A Cultural Probes Study on Video Sharing and Social Communication on the Internet

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ABSTRACT
The focus of this article is the link between video sharing and interpersonal communication on the internet. Previous works on social television systems belong to two categories: 1) studies on how collocated groups of viewers socialize while watching TV, and 2) studies on novel Social TV applications (e.g. experimental set-ups) and devices (e.g. ambient displays) that provide technological support for TV sociability over a distance. The main shortcoming of those studies is that they have not considered the dominant contemporary method of Social TV. Early adopters of technology have been watching and sharing video online. We employed cultural probes in order to gain in-depth information about the social aspect of video sharing on the internet. Our sample consisted of six heavy users of internet video, watching an average of at least one hour of internet video a day. In particular, we explored how they are integrating video into their daily social communication practices. We found that internet video is shared and discussed with distant friends. Moreover, the results of the study indicate several opportunities and threats for the development of integrated mass and interpersonal communication applications and services.

Categories and Subject Descriptors
H.1.2 User/Machine Systems, H.4.3 Communications Applications, H.5.1 Multimedia Information Systems

General Terms
Design, Experimentation, Human Factors.

Keywords
internet video, online communication, cultural probes, user study.

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1. INTRODUCTION
Since the internet has widely spread among the western population, streaming video services such as YouTube and file sharing (e.g. torrents) have grown in popularity and represent an ever increasing amount of internet traffic [13]. At the same time, instant messaging has also become extremely popular [15]. More recently, online social networking sites (e.g. MySpace, Facebook) are employing the use of commercial and personal media content as a profile characteristic. Although there are some studies on the sociability that develops around media content, there is no ethnographic study that focuses on internet video and sociability.

Previous research on the social impact of communication technologies has followed two distinct directions and has considered independently either the interpersonal communication, or the mass communication [2]. In this article, we examine the human-computer interaction aspects of integrated media and social communication. We explore requirements for the design of Social TV systems that support interpersonal communication, which is motivated by mass media consumption and which takes place over distance. Our goal is to establish a holistic outlook on internet video use and interpersonal communication.

The rest of this article is structured as follows. First, we review related research, identify open issues and then we formulate research questions. Next, we describe the methodology of our study. We employed a short structured interview for pre-screening of participants, cultural probes (media diary, photographs), software monitoring and bookmark-analysis, in order to study the behavior of the participants during everyday life. Finally, after presenting the findings we draw conclusions and make suggestions for further research.

2. RELATED RESEARCH

2.1 Social Aspects of TV
Within media studies, television has received significant attention, although it has remained a controversial electronic medium. For example, some researchers have blamed television for a fall in civic engagement ([14], page 228). On the other hand, there are researchers ([16], page 32) who argue that TV creates a shared and common experience that bonds together members in an extended society. Indeed, people lead widely diverse lives and activities, but TV and other mass media (radio, newspaper) provide a common point of reference or a kind of "social glue" that bonds both strangers and acquaintances together [10].

Despite the many criticisms on the quality of TV content and on the passive nature of the watching activity, the social uses of TV have been documented in acclaimed research [4], [9], [11]. In particular, the use of audiovisual content as a placeholder for starting and sustaining relationships (e.g. discussions about yesterday's football match or a popular TV series) is an everyday experience for the majority of TV users. Nevertheless, the pressures of daily life and the increase in the number of diasporic households make joint television viewing increasingly difficult.

With regard to distant social communication, there has been a significant body of computer supported co-operative work (CSCW) research on facilitating interaction among geographically distributed co-workers, but there is limited investigation in the context of leisure activities, such as TV. As a matter of fact, there is not much knowledge on designing applications for leisure or informal TV sociability. Previous research has not considered a closer integration between mass media content and social communication. Social TV applications have a wide appeal as audiovisual content becomes more closely integrated with the social structure of web video services, such as YouTube and MySpace.

There are some early studies on interaction design for distant social communication over internet video. Geerts [7] compared voice and text chat during remote TV watching and found differences between the preferences of young and senior viewers. Moreover, he raised the issue of distraction during the use of interpersonal communication channels (e.g. text, voice). On the other hand, Weisz et al. [17] examined how groups of friends and strangers interact, and found that chat has a positive influence on social relationships, and people chat despite being distracted.

Both of the above studies were performed in a laboratory setting. Therefore, the findings might be very trustworthy, but might not be realistic. The main question then is if and to what extent users employ distant interpersonal communication while watching videos online.

2.2 Ethnographic Studies

In the past, ethnographic and survey studies have documented the social uses of TV [4], [9], [10], [11]. More recently the convergence of computing with mass media has provided many opportunities for studying emerging user behaviors. Indeed, according to Brown and Barkhuus [1], the life cycle of digital television has grown in several directions besides enjoying the favorite content on the broadcast schedule. In particular, modern television viewer behavior includes the management of personal collections of TV shows, and sharing and discussing them with others.

Darnel [3] investigated the use of established TV technologies such as traditional TV and digital video recorders (DVR). The most popular behavior among DVR users is to fast-forward past ads while watching prerecorded or delayed TV. Besides skipping ads, users employed rewind to correct for skipping. The second most popular behavior was to pause the video in order to pay attention to something else. Most notably, DVR users begin their TV watching sessions by selecting a prerecorded program instead of a broadcast.

Harboe et al. [8] performed an ethnographic study of a traditional TV set-up, which is enhanced with novel communication devices that support lightweight remote awareness. They reported that the ambient communication devices have enhanced the shared experience of TV watching over a distance. The main contribution of this study is that it considers an alternative channel for the interpersonal communication aspect of Social TV. Nevertheless, current users of media and social communication technologies might not be willing to combine distinct communication channels if they could employ a single computer for that purpose.

Obrist et al. [12] performed an extensive ethnographic study of interactive TV use. They employed diaries and cultural probes and evaluated a broad range of ITV applications. They found that the preferences of different user groups (e.g. couples, singles, flat sharing individuals, seniors) could only be fulfilled with an equally diverse set of ITV applications. Although they offered several findings, their ethnographic study was not focused on the social aspects and therefore they did not describe the respective practices.

2.3 Combined Video Watching and Distant Interpersonal Communication

There are several applications that offer a combined video and interpersonal communication feature. For example, Joost was developed by the creators of a popular social communication platform (Skype) and offers a video streaming application that allows instant messaging between viewers.

Besides integrated applications, there are many alternative ways to watch video online and have a chat with a distant viewer. Most notably, YouTube's comments function is a popular social (group) communication feature; yet writing a comment on a web page is more like writing on a public notice board for a stranger to read. However, the social aspect of TV is linked rather to the actual social environment than to strangers.

In order to explore the synergy effects out of the combination of mass and interpersonal mediums, we conducted an ethnographic study. We aimed to document everyday media usage of heavy users of internet video, to identify unfulfilled needs concerning internet video and interpersonal communication and to make suggestions for Social TV systems.

In summary, most of the previous studies on TV sociability belong to two categories: 1) traditional studies on how viewers socialize while watching TV, and 2) studies on novel applications (e.g. Joost) and devices (e.g. ambient displays) that provide technological support for TV sociability over a distance. The main shortcoming of those studies is that they have not considered the dominant contemporary method of Social TV. In the rest of this article, we examine how viewers employ internet messaging and video tools for a shared TV experience over a distance.

3. METHODOLOGY

3.1 Objective

The social aspect of internet video is in some ways similar to the social aspects of television: discussing certain shows, watching TV together or recommending programs. Our main research question was: What role does internet video play in everyday domestic media consumption and online social life?

3.2 Approach

> "Probes represent both a method and an approach. Taken as a method, they suggest the use of multiple, easy-to-use tasks to make the job of collecting data more engaging. As an approach, they advocate the use of open, ambiguous, and even surreal tasks as a way of undermining the assumptions both of volunteers and researchers." (http://www.equator.ac.uk/index.php/articles/629)

Gaver et al. [6] introduced simple data collection tools called "cultural probes" in order to include users in the design process. Probes were reported to allow users to gather information from their own lives, thus providing designers with a better understanding of users' daily routines. Unlike direct observation such as usability testing or traditional field studies (e.g. ethnography), cultural probes allow users to self-report and provoke "inspirational responses" [5].

Since cultural probes are a design-led approach, there is no given way to analyze the gathered data. It is possible, for example, to build up patterns of how users behave, to create personas or to just let the used probes sink in. In any way, making participants' notes and photos available to project team members provides a good way to communicate findings and gives fragmentary clues about the subjects' lives and thoughts. In particular, this approach is valuable in inspiring design ideas for technologies for the home [5].

In order to gain insights into the everyday lives of internet video users, we used the following data collection instruments: 1) short structured interview, 2) cultural probes (media diary, photographs), 3) software monitoring and 4) bookmark-analysis. Since internet video is watched mostly for entertainment purposes, we concentrated on the participants' homes and their media-related leisure activities. We tracked the media consumption of the subjects during one week. We tried to ensure that that week was just a usual week in their lives (they had to be as healthy as usual and go to university and/or to work, just as they usually do).

3.3 Procedure

The participants used internet video heavily. Internet video includes streaming video services such as YouTube, videos downloaded from the Web, through file sharing, torrents, etc. We defined as "heavy" the users who watch an average of at least one hour of internet video a day.

In order to methodically determine if every person in our sample could be categorized as a heavy user of internet video and to gather general information, we conducted a short structured interview, asking about demographics, computer usage, internet usage in general, usage of internet video services in particular and usage of other media (mobile phones, newspapers, magazines, television, radio, DVD, cinema).

We developed a structured set of questions and added predefined answers to choose from. But the participants still had the chance to give their own personal answers. This way, the interview could be completed effectively in short conversations (approximately 15 minutes) with the interviewees, who had the chance to ask questions in order to clear up possible misunderstandings. Thus, the team explored the media consumption of the sample in general before using other methods to gather more detailed information. All participants were asked the same questions in the same way.[1]

3.4 Materials

The cultural probes given out in our study consisted of common everyday practices, which included the task of taking photos and writing diaries. The participants were briefed after the interview described above, given a kit of materials and instructed about the requirement to note specific events, feelings or interactions over a specified period of time. We encouraged the subjects to use the cultural probes in the way they liked and we explained how notes, photos and drawings help us to better understand their wishes and needs. The probes were left with the users for one week.

Media diaries: A diary is one of the simplest cultural probes and still one of the most important ones. The purpose of this probe was to produce self-reports of media usage during an ordinary week. The diary included some instructions and questions about the participants' day, exceptional situations and their feelings.

The size and form of the diary is relevant to how it is perceived by the participants. That is why we personalized the cover of the diary to motivate the subjects to fulfill the task and to further personalize it by putting pictures or drawings on it. The instructions on the first page of the booklet were meant to structure the notes, rather than push them in a certain direction. At the beginning of the study, a lot of blank space could be overwhelming to the participants. Therefore, we pointed out that it was not necessary to complete the whole booklet.

Photographs: As with many probe-inspired studies, our subjects were asked to take pictures of particular places and things in their homes with a special focus on new media devices. Some of the requested photographs were extremely open-ended or even absurd, such as "something you would like to get rid of" or "the eeriest place in your apartment". By using this probe, we expected to get an intuitive insight into the participants' everyday lives, their home environments and their habits of media consumption. As Gaver et al. [5] put it, "accidental glimpses of the home's atmosphere were as informative to us as more purposeful presentations made by the volunteers."

Our picture requests regarded the subjects' households because the focus of the study was leisure time. Some examples of questions were:

1. Place at home where you spend most of your time
2. Your favorite place at home
3. Place where you work (if you ever work at home)

[1] The exact wording of the questions in German and their translation into English is available on request.

Figure 1. An empty CD and a list of possible topics to photograph during the study

Software Monitoring: We used Mouse Odometer to collect behavioral data about the computer programs the subjects used. Mouse Odometer (www.modometer.com) is a tracking tool and participants were asked to install it on their computers. It gathers rough statistical data, such as mouse mileage and number of mouse clicks, keystrokes and scroll wheel rotations users make while using specific software.

At the end of the week we collected the information in the form of charts. In this way we were able to find out which computer programs the participants used most (with special focus on web browsers, applications used for video and social communication).

Bookmark Analysis: In order to gather information about the video websites the subjects liked or found important, we conducted an analysis of their bookmark-list. Our team examined the bookmarks and tried to sort them in categories, regarding the structure of every participant's list. The focus of the analysis were the websites which were somehow linked to internet video (torrent websites, streaming video websites, sites hosting movie subtitles, etc.).

3.5 Participants

All participants fitted the definition of heavy users, watching an average of at least one hour of internet video a day. The sample consisted of six subjects (recruited with convenience sampling). They have been using the internet for (nearly) a decade and were daily users of internet video in the broadest sense (ranging from streaming video to movie downloads). Four were male and the other two were females. Five of the participants were students and one has already graduated and was working as an IT-specialist.

Their age was between 21 and 30 years, the average age being 25 years. Four of the subjects were living alone and two were living in shared flats with other students. Four of the subjects used laptops at home and the rest used desktop computers.

All participants had some extra accessories for their computers: external speakers, headphones, webcams and microphones. In the interview they stated that they use their computers seven days a week and between four and eight hours a day. When asked what purposes they used their computers for, every person of our sample named at least four different things, whereas everybody used their computer for entertainment, information and communication.

On average the participants have been using the internet since 1998, have had an internet access at home since 1999 and have been "daily users" since 2002. All of them were using the internet mostly at home (where they all have a DSL internet connection), but also at other places like university, work, library, etc. All participants watched short videos online (e.g. user-generated videos, like in YouTube). Almost all of them also watched movies, music videos, TV series and TV programs online. On average they spent between one and two hours a day watching internet video.

All six of our selected heavy users of internet video owned and used technical devices such as mp3-players, mobile phones, stereos, DVD-players etc. Mobile phones and mp3-players were mainly used over short periods of time or on the way to work. In contrast to this, the subjects spent several hours a day online.

All subjects owned mobile phones and used them for communication (calls and messages). Two subjects also used them for music (like mp3-players) and one participant went online with his mobile phone. Almost all subjects (with one exception) read newspapers and magazines – both on and offline. Two of the subjects did not have a TV and the other four had one but spent only one to three hours a week watching it. Almost all participants (again with one exception) listened to the radio (again both on and offline) and rented DVDs occasionally, watching them mostly on their computers. Some of the subjects went to the cinema only once a year and others more than twice a month.

Although our study was deliberately focused on young experienced internet users, it would be worthwhile to perform further studies with different user groups. It is expected that results might differ considerably. On the other hand, the participants in our study might be representative of "early adopters" and "innovators" of social communication and video sharing on the internet, thus providing early insights in emerging media users' behavior.

4. Results

Next, we present the results of the cultural probes (media diary, photographs), software monitoring and bookmark-analysis.

Media Diaries: Since it was left open to the participants how to accommodate their personal media diary, the diaries were kept very differently. While some participants delivered an elaborate, detailed and emotional description of their daily routine and of their use of media, others confined themselves doing a rather rational and quantitative documentary. Some of the participants wrote down little poems or melodies.

It is apparent from the different records that the internet and the computer are used in almost the same intensive and regular manner by all participants. Most of the subjects turn on the computer right after getting up from bed to check their emails and read the news. Some do not turn off their computer when leaving the apartment for several hours and some even keep it turned on 24 hours a day:

"Basically my computer was turned on all day long and my desire to communicate made me check my emails every two minutes and wait for some of my friends to come online." [diary excerpt]

TV and radio were used rather rarely compared to the computer/internet. Some participants listened to the radio while having breakfast or in the car, where it served as a kind of

background noise. The TV for the most part was watched selectively in the evening (no channel surfing).

All participants showed an exceptional interest for movies, series and documentaries. Many of them regularly searched for new and interesting videos online. Some used the online service Stumble Upon (http://www.stumbleupon.com), which makes recommendations for potentially interesting new videos. The analysis of the diaries suggested that some subjects were probably spending more time with videos than they had stated in the interview beforehand:

"I turned on my computer at about 8 a.m. and I did my daily routines like checking my emails, visiting the website of my university and looking for interesting films […]. Then I realized that I feel like watching anime all day. That is why I dedicated myself to something I have wanted to do for several months: watch all Death Note episodes at once (37 episodes altogether). The first time I tried that I didn't manage to watch even half of them." [diary excerpt]

Figure 2: Example of a media diary

Besides entertainment and information, social communication is an important function of the internet for the participants. All of them use applications and programs like Skype or msn messenger and email. It is notable that it seems common for people to put links to internet videos on their Skype profile to recommend them to their friends:

"I watched videos on www.vbox7.com for half an hour. It all started because some of my Skype contacts have put links to certain videos as a personal message on their Skype profile." [diary excerpt]

Some participants wrote in their diaries that they often chat with friends and family members while watching the same video online. Other participants did not state explicitly that they communicated about online videos using instant messaging, but the diaries made clear that chatting and watching videos online were integrated in the same intervals of their daily routines: approximately between 8 and 11 p.m.

Furthermore, one of the participants included very detailed information about the videos he watched combined with indirect recommendations to the investigators to "check them out":

"I downloaded the episodes from the following website: www.deathfan.com (to whom it may concern: on this website you can find the links for the video files. They are located on the megaupload-servers)." [diary excerpt]

Photographs: All subjects took a picture of the place where they used their computers as the place at home which they liked the most or where they spent most of their time. At the same time, the computer defined the place where they worked, went online or even where they ate most frequently (this was the case for two of the participants).

It is notable that some subjects used their laptops on the sofa or took them to bed. This behavior means that the different "functional spaces" at home (sleeping, working, eating, spending time with friends) are not separated from each other, due to the adoption of mobile internet access. In fact, computer and internet are fully integrated into everyday life at home and serve as a companion while relaxing, working and eating.

Figure 3: Examples of places at home where the participants spent most of their time

Figure 4: Examples of places at home where the participants spent most of their time working

Software Monitoring: The data logs confirmed the categorization of the sample as heavy users. The mouse mileage and the number of mouse clicks and keystrokes were in agreement with the pre-study self-assessment. The application used most often by all subjects was their web browser. Although we could not monitor the activation of certain plug-ins within the web

browser (e.g. Flash Player used by online video sites) it became evident that all subjects had a video player in their top ten most used applications (VLC Media Player, BSPlayer, etc.). Most of them used torrent clients; all of them used Skype and sometimes other additional instant messengers.

Bookmark Analysis: The number of bookmarks of the subjects ranged from fifty to more than a hundred. They were sorted into categories like "studies", "video", "news", etc. The bookmarked pages spanned along a lot of topics: they ranged from bank websites to websites about artificial intelligence. Each participant also had a substantial amount of unsorted websites and dozens of websites related to internet video in their bookmark list. Here as well, the interests were very diverse: TV-shows, movies, video guitar lessons, documentaries, anime, etc. The subjects not only bookmarked search engines or hosts for internet video but also specific videos.

5. Discussion and Further Research

The results from our study show that heavy internet users have integrated internet video as a part of their daily television watching. Moreover, several casual domestic activities are revolving around the computer. That is the place where they are having meals, communicating with friends and members of the family. The traditional image of the computer situated on a desk where someone is working in an efficient and rational way did not apply. In fact, the computer/internet was a constant companion at home. Our study revealed that the personal computer might be referred to as an intimate partner or a friend who accompanies someone from the moment of coming home until falling asleep.

In conclusion, there are several findings that might be useful for new services. According to the diaries, the participants followed links to videos from their friends – mostly short videos, but sometimes also whole full-length movies. They regularly discussed and shared video content with friends. They watched videos in their spare time but also liked stealing time with videos and distracting themselves from working or from studying. They did not only spend time watching videos but also searching for videos. They used websites like the Internet Movie Database (http://www.imdb.com) to find out about new movies. They used recommendations from their friends to discover new TV series. They also watched short funny videos and used multiple ways to find them (recommendations from friends seemed to be valued the most).

Besides the conclusions stated above, the software monitoring and bookmark analysis confirmed the interest for videos downloaded from the internet and watched on a computer. The analysis of the bookmarks made clear that users did not only bookmark search engines or hosts of internet video like YouTube, but also links to specific content: e.g. a very funny short video or a very nice movie. In the diaries we found evidence that the point of doing this was not only to watch the bookmarked videos again, but also to be able to instant message a friend with the link when that friend is online.

For the subjects, spending time online meant relaxation, communication, entertainment and information seeking. They were mostly using their computers when they were alone. On the other hand, the subjects had the need to tell their friends and family something about their day, their newest findings online, the funniest videos they have discovered lately, and they used Skype and other instant messaging services to do this. The diaries revealed that they even sometimes tried to watch a video "together", while they communicate online. Just like TV, internet video seems to have an important social aspect.

Our ethnographic study showed that internet video consumption is already strongly integrated in social communication. On the one hand, heavy users of video content mostly use their computers when they are alone. On the other hand they prefer to stay in contact with their friends through instant messaging services like Skype and sometimes try to watch a video "together", while they communicate online. As a matter of fact, Social TV applications could become a feature in existing interpersonal communication tools (e.g. social networking, voice and instant messaging). A person could invite friends to share video content they like and to start watching a video at the same time. Moreover, every person could keep a personal video profile as part of general profile and could be invited to rank the watched content and to comment the videos.

In summary, our study confirms the potential value of technological support for Social TV, but raises some doubts with regard to the path towards a shared TV experience over a distance. In particular, we suggest that popular interpersonal communication tools might offer the most familiar platform for the deployment of Social TV services. In contrast, additional devices or novel applications might be a distraction to the established patterns of everyday life, television watching and communication with distant persons.

6. ACKNOWLEDGMENTS

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