

Design of Future Television

Leena Eronen

*Helsinki University of Technology, Telecommunications Software and Multimedia
Laboratory, P.O.Box 5400, FI-02015 HUT, Finland
leronen@niksula.hut.fi*

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Abstract

To enable the future users to create their own product concepts is a relatively new idea in the design of consumer products. In this paper, ten TV viewers created new concepts of interactive television programs and applications for digital television. During the user study, the study participants were asked to gather data on themselves in their home environment. The study focused on TV viewers' leisure time and their thoughts of the television in the future. The study resulted in a set of user profiles and innovations of future interactive applications the study participants designed for themselves. The study aims at creating a user centered design method with the study participants as equal research partners with the designers.

1. Introduction

There have been few studies published so far on how to include the TV viewers into designing interactive television applications or how to receive feedback from them. There are results from ethnographies (O'Brien et al., 1999) and usability testing, namely Electronic Program Guide prototypes (Eronen and Vuorimaa, 2000), interactive multimedia services (Hvannberg and Larusdottir, 2000) and the access to PC functionality and applications (Bødker et al., 2000). Besides that, there is work related to the design of television in general, for example, a study focusing on on-screen displays and remote controls (Logan, 1994). In some studies, prototypes of personalized TV news were created (Marrin et al., 2001 and Merialdo et al., 1999). It is concluded that new research and new research methods are needed for designing interactive television programs and applications.

1.1. Aim of the study

The research work concentrates on the subject of how to include the future users into the product development in the early stages of product development. The main research question is, how to gather data on TV viewers and their home environment, and what influence this data has on the design process of interactive television programs and applications. We also had an interest to see the results from asking TV viewers to design innovations of future interactive applications for themselves.

2. User centered design

Traditionally, users of technology have been included in the product development in two roles. First, researchers have observed users using technology tools in users' authentic context of use, and second, users have been asked for their feedback long past the completion of the initial design stages of a new technology. The latter approach has caused a great interest among the researchers in usability testing. Unfortunately, usability testing of existing devices does not tell directly which new technologies should be created for future users. There should be approaches which enable users themselves to

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initiate ideas and encourage them to take part in the creation of a new technology. The different roles of the user in the product development are discussed next.

2.1. User research

Traditional user research methods consist of interviews, observations, video recording, focus group sessions and ethnographies, which are based on field trips (Blomberg et al., 1993). For example, ethnographic research in the workplace aims at developing a thorough understanding of users' current work practices. The research in users' real working environment takes into account users' tacit knowledge, domain-specific terminology and expert knowledge (Wood, 1996). Interviews in general aim at obtaining rich data for building theories that describe a setting or explain a phenomenon. Based on the interviews, qualitative researchers build theories step by step from the examples and experiences collected (Rubin and Rubin, 1995). Researchers try to find the underlying concepts that reflect the ideas with which users label their descriptions and understandings of their world. There are also other research methods, for example, meetings, document analysis, rich pictures, mock-ups and scenarios.

2.2. Participatory user research

Research methods such as interviews, observations and ethnographies include the user in the research process as a source of information. The nature of the research process has it that the user is not an equal research partner in the research process but more or less a subject of research. As opposed to this line of action, some new research methods rely on the user as an active participant in gathering and interpreting the information. Instead of asking the researcher to make an observation or do an interview, we can ask the user to gather the data.

For example, a research approach called 'Cultural probes' aimed at finding new ways as how the new technology could enter and affect the everyday culture (Gaver et al., 1999). In this study, the study participants were supplied with maps, postcards, disposable cameras and booklets. The study participants then answered the questions, collected a photo album and wrote a 7-day media diary. Another example of a participatory user study focused on study participants' lifestyles, activities and attitudes (Forlizzi and McCormack, 2000). Yet another study focused on information capture in working life (Brown et al., 2000). During the study, the study participants took photographs with handheld digital cameras whenever they captured some information or would have liked to capture information but did not have the means. The study revealed that the capture of information was goal oriented, namely, that the study participants did not gather information for its own sake, but rather did it to use that information in some other way. For example, a journalist collected newspaper clippings for reuse as he was writing new articles. In this case, user's goal oriented behaviour has an effect on the design of future devices.

2.3. User research in the home environment

User research in the home environment reveals that users' goal oriented behaviour can not be transferred from the working life to the home environment as such. For example, watching the television at home is not a goal oriented task. People watch television as a leisure time activity and on leisure time, there are no tasks to accomplish or distinct goals to achieve. Instead, there are activities and daily routines at home. A study of approximately 500 TV viewers revealed that most TV viewers' everyday activities were structured by a clearly organized schedule, and an important part of the pleasure of TV viewing was to talk about it afterwards (Gauntlett and Hill, 1999). As it is known that much of what people do is socially driven and based on communication, studies have been made in the area. For example, there are studies on designing social communication devices for the home (Hindus et al., 2001) and envisioning new media for interpersonal communication (Tollmar et al., 2000). It is concluded that the user research and the design of new devices for the home environment must take into account how people use and understand the new technologies as part of their everyday activities.

3. Methods

The user study presented here is a continuation of a user study that combined quantitative and qualitative user data (Eronen, 2001). The quantitative data from a questionnaire study revealed information on the scope of new media in Finland and its innovations among 12-60 year old people. The qualitative data from a set of focus group sessions revealed specific information on users' expectations on forthcoming services in digital television. The two data sets, quantitative and qualitative data, were combined and resulted in three user group profiles. These group profiles were easy and fast to update with results from focus group sessions when needed. It was our intention to take the group profiles to a broadcasting company and make innovations of interactive TV applications. The group profiles didn't however include visual data of individual TV viewers. It is known that visualizations help designers to get closer to users and thus help them produce design ideas. We decided to make a continuation of the user study to get more specific data and visual information on selected TV viewers.

It then appeared to be difficult to do a user study in the early stages of product development. Without prior experience or knowledge on the subject, a user cannot address any particular user needs when asked. During year 2001, the interactive services for digital television were not yet available in Finland. Therefore, the plan followed in this study was to make a qualitative user research on the use of existing, similar equipment. In this case it was the analogue television. Ten focus group study participants were asked to gather data on themselves in their home environment. Five women and five men in the age range of 16-78 years participated in the user study. They received an envelope with questionnaires, separate questions, two diaries and a disposable camera. The approach has been adapted from a study called 'Cultural probes' (Gaver et al., 1999). The study participants completed the questionnaires, filled in the diaries of their television watching over a three-day period and took photographs of objects and incidents at home. They also designed innovations of future interactive applications for themselves. A subsequent one-hour interview with the researcher revealed more of the study participants' needs for specific types of information and their thoughts of the television in the future. The interviews were recorded for later inspection.

4. Results

The user study of ten TV viewers resulted in a large amount of ethnographic data. This includes questionnaires, diaries, photographs, users' innovations of future interactive applications and notes from the interviews. However, the research method was not 'ethnographic research' in a sense that the study participants, not researchers, collected the data. The approach enabled the users themselves to gather the results, explain them and give their interpretations as why events happened.

The results from this participatory user research are covered here next, namely the user profiles, study participants' preferences for favourite applications in the future, proposals for improving their favourite television programs and study participants' innovations of the television in the future. For innovations of future interactive programs and applications, it is anticipated that the interactivity takes place by either interacting with the remote control and the set-top-box, sending a text message from a mobile phone, making a call or sending a postcard to the TV show.

4.1. User profiles

Results of the user study were collected in ten separate user profiles, each 8-18 pages in length. The user profiles include information on study participants' favourite television programs and channels, use of the entertainment equipment at home, stories of television watching habits and the leisure time, two diaries, photographs, users' preferences for favourite future applications and new concepts of interactive television programs for digital television. An example of a user profile is presented here next. For the purposes of this paper, the user profile has been shortened to fit half a page. All names have been changed to protect privacy.



Figure 1. John at work in the garden.



Figure 2. John is watching the TV with his youngest son.

User profile: John, 46 years, Chief coastguard.
Family: Janet 41 years, Bruce 17 years, William 15 years, Jim 13 years, Terry 3 years.
Devices at home: Four TVs, two VCRs, CD player, PC, Play Station.
John prefers to watch: Comedy, Current affairs, Documentaries, Domestic movies, Domestic serials, Entertainment, Foreign movies, History, Military, Classic music, News, Thriller, Travelling, Weather.

“In your opinion, what is best about television?” *”It is the rich supply of TV programs. In general, everyone in the family finds something to watch.”*

“In your opinion, what is worst about television?” *”Good movies start nowadays too late in the evening. The TV dominates the individuals’ leisure time too much perhaps.”*

“Which video tapes are most important to you?” *”Most important tapes are domestic and foreign best seller movies, and children’s animations.”*

“What do you prefer to do on your leisure time?” *”I do physical activities and household work.”*

Figure 1 illustrates John at work with the lawn mower in his garden on his leisure time. John said about Figure 1: *“The work at the garden is pleasing. We live in a one-family house that we built ourselves.”* In Figure 2, John’s youngest son takes part in watching the TV with him. The family has four TVs. John said about Figure 2: *“The evening news is one of the programs during which we at the latest come together in the living room to watch the program together. Children play football and often, if there is a football match on TV, we change the arrangements for the weekend. The TV series or movies don’t make such changes.”*

4.2. Favourite television programs in the future

It is known that some television programs attract TV viewers to watch the same series for years. We asked the study participants to think about features that would make their favourite programs even more pleasing to watch.

Some study participants proposed for interactive features that would enable them to see background information on their favourite television programs. A study participant with a favourite program called ‘Men behaving badly’ said: *“I would like to see background information on the actors and the scriptwriter, and if there are any other television productions of this type. It was quite interesting on MusicTV channel to see the info boxes during the music videos. I’m interested in all references to popular culture and entertainment.”* Another study participant keen on talk shows said: *“I would like to see background information on documentaries and talk shows. There could be a menu on the TV*

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screen providing me the same information that the editors have already collected when editing the TV show. The information would explicate the arguments presented during the show. For example, when the people on the show talk about the depreciation of the value of money, the graphs barely flash on the screen. Now you could click on the remote and get them in sight again."

A study participant with a favourite program called 'Futurama' wanted to collect a group of TV viewers to play a game where the players guide the actions of a chosen person on the program. This 'interactive scriptwriting' would have an affect on the program coming next week: *"There are difficult tasks on the program with given alternatives that the group of people must work out. The program would show how some of the groups got through the tasks. These shots are not necessarily shown on the TV but on the Internet."*

An enthusiastic Formula 1 spectator wanted to have a racing quiz for Formula 1 fanatics. She said: *"It takes us 1½-2 hours to drive to our summer house, so we must make a plan when to go as not to miss the Formula 1 racing on TV. I would like to make a guess on who will do the next pit stop, who will stop altogether or which car will beat another. I would get points for right guesses and I could see the statistics from the races. I could also see camera shots from the pit during the race."*

4.3. Television in the future

It is not yet known what the digital television will look like in the future. To get the study participants' opinion on the subject, they were asked to think what their television will look like in year 2006, five years ahead of the present moment. Four proposed scenarios for the future are presented here.

A 27-year-old product manager said about his television in the future: *"The television would recommend me the same type of TV shows I've watched before and there is a quick on-demand online quiz that doesn't disturb watching the TV shows. The TV display is light and easy to set on its place. I can send short notes to friends with a snapshot I've taken with a digital camera and there is a family photo album on TV. We play board games like Trivial Pursuit and PC games like Worms and WarCraft from the set-top-box memory with the family. There is a Home Shop application with a product catalog. I first select the products, for example spare parts for a car, from the catalog on the screen and in case I need more information, I can make a question to the salesperson in the shop over a video connection."*

A 46-year-old chief coastguard said about his television in the future: *"I want to have a personal self-study English language course on TV that I can start at a chosen moment. I am a self-made man and I want to access do-it-yourself directory on remodeling and renovations at home. I also want to see a cooking program on TV with new recipes in a chosen breadth with pictures, video and text. I can't use a cookbook and I don't believe many men can. A TV program is easier to follow as there you see the results. My wife is self-employed and often away from home in the evenings. I make food for the children and it is always the same 5-10 recipes I use. Especially now when children grow older I feel I had more time to cook according to a recipe. I also want to get travelling information on TV and video on holiday destinations. It would be useful to read other travellers' holiday stories on TV. I have travelled a lot."*

A 78-year-old senior citizen said about her television in the future: *"I want to have the Wheel of Fortune TV program on TV as I want to try if I could win something too. I want to have a special channel for retired people that presents the church services, programs on current affairs, gymnastic exercises program and stories on recovery from diseases. Today, I enjoy listening to a radio program where listeners make a call to the studio and say their opinion on a current topic. I also enjoy watching old black-and-white movies on TV. They remind me of the old days when I saw the movie for the first time. For me, it's more important to read the books. I have always something to do if there is nothing on TV that interests me."*

A 55-year-old nurse said about her television in the future: *"I want to have an application on TV that shows me a live video from the grocery shop. I could select the products on the screen and send my order to the shop. They would then deliver the products to my mother's home as she is getting older and needs help in doing the shopping. I also want to have a video connection with a group of family*

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members and a voice mail on TV. I want to see the bus and train timetables on TV and I want to be able to do ticket reservations for a theater. I want home banking and voice control for TV. There should be light TV displays, a small one for the table and a big one that is like a picture on the wall. The prices of displays should come down so you could have a display in every room."

4.4. Favourite applications in the future

The convergence of technologies which links the computer with communication and entertainment technologies will create new applications for the home. A list of 22 applications that possibly find their way to digital television in the future was created and the study participants were asked to tell how important these applications are to them. The question was: "They want to make the digital television as a personal tool for gathering entertainment and information. Which of the next applications and services are of interest to you?"

The study participants rated the services on a scale from +3 to -3. They used the verbal expressions from 'Interests me a lot' (+3) to 'Interests me a little' (-3). As some people are hesitant to use the extreme expression, 'I'm not interested', we used instead the expression 'Interests me a little'. Study participants' preferences were combined into one and the results are presented in Figure 3 with values scaled from +30 to -30.

30 Interests a lot

- 14 Information of the ongoing TV show
- 13 Local events /City guide
- 9 Bus and train timetables
- 5 Domestic banking
- 5 Electronic Program Guide for 7 days
- 4 Email on TV
- 4 One-touch dial for preset Teletext pages
- 2 Teletext
- 2 Yellow Pages
- 1 TV program recording into set-top box memory
- 1 Web on TV

0 Interests in some degree

- 0 Bookshop on the Internet
- 0 Video on demand
- 2 Online movie tickets
- 3 Music video on demand
- 4 Online quiz while watching the TV show
- 5 Grocery shop on the Internet
- 5 Web pages for TV channels
- 8 Home shop
- 11 Internet chat
- 14 TV games
- 15 Job hunting

-30 Interests a little

Figure 3. Preferences for favourite applications in the future.

The preferences show that the top three applications are all related to searching for information, namely 'Information of the ongoing TV show', 'Local events /City guide' and 'Bus and train timetables'. It must be noted that the results are qualitative only as it was 10 people who participated in the user study. The results could show more favour to entertainment related applications if we had made a statistical user survey among a large sample of Finnish population. Furthermore, the study participants had experience in Internet and PC use, but none had used a set-top-box and therefore they had no experience in interactive applications or digital television use in general.

5. Conclusion

In this paper, ten TV viewers were asked to gather data on themselves in their home environment. The user study focused on TV viewers' leisure time, their television watching habits and their thoughts of the television in the future. The study participants were also asked to create product concepts and innovations of future interactive applications for themselves. The study resulted in a large amount of ethnographic data which includes questionnaires, diaries, photographs, users' innovations and notes from the interviews. The results were presented in ten user profiles including study participants' preferences for favourite applications in the future, proposals for improving their favourite television programs and their innovations of the television in the future. The participatory user research approach selected enabled the TV viewers themselves to gather the results, explain them and give their interpretations as why events happened. It can therefore be stated that the study participants were not mere subjects of research but they were equal research partners with the researchers. The participation of future users in product development is central in user centered design.

5.1. Design implications

Design implications of this user centered design method deal with gathering the user data and transforming the data into new product concepts. There are three main design implications of this research. First, it was found that qualitative user research can be carried out to produce new innovative ideas with the future users of a new technology. The resulting user profiles are a source of information the designers can refer to whenever they need to remind themselves about who the users are or what aspects they look forward to in the digital television and the interactive applications. These new insights can act as a basis for designers to create new designs. Second, it was found that the initial focus group sessions revealed users' opinions and first reactions to new concepts, whereas a user study in the home environment goes beyond that. At their leisure at home with plenty of time, users were able to give thorough answers to questions and they initiated new ideas. During a focus group session, there was not enough time for such brainwork.

Third design implication is connected to future research. The user data will be taken to a broadcasting company for a set of design sessions with designers. The early results show that qualitative user data can initiate design ideas the quantitative data familiar from the audience research can not. During the design sessions, the designers were able to produce design ideas and make innovations of new programs and applications for digital television. Future research also includes more qualitative user research, namely concept validation sessions with users.

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