On the design of television as a service based on average TV watching

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ABSTRACT
Ten households were interviewed about their TV watching to inform the design of TV services. Our participants were average TV viewers who had Internet access but were not technically advanced or frequent users of the Internet as a source for TV material. We found that the flow of programs that broadcast television brings to viewers was the most important motivation for our participants to turn to the TV on-demand possibilities they had access to. Examples of triggers were social cues from people talking about things seen on TV, or time-shifting issues such as missing all or part of programs in the broadcast flow. Special interests such as sports were also a strong motivation for on-demand behavior. For the viewers, linear and on-demand TV watching was intertwined. We conclude that on-demand services should be integrated with broadcast TV in the design of future TV services.

Keywords
Television, interactive television, IPTV, on-demand, TV watching, user studies.

INTRODUCTION
The 21st century has witnessed an explosion in technological development within the TV area. In 2012, Europe will have closed down analogue TV, a major technological shift that has already taken place in several countries. TV producers and broadcasters are offering more and more of their content on an on-demand basis, over the Internet or directly to the TV set by the TV operator. Operators in their turn are exploring new TV offerings combining broadcast and on-demand TV with increasingly more powerful set-top boxes, allowing for interactive TV, personal video recording, time-shift, catch-up, pay-per-view and other services. And while computers and “media boxes” of various kinds become more and more powerful, the functionality of the TV set itself also evolves, turning the computer into a TV set and the TV set into an internet browser. TV today can no longer be defined as tapping into a flow of broadcast content using a dedicated type of equipment: the TV set.

The new ecology of hardware and software tools offering services, and various types of content opens up a new design space for TV services. It makes it possible for TV viewers not only to choose what they want to watch from a broadcast flow, but also to actively compose their TV experience. The distribution of TV over IP connections enables not only download but also upload of information from the viewer, creating possibilities to interact with the sender of the information and with other viewers. However, the new possibilities come with an increased complexity. TV viewers need to handle more hardware and more complex software than ever before while watching TV. In this perspective, it is important that the next generation of TV services is designed to help users navigate the ecology.

We set out to investigate the effect of this evolution on TV viewers, with the aim to better understand how the functionality of and interaction with the TV service should be designed. Since TV is an extremely wide spread technology that can be found in the vast majority of homes in the western world, on-demand TV services must be designed for all kinds of users. Therefore, we have chosen to study average TV viewers that do not necessarily exhibit advanced TV behavior and that are not technically advanced.

We believe that approaches from HCI with respect to user needs and user behavior can contribute to this area. Based on a study of viewers watching traditional TV combined with occasional TV on the Internet we ground a design discussion with the aim to broaden the perspective on the use of existing and future TV services.

TV IN SWEDEN
Since state-of-the-art for TV differs significantly between different countries, we begin by briefly describing the situation in Sweden.

In 2008, the analogue terrestrial network for TV broadcast in Sweden was completely shut down. The effect on the viewers varied. Single-house owners in rural areas and other viewers who had previously received the TV signal using a simple antenna now had to invest set-top-boxes, while many others continued to have analogue TV delivered to the home through cable (almost 50% of the households in 2009 [15]). A growing number of viewers are also getting their TV delivered over IP.
This is a natural development for a country where 83% of the population has Internet access in their home [6] and where 87% of these connections have a bandwidth of 2Mbit/s or more [15].

Most Swedish TV networks are also offering more and more content on the Internet. The overall term for this has come to be “Play” services, from the Swedish public service broadcaster SVT who launched their service “SVT Play” in December 2006. Depending on the network, services may be free or pay-per-view. Web-based video on-demand services for movie rental have also been available over the Internet since 2001. However, contrary to the rapid technical developments, not very much has changed from the general viewer’s point of view. Although “broadband TV” has been part of some Swedish TV operators’ service offers for quite some time, it has until recently not taken on. Personal video recorders (PVRs) were not introduced in Sweden until 2006; Electronic Program Guides (EPGs) are also quite new to the average Swede due to the fact that analogue TV via cable - where no set-top-box is needed - remains a common form of TV delivery. Finally, while video web services are abundant, most often it is still the viewer’s problem to somehow transfer the Internet content from the computer to the TV set in the living room, a definite non-trivial task.

The situation is currently changing rapidly. During fall 2009 most the major TV operators have launched new digital TV services, including on-demand video rental services and direct access to the same “play” content that is offered on the Internet. However, this development had not yet taken place at the time of the studies reported in this paper.

RELATED WORK
Traditional TV is well domesticated and understood by most people and TV practices are deeply embedded in the ways that we live our daily lives [18]. The growing complexity of TV viewing in terms of functionalities, technology and ongoing change opens up new and interesting challenges for the HCI community.

In a literature study, Van den Broeck et al. [20] investigated existing viewing practices and the effect of new TV and video possibilities on these practices. They concluded that video on-demand services have an effect on the TV experience and on viewing practices by introducing new degrees of freedom regarding time, content and place. Two important elements of TV viewing were identified: 1) the degree of domestication that makes TV viewing such an integral part of people’s daily lives; and 2) the importance of the TV experience as a whole.

Moe [10] investigated the development of new TV services and issues of viewer control in relation to the flow of content provided by the channel operators. One conclusion was that “The development of tools and services designed to increase personal control of flow, and the actual use of them, exist inside the relatively stable structures of broadcasted television.” [Page 779].

Ethnographical studies have also been performed. Taylor and Harper [19] studied routine TV habits with a focus on program selection. Several program selection methods were identified, ranging from “effortless” channel surfing to EPGs that were perceived to be quite demanding. In addition, they found that TV viewing seems to be “curiously unplanned”. These findings support the general understanding of TV as a lean-back medium in comparison to the more active lean-forward computer.

Barkhuus and Brown [3] came to similar conclusions in their study on the use of recording media. Through in-depth interviews behavior and attitudes of PVR users were compared to users downloading TV programs from the internet and to VCR users. Although these users differed a lot, there were similarities, notably that TV watching was viewed as a social activity by all groups, although this was manifested in different ways.

In another study, Barkhuus [2] studied college students watching television on the Internet, using computers. In short, the conclusion was that compared to traditional TV viewers, the Internet TV viewers in the study were more selective with what they choose to watch, and that television viewing was more of a solo activity.

O’Brien et al. [12] studied existing technology use in the home and the introduction of set-top boxes. They found that daily activities were often scheduled around personal use of the available media technology. User issues raised upon introduction of the set-top box were in many cases due to poor understanding and perception of the technology in itself.

The view of TV as a social medium is a central theme for most studies of TV viewing [4, 20]. Social TV investigates different ways of making people aware of one another’s TV viewing, connecting people through the TV service. Starting from the question of what happens with the “water cooler effect” if television turns on-demand, Nathan et al. [11] built a system aimed to support the communal viewing experience. In a field study to investigate the usefulness of the system to support the communal viewing experience, participants reported being able to successfully converse online, using the show as a backdrop as well as conversation starter.

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1 Film2Home.se was launched in 2001, SFAnytime.com in 2002.
Another recent example is Svensson and Sokoler [17]. In collaboration with a group of elderly users, they explored the view of TV as conversation piece and a companion. A TV viewing awareness concept service for elderly people was developed, taking great care in understanding and adapting to the complex practices of humans in social relations. To cater for the needs of more closely networking groups of people, Harboe et al. [8] designed a richer service, including limited communication possibilities over TV. The setup also included an ambient display that in an abstract way mediated presence of the other people in the network also outside of the TV screen. In a test with users, they found that the social nature of TV viewing was enhanced in creating a sense of closeness and also triggering social interactions not only over the system’s interface, but also more directly e.g. by phone.

As the sources for and amount of TV content offered continue to grow, the electronic program guide (EPG) becomes an increasingly more important tool for the TV consumer. Obrist et al. [14] developed and tested a prototype EPG for mixed content deploying a user-centered approach. The prototype gave access to content from several sources: broadcast TV, local content on a PRV or other media server, an on-line content available over the Internet.

Besides Social TV and services managing audio-visual content, television has been an important application for the mobile community [5, 9, 13]. Issues about limited bandwidth and small screens taken apart, the main challenge for mobile TV is the place of watching in the mobile scenario.

METHOD
This study has two parts: a survey and a set of interviews. The survey was used to gather information about our user group, while the interviews were used to deeper explore their TV watching.

Subjects were recruited from users of an existing test bed. In this testing environment a number of households are connected by optical fiber to an experimental, open (operator neutral) access network that allows for measuring traffic, testing of different technical equipment, and investigating viewer behavior. The open access IPTV platform OpenChoice provides TV and TV based services. Connected households – test pilots – receive an OpenChoice set-top box with access to a number of TV channels and a set of example services. At the time of the study test pilots had access to around 45 TV channels and a few services such as an on-demand video service (free but with a very limited set of movies), a guitar course and an electronic program guide.

Survey
The test pilots had originally been recruited based on where they lived, i.e. that their homes were already connected to the experimental network. Several households had additional TV providers since the test bed had not been entirely reliable, especially in the beginning of the project. All households in the survey were test pilots and all test pilot households were prompted to take the initial survey. The number of family members in the participating households ranged from one to six, see figure 1. Thirty-six of the families lived in separate houses and 14 in apartments. Seventeen respondents were younger than 35, 15 were ages 35-44, and 18 were older than 44.

Figure 1: Distribution of family size in the testbed households

The web-based survey was distributed by email to the contact person of each of the 52 test pilots in, a procedure well known to them. Subjects were anonymous to us but not to the test bed administration. After two weeks and a few reminders 50 households had submitted their answers and the survey was closed. The survey contained 27 questions, mostly multiple choice but also a few open questions. Background questions were asked on age, gender, household size and TV arrangements. The remaining questions were grouped into four categories: TV habits and attitudes; social aspects of TV

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2 The test bed is administered by Acreo, www.acreo.se.
Broadcast TV can be described as a flow of programs that are delivered to viewers, in a predefined order, in a one-way flow [10]. Viewers can choose when to watch and on which channel, but they have no further influence on the content that is delivered to viewers.

According to the survey results they were average families in terms of TV watching. They watched TV daily, mostly during the evening and night, and had in average 2.1 TV sets per household.

The most watched categories of TV programs were film and drama, entertainment and news. Series were very popular in the youngest group, while the 44+ age group dominated in watching culture and music. From previous studies we know that TV watching is a social activity that often takes place in groups [7] and that is discussed with friends and coworkers [11]. Well in line with this, 35 respondents reported watching TV with other people daily and 46 communicated that they discussed what they had watched with others. 37 subjects also reported watching the same shows as friends or colleagues. For detailed results from the survey, see [16].

**Interviews**

Once the characteristics of the user group were established we proceeded with interviews to get in-depth information on TV watching. First, four pilot interviews were conducted. Pilot interview participants were recruited through notes on billboards in Stockholm and had no connection with the experimental IPTV environment in Hudiksvall. Two men and two women aged between 36 and 61 were interviewed; two of them lived by themselves, one in a family with small children, and the fourth in a relationship. The pilot interviews covered the same content categories as the survey and contained additional questions on movie renting, additional activities the TV was used for, and questions on what kind of TV on-demand services participants would like in the future.

After the pilot, ten households were selected for interview. We aimed to select people that had some experience of watching on-demand TV, such as watching TV on the Internet or using the test service for on-demand video that subjects had access to. However, only five survey participants had that kind of experience at the time of the survey. They were chosen for interview, and in selecting the rest we aimed for diversity in terms of age, gender, and family size, see table 1 for details.

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Table 1: Attributes of interviewed households. #I = No. of people interviewed, #F = Size of family.

All but one interviewed participant had experience from watching TV material on the computer; however, three of them had only tried once or twice.

The interviews were semi-structured. Based on the survey and pilot interviews, the following themes were chosen: TV watching (why people watch what they watch and how they choose it), TV shows followed, recording habits, movie renting habits, other activities the TV is used for, and watching TV material on the computer (over the Internet). Questions about future on-demand TV were excluded since pilot participants had manifested difficulties talking about unknown services.

Each interview started with questions about what participants watched on TV last night to provide an easy introduction to the subject. A paper TV guide was provided in case participants needed memory support. Four interviews were conducted in the homes of the participants and six in a conference room at Acreo, at the participants’ choice. All members of the household that were interested were invited to participate; three interviews involved more than one participant (table 1). All interviews were conducted in Swedish and audio recorded. The analysis of the interview data consisted of categorizing the raw data guided by grounded theory. The resulting categories were unplanned TV watching, planned TV watching, existing on-demand behavior, and TV environment/hardware merge, and will be further discussed in the following.

**TV WATCHING WITH AND WITHOUT PLAN**

Broadcast TV can be described as a flow of programs that are delivered to viewers, in a predefined order, in a one-way flow [10]. Viewers can choose when to watch and on which channel, but they have no further influence on the content that is delivered to viewers.
delivered to their homes. Our view of the flow in this paper adheres to Jensen’s et al. concept of super-flow (described in [10]) containing the broadcast of all the channels that viewers have access to.

Our participants orient themselves to this flow of programming and navigate it in a way very similar to that of the participants in Taylor & Harper’s study [19] in that many times no conscious or explicit decision process is present. However, in some cases they had very specific plans.

**Unplanned watching**

Several participants reported that they do not plan their TV watching. They did not read TV guides or TV sections in newspapers. Rather, when they wanted to watch some TV they just sat down in front of the TV set, turned it on, and tried to find something that they liked.

*I don’t read the TV guide. It is uninteresting to me when I read the paper in the morning. I just sit down [in front of the TV] and look what is on.* (Interview 7)

The lack of planned TV watching did not mean that participants never watched an episode of a series or other reoccurring element. However, they pointed out that they did not adapt to TV nor structure their day to fit with TV schedules. If they had time when an episode of a series they liked was on they might watch it but if they were doing something else they would not stop that activity in order to watch TV.

*If something else would come up? Then we skip the TV (interview 1)*

A special case of unplanned TV watching occurs as a part of a more or less daily routine. When dinner, homework, chores and other daily activities are finished and kids are in bed (if they are young), an open time slot occurs. As O’Brien et al. put it, “The technology not only fits within routine but may be used as a means of constructing the very routine of home life” [12, p 292]. Many of our participants reported that they usually ended up in front of the TV by the end of the evening and watched something that was on without a special plan.

*There is some lazy watching. It’s after eight or nine o’clock that we sit down. And then it’s a little random what is on.* (Interview 1)

In those cases, they reported having no particular preference for channels and would for example watch any news broadcast that happened to be on when the TV was turned on. To them, the free TV watching slot in the evening was more about the relaxation or the break from chores than about the actual TV content.

*We usually end up in front of the TV around the news, or any one of the news, there are many. Then when you are done for the night and relax then it’s nine o’clock, and then we often watch.* (Interview 7)

Other daily TV routines were found in [16] where parents for example let children watch kids programs every evening because it was a good routine for them, dinner, TV, and then going to bed.

Our participants also navigated the broadcast flow by sticking to favorite channels. That way they could quickly find things they liked to watch without reading TV guides or having to browse through a large number of channels. The channels that were most often mentioned as favorite channels were theme channels such as Discovery or Animal Planet.

**Planned TV watching**

When our participants planned their TV watching it was mostly connected either to a specific TV show that they followed, or to TV content related to some specific interest that they had.

**Series**

Many participants had a complicated relationship to TV series. On the one hand, many of them had one or more series that they liked and wanted to follow. On the other hand, they did not like to be caught up in watching a show at a specific time and day for a long period of time and found it difficult to watch a whole season. For example, one participant preferred miniseries, with two or three episodes, which felt less bothersome to follow.

*It has happened that we followed one of these shorter series, two or three episodes. That’s about what we can take, then it becomes too much.* (Interview 7)

Other participants reported that they preferred series with a finished story in every episode, since that minimized consequences if an episode was missed.

*These series like House work since the episodes are separate, and then you can have a few holes. It doesn’t matter because you know the basic theme.* (Interview 11)

However, not all series have a structure with separate stories for each episode. Often there is a high level story that spans over a whole season, making it difficult to follow what is going on if some episodes are skipped or if episodes are watched in the wrong order. Our participants mentioned 24 and Lost as examples of such series.
For example 24 that is on now. You can’t miss a whole episode, you have to follow it all the time, for 22 episodes. Series like that are really hard to follow. (Interview 11)

A few participants had solved this problem by downloading material from the Internet.

Special interests
Special (leisure) interests were the prime matter that made participants plan their TV watching, arrange for recording broadcasts that they were unable to watch, or watch TV at inconvenient times in case of lack of recording equipment. It was also the most frequent matter that made participants learn about and use the possibilities they had for on demand TV. The most prominent special interest in our material was various kinds of sports. Sports events were found important enough for people to deviate from daily routines to be able to watch. Participants also reported following the whole season of various sports such as soccer or hockey.

EXISTING ON-DEMAND BEHAVIOR
Our participants had access to two types of on-demand TV: a test service for on demand movies which was free but only contained a limited movie selection, and the TV content made available on the Internet by the TV channels. Three families owned a recording device and could thus create their own time-shifting.

Our participants showed a limited amount of on-demand TV watching. Only three participants had tried the movie service (8,9,11), and one had tried to watch a movie but failed (6). A few participants watched movies in a more traditional on-demand way at home. Two participants reported renting movies regularly (7,10), one family received a movie every week from a movie service (8), and two participants (5,9) reported that they download movies from the Internet.

Time-shift by watching recorded material was rare in our material. Only three families had equipment to do that but they did not use it frequently. The only type of TV that they reported occasionally record was sports events that they followed.

I record if I can’t watch. I buy the DVD after the season but I still want to watch it. You see it sooner on TV. That’s the only thing I record I think. (Interview 4)

Using the Internet to watch TV on-demand was more common. All but one participant (10) had watched TV on the Internet at one occasion at least. Web TV was used both for time-shift, catch-up, and to get access to content that participants did not have in their regular TV package.

One family reported that they used the computer to time shift when they were interested in different shows that were aired on the same time.

You watch ’The angry carpenter’ when I watch ’Mama’s boys’ right? So sometimes I go and watch ’The angry carpenter’ on the computer instead. (Interview 6)

The computer was also used for catch-up purposes, i.e. to find material participants had watched a part of on regular TV and wanted to see the rest of on the computer.

When you start watching at the end and only get about the last quarter of the program, and then you can go back and watch the same program from the beginning without waiting for a rerun. (Interview 11)

On some occasions, social cues such as discussions at work or with friends made participants watch TV material on the computer. Other people would talk about something that they had seen in a way that inspired our participants to find it and watch it later.

The time when Jan-Tore had his big hand and waved when he greeted the boats. The story was told at work and I thought I had to see it. (Interview 11)

Another reason for watching TV on the computer was using Internet as a resource for TV material that participants did not have access to in their TV package. The interest in such material usually related to various special interests such as particular sports and in one case nationality: one person was Norwegian and did not have access to any Norwegian channels in his TV package.

I watch NRK on the computer. It’s a channel I don’t have. (Interview 1)

Participants’ special interests were highly reflected in what kind of TV material they watched on the Internet. Sports event were commonly watched, for example when important games were broadcast on channels participants did not have access to. Sometimes, the interest for specific sports or sports event was so deep that participants watched it on the Internet when they had missed the live broadcast even though they knew the result.

I could, I don’t have to see it live ... I want to see facial expressions and why. (Interview 9)
Sports were also the only example in our material that participants were willing to pay for, even though the majority tried other ways to get access.

But when it’s ice hockey then it’s eliserien [Swedish league]. Then I buy, I usually buy, that’s canal+. (Interview 11)

A large part of the on-demand TV watching in our material is related to the flow of linear, broadcast television. Participants reported going to the computer to find programs that they would have liked to watch when they were broadcast but could not, either because they were aired at the same time as something else, or because the person was unable to watch TV at the time. Another common reason for on-demand watching was that participants could not watch the program they wanted because it was not included in their flow. Thus, there is a strong connection between the broadcast flow and the on-demand watching. In many cases the flow actually is the prime trigger for the on-demand watching.

TV ENVIRONMENT/HARDWARE MERGE

TV watching is an activity that is highly social and usually has a prominent place in the home with comfortable seating for the whole family [1]. Computing, on the other hand, is mostly considered as an individual activity. This is reflected in that a computer often is set up for one person at a time using it. The placement and other arrangements of course influence how the TV and the computer are used. In our material we see differences in how participants watch TV on their TV set compared to how they watch TV material on the computer.

For example, there is very little browsing in the TV material watched on the computer. Participants reported that they usually had a plan for what they wanted to watch when they went to the computer. Once they had found the specific material, they watched it and then they were done, while at the TV set they often sat down without a plan and browsed among different channels.

Then I sit down in front of the computer and watch, and when it’s over I turn it off. I know beforehand what to watch. (Interview 1)

Watching TV material on the computer often took place in the “office space”, i.e. where the computer was placed for home work or other administrative tasks.

We have a little computer table upstairs that I sit at. But you can move it around [the computer] if you want to. (Interview 6)

When participants reported that they moved the computer to watch TV material, they still did not place themselves in the TV couch even though they had laptop computers with wireless network.

I mostly watch in the kitchen. (Interview 1)

The impression from the study was that the physical settings highly influence the participants’ behavior. The placement of the computer does not afford the social and relaxing activity that TV watching represents to them, which makes them watch TV material on the computer in a different way.

Another physical factor that affected the TV watching of our participants was the home infrastructure. One family reported that they had only briefly used the set top box for the IPTV, since cable length, placements of outlets, and their TV location forced them to draw the TV cable across the living room floor.

One participant stated that the reason why his family had never connected a computer to the TV was that they had stationary computers: they did not have cables long enough to reach between the computers and the TV set.

If you have a laptop it might be easier, but if you have stationary computers it’s far [to the TV] if you don’t have wireless ... Then it feels easier to watch on the computer if I want to see something there (Interview 4)

As a counter example, one of the participants (5) had a significantly different physical setup in his home. He had a 52 inches screen that served both as TV and the only computer screen. A cordless keyboard and mouse made it possible for him to use his computer while sitting in his TV armchair, and to switch between TV and computer with a single key press. With that setup, he watched TV and TV material on the computer in the same setting. Interestingly enough he also reported a more browsing oriented behavior for the TV material he watched on the computer.

When I’m with friends that have a hundred TV channels there might be something good on two, or not even that. While if I open up the computer we can look if there is something, and there is. (Interview 5)

Merging the TV and the computer would not turn our participants into pure on-demand TV watchers, but there is reason to believe that the physical settings do create a threshold. Watching TV material on the computer is physically different from watching TV which also makes people orient differently towards the two.

IMPLICATIONS FOR DESIGN

TV is a mass medium spread in all types of households in the western world and watched by people with large differences in education, financial means, age, technical interest, and technical experience. But television today is different from what it used to be. For the ordinary TV viewers, the combination of new services, distribution mechanisms an hardware creates a
very complex situation, both with regards to navigating and managing content and to compiling and handling the hardware solution.

Our approach has been to study people that are “average” TV viewers and not very tech savvy, trying to find out how to design future on-demand TV for them since they constitute a substantial part of the world’s TV viewers.

We have found several aspects of the TV watching in our material that may help in the design of new TV services, introducing on-demand TV to a broad audience creating a smooth transitioning from broadcast TV to a co-existence of broadcast and on-demand TV.

Using the flow
We see a strong relationship between the flow of linear broadcast TV and the on-demand behavior of our participants. Missing something in the flow, or only watching a part of a program in the flow were the most common reasons for our participants to use their possibilities to go back to the same TV material on-demand.

The relationship between the flow and on-demand TV is very clear in basic on-demand concepts such as time-shift and catch-up. Both concepts are defined as manipulations of the flow, where time-shift allows watching parts of the flow on different times than the broadcast time while catch-up allows viewers to restart a show and watch it from the beginning if they get in late.

The broadcast flow also has a social element that creates on-demand behavior. TV is discussed in work places, schools and other social settings [11] and our participants reported watching TV material on the computer that friends or co-workers had talked about.

Since the connection between the linear broadcast flow and on-demand services for TV is so strong, we argue that it is important to integrate them when designing TV services.

The terror of choice
The purpose of on-demand TV is to give viewers the opportunity to watch TV when they want, and still be able to watch what they want, i.e. to decouple content from a specific time slot. However, in doing this, viewers are not only offered a wider choice and more flexibility but are also forced to make active decisions on what to watch and when.

TV has often been characterized as a lean back medium, meaning that viewers do not take a very active approach to their TV watching. Again, Taylor and Harper found that there was very little rational decision making involved and that people tried to minimize their effort in finding something to watch [19]. Van den Broeck et al. found that even though people like to feel that they are in control of their TV watching, they do not necessarily want to exert that control in practice [20]. Moe also argues that despite the possibility to choose among many different channels there is no real viewer control in broadcast TV: viewers cannot influence what is broadcast or when, only choose if they want to watch or not [10]. We find support for this in our data where participants described that they watched whatever was on when they sat down in front of the TV (see section on daily TV routines). To them it was more important that they had a free time slot to sit down and relax, than finding something they really liked.

The role of TV as a relaxation medium and a social event rather that content consumption should not be underestimated or removed. Again, the importance of integrating linear TV and on-demand TV becomes clear. We believe that viewers’ flexibility and freedom of choice should not come at the expense of the opportunity to tap into the broadcast flow without having to actively make decisions.

Consequences of choice
The ability to choose what to watch on TV through on-demand services, using personal video recorders or by other means makes it easier for viewers to watch content that they like at times that suit them. However, when the process of choice to a large extent is governed by viewers’ personal preferences, the room for surprise and unfamiliar content diminishes. Finding something to watch by navigating a flow through for example channel surfing opens up for stumbling upon programs that attract attention or seem interesting at first glance even though they might not fit into a viewer’s preferences per se.

Use of content types for natural transition
In our material we see that participants more easily could apply an on-demand perspective to some types of content than others. We believe that this should be used when designing and introducing on-demand services to a broad audience.

Movies were the type of content that most easily lent itself to an on-demand perspective. Based on a tradition of physically going to the movies and renting films at the video store, “watching [movies on] video is perceived as an event unto itself” [20], p. 36. Similarly, the college students in Barkhuus’ study [3] enjoyed watching movies together with others in the common room, while other TV content was often mediated by the computer. Even when watched on broadcast TV, movies are not aired with the same regularity as series and each movie is separate from the other, thus not creating the same habit as a series or a regular news show. Even though only five of our participants watched movies in an on-demand fashion, either
Series were the second type of content that participants easily could imagine as on-demand content. As described above, several of our participants reported that they found it bothersome to follow series. They found it difficult to watch TV at a specific time of the week for many weeks in a row, and when they missed episodes it was often difficult to get back to the story. This is not new; rather it is one of the reasons for the success of the TiVo in the US and the Sky+ in the UK. PVRs make it easier to follow series as found by e.g. Barkhuus & Brown [3] who observed that people with PVRs followed more series than people who did not have one. We believe that services for series would be an easy entrance to on-demand TV for a broad audience.

The third type of content we found suitable for initial on-demand TV services was more diverse that the two previous ones. We described above that the special interests of our participants created a rather distinct TV behavior. They were more likely to record events related to their special interests (usually sports), and in some cases they were so interested in the details of a sports event that they watched the recording even though they knew the result. Not surprisingly, TV networks have already tapped into this niche. Sports events were the first to be available as pay-per-view just because there are many people who are avidly interested. We believe that the design of on-demand TV services should continue to build on this behavior, and expand it to other areas of interest such as culture, music, science, or nature. People's special interests motivate them to search for material and make active choices which on-demand TV should strive to support.

Moreover, it is worth noting that the sport interest in some cases goes beyond the live broadcast and the excitement of not knowing the outcome. Therefore recording races, buying the season on DVD, or watch an already finished ski competition on the Internet still holds great pleasure. Sports and news are the content categories where the live component usually is deemed to be the most important, but we believe that there is room for archival services for this type of content too. Re-watching is re-living the experience.

TV as a service – regardless of the medium
The distinction between watching TV on the TV set or on a computer may seem like a natural starting point for the design of the new services needed to handle current and future TV viewing. At the same time, an important effect of the current technological development is that computers are developing into TV devices while TV sets are provided with in-built Internet connections and intelligent set-top boxes.

The college students in Barkhuus study on TV watching on the Internet used computer to access TV material [3]. Viewing practices were different compared to traditional TV viewers, e.g. more viewing alone and less browsing for content. We found similar results in our study, where the rationale for enquiring about computer TV viewing was to access on-demand behaviour among our subjects. It could however be argued that these new practices are brought about by the medium – the computer – rather than the activity of Internet viewing. Being designed for single-user deployment, the traditional computer does not afford social TV viewing to the same extent as a TV set does; the computer is considered as a work tool and therefore placed in “the office” rather than in the living room; and interaction capabilities by far exceed the interaction with the TV set.

Our conclusion is that it is crucial to consider TV as a service regardless of the medium. In designing for this current and future service in all its complexity, lessons learned from studying both traditional and computer-mediated television viewing should be taken into account.

CONCLUDING REMARKS
We have discussed the design of future TV services combining broadcast and on-demand TV based on TV watching habits of ten average TV viewers. While their on-demand behavior was limited, we could still see that the on-demand watching that did occur was motivated by factors such as limitations in their broadcast flow, special interests and social cues. These factors should be used in the design of future TV services. Moreover, we found a strong connection between the broadcast flow of programs and the on-demand watching, since the broadcast flow triggered many cases of on-demand watching. We believe that on-demand TV would benefit from a close integration with traditional broadcast TV to be able to draw upon its flow.

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