertation, 232 p.
 24. Van Rompaey, V., Roe, K., & Struys, K. (2002). 'Children's influence on internet access at home. Adoption and use in the family context.' *Information, Communication, & Society*, 5 (2): 189-206.
 25. Venkatesh, A. (2004). The Tech Enabled Networked Home: An Analysis of Current Trends and Future Promise, in Dutton, W., B. Kahin, et al (Eds), *Transforming Enterprise*, Cambridge, MA: MIT Press, 2004.
 26. Westerlund, B., Lindqvist, S. & Sundblad, Y. (2003a). Co-designing with and for families. In proceedings for the conference Good | Bad | Irrelevant , *COST269: User aspects of ICTs*, in Helsinki 3-5 September 2003. pp 290-294
 27. Westerlund, B., Lindqvist, S. & Sundblad, Y. (2003b). Co-designing methods for designing with and for families. In proceedings for 5th European Academy of Design Conference in Barcelona, 28, 29 & 30 April 2003.
 28. Wright, P. C., & Monk, A. F. (1991). The use of think-aloud evaluation methods in design. *SIGCHI Bulletin*, 23(23), 55-57.