

or aggregate existing video content. However, timing is crucial. The field of web video content providers is already littered with failures or false starts (La Franco, 2000). Further, the cost of transmitting video through a broadband web pipe is relatively unexamined. Some preliminary analyses suggest that the cost in the near-term will be high.

At the same time, web video offers the potential to find new audiences for existing video content that currently reaches a limited market (e.g., independent documentary films) and to help recover some of the lost audience for television. That is, a number of research studies have indicated that people who use the web heavily say that they have cut back on TV viewing. If web users are shifting some of their media consumption to the web, then existing video suppliers might be able to recapture the loyalty of viewers by providing video programming in this new medium. However, it is unclear how much of the reported time displacement (i.e., watching the web instead of watching TV or doing other activities) is actually time stacking (i.e., doing multiple things at once).

This chapter focuses on one piece of the Web TV puzzle: Do audiences want to watch video on a personal computer and is there a demand for all of the associated features that could be provided, such as interactive television, customization of video, and two-way video telephone calls? It draws on some lessons from earlier technology trials, current research about web usage habits, and an in-home ethnographic study of people who have broadband web access.

LESSONS FROM EARLIER NEW MEDIA

In the rush to market web video, there have been few attempts to learn lessons from past trials and market introductions of high bandwidth video over telephone wires and other new media. The value in such a review is not just to prevent a repetition of earlier mistakes. It is also to learn the positive lessons about how to introduce new media effectively. Further, in the case of earlier technology trials that failed, there are often key insights, which in hindsight might have prevented failure and can now be used with foresight to help achieve success during a reintroduction of the service.

A few specific lessons and some general learning from earlier trials are relevant. The first is to be cautious about technological gimmicks. For example, France Telecom has experimented with a new service that can create scents to accompany web content as well as television programs. A similar technology, "Smell-o-Vision," was introduced in movie theaters during the 1950s to help recapture audiences that had been spending more time at home watching television instead of going to the movies. However, consumers saw little benefit in adding smells to movies. Further, there was a significant technological problem: It was very difficult to get rid of a smell created for one scene in order to introduce a second smell for a subsequent scene.

There has also been discussion about creating two-way video phone calls over the web. Video telephony has a long history. In the past, problems included high cost, jerky pictures, and a general networking problem (i.e., there is little value in having a video telephone unless other people with whom you want to communicate also have a compatible video telephone). Even if these problems can be overcome, there is a more fundamental obstacle: Many people in earlier trials and marketplace services simply did not want to be seen (Noll & Woods, 1979).

Many current and planned video services on the web offer small samples of content. This has been problematic in the past. Consumers expect new services to match or exceed what they currently use. For example, when the Discovery Channel tested an on-demand video program service called *Your Choice TV*, it offered a small sample of programs in a few categories (e.g., a couple of soap operas and a few news programs from three or four cable and broadcast channels). Reactions were weak. Consumers expected the service to offer a robust variety of soap operas and news programs, not a limited sample.

Earlier introductions of new media also provide a lesson about the time it takes to develop or discover creative new applications for a technology. Indeed, as McLuhan pointed out (McLuhan, 1964), people tend to fill new media with content from earlier media. So, many early TV programs were radio programs adapted for TV and much of early radio programming consisted of vaudeville acts adapted for radio. It takes time to understand the characteristics of a new medium and create exciting content for it. Often, developers underestimate the time and cost to build creative content that captures audiences.

The past also teaches the value of simplicity. For most people, the anchor service on the web that they value most is not researching topics of interest or having access to millions of content sources. Rather, it is electronic mail—simple communication with individuals that people know or with whom they want to communicate. Much of the early video content on the web is offbeat (e.g., two popular films offered through the web are *Froggy in the Blender* and *Bikini Bandits*). This may reflect the taste of early adopter college students, but in historic terms it does not reflect the demand by mass audiences.

Perhaps the greatest challenge to web video is changing habits. Historically, people have changed viewing habits many times, but there is often a strong inertia factor. Web video faces the challenge that until recently people have used television sets to receive video and personal computers to receive text and graphics. More recently, some personal computers have provided DVD drives that can play movies and high-end personal computer (PC) games have included some video. Further, there is much more use of personal computers for entertainment compared to a decade ago. So, some of the building blocks for changing behavior may be in place.

THE USER EXPERIENCE

In one sense, it is remarkable that video can be transmitted at all over the Internet. In 1996–1997, it was science fiction to believe that the Internet could handle video. Despite extraordinary advances in compression and streaming software, however, most user experiences with streaming video in late 2002 leaves much to be desired. Narrowband video streaming generally provides a poor user experience. Typically, the video is displayed in a small box on the screen. Further, the video may be choppy and the audio may be out of sync with the picture. Downloading video at narrowband access speeds can overcome the problem of choppy performance, but at narrowband speeds it may take several hours to download a 30-minute television program. Broadband access speeds improve performance, but most services still provide less than full screen video and often a user must wait for some of the video to be downloaded into cache. Broadband services at the edge of a network (i.e., on a server at a cable headend or a telephone company central office) improve performance considerably by avoiding traffic congestion in the backbone of the web or links between a video server and the backbone. Further, compression technology has improved significantly, allowing more video data to be squeezed into the bandwidth of a given channel. Compression algorithms are expected to continue improving during 2003 to 2005.

It may be argued that in the late 1940s and early 1950s, most television viewers watched video programs on small screens, often with snowy pictures and double images, or “ghosts,” caused by the reflection of signals off buildings and other large structures. By analogy, it could be argued that web users will accept poor quality video because it is a unique new service over the web. However, early television in the home had little competition and even bad pictures were a technological marvel for the average person. TV over the Internet is one of several ways for households to access video.

What types of video content does a web user encounter? A review of early content models reveals that there are at least six categories with a mix of existing television or film content and some new variations. The first may be called sampling or providing a short excerpt from a longer television program or film, often to encourage a web user to watch the TV program on cable or purchase the film on a videocassette or DVD. A second and related category involves providing a promotional trailer for a TV program or film. Typically, these are the same trailers that appear on television, in movie theaters, or at the front of prerecorded videocassettes. Third, traditional third-party advertising appears on some Web sites (i.e., a video commercial for a soft drink company that appears on a general entertainment Web site). Curiously, to date there has been relatively little third-party video advertising on the web.

A fourth category of content includes full-length television programs and films. The latter category consists of short documentary or animation films

and even full-length motion pictures. These are available as video streams or downloads. The fifth and sixth categories include new content models. These have been labeled two-channel TV and parallel broadcasting. Two-channel TV includes content on the web that complements regular TV programming. In this sense, the distribution of content for a program utilizes two channels, regular TV and the web. There are a few variations within this model. One variation involves text or rich media on a Web site that complements a TV program (e.g., a web game that allows a viewer of the TV program to play along in real time or asynchronously). In the United States, the History Channel offers an online game, *History IQ*, that accompanies a TV program and lets web users play against each other as well as against contestants on the TV program. Another variation involves streaming video that supplements the video content in a TV program, for example, some scenes that were not in the main channel broadcast. Two-channel TV fits within a large subset of user behavior that involves simultaneous use of the web and TV. Most of this simultaneous activity consists of unrelated TV and web usage—for example, a person who watches a sports program on TV while surfing the web for news content. By one estimate, nearly half of web users in the United States make some simultaneous use of the web and TV (Neel, 2000). This group has been dubbed “telewebbers.”

Parallel broadcasting is the transmission of the same content on a cable or broadcast channel and on the web, at the same time or a similar time frame. Most examples of parallel broadcasting have been in Europe—for example, video coverage of the 2000 Summer Olympics in Sweden via both broadcast and webcast. However, there has been some activity in the United States as well (e.g., the parallel cablecasting and webcasting of MTV’s *Direct Effect*. In a few cases, the webcast has included long and largely unedited footage of a TV program before it was televised (e.g., *Big Brother* in Europe and *Inside Cell Block F* on Court TV in the United States).

A review of the user experience with TV over the Internet also reveals that certain types of video work much better in a streaming web environment than other types. For example, video with a lot of motion does not work as well as video with less motion and few pans or zooms. Similarly, close-up shots are easier to view in small boxes on a screen than medium or long shots. Large text fonts are also more legible in this mini-TV environment and simple animation works well because it helps to mask choppy video. In general, the challenge is to adapt content to meet the characteristics of small screen, low frame rate TV.

THE MARKETPLACE CONTEXT

There are at least four categories of video streaming and downloading service providers: original producers of video for the web, content aggregators who specialize in video streaming, video search engines and portals, and traditional video distributors such as cable or broadcast net-

works who offer some video on their Web sites. In reviewing the types of content and services offered, it is important to note first that video streaming and downloading activities in Europe are at least equal to if not greater than in the United States. Overall, there were at least 50 trials of TV over broadband in Europe and the United States and many additional services for the universe of broadband and narrowband users. Several groups have developed robust video streaming services. Further, a few groups have begun or plan to charge fees for their video streaming content.

However, a much greater number of existing Web sites have been "testing the waters" with video streaming or downloading by offering samples of video content and occasional special events such as live sports coverage. Nearly all of the broadcast and cable networks in the United States offer samples of video streaming content on their Web sites. There has also been a great deal of experimentation with video streaming formats and content. For example, in the United States, some broadband ISPs have let consumers upload video clips like the video of a family wedding, store it on their server, and make it accessible through video streaming to other family members or the general public. In Germany, two television stations have created original soap operas for the web. RTL has created *Zwischen den Stunden* (*Between the Hours*), a 3½-minute-long soap opera that is webcast three times per week. Germany's public broadcasting network, ZDF, has created another soap opera, *Etage Zwo* (*Second Floor*). In the United Kingdom, British Telecom has been active in developing video services for its broadband customers.

AN ETHNOGRAPHIC STUDY OF BROADBAND USERS

If video over the web is to be viable, then it will almost certainly require broadband access by users. Many issues then follow: What quality of video content can broadband provide; how fast will broadband services rollout in the marketplace; how quickly will consumer users adopt it; and how will people use the broadband web once they have it? The last question was addressed in an ethnographic study of broadband web households that is reported here.

Ethnography is a research methodology that was developed in anthropology for the study of distant cultures. Anthropologists would live with a native group over a period of months or years and write-up a detailed description of the culture based on observations and interviews. Ethnography was later adapted for the study of Western cultures and the behavior of people in everyday life (e.g., in the work of Erving Goffman) (Goffman, 1959). In the last decade, a number of researchers have utilized this technique for the study of new media use and effects, both for well-established media (e.g., television) and new media (e.g., interactive television) (Carey, 1996; Moores, 1996; Silverstone, 1994).

The study involved in-depth interviews with broadband users (all had cable modem access) in their homes and observations of how they interacted with web content as well as other household media. This small, qualitative study included 18 people in 12 households located in the northeast United States (New Jersey, Massachusetts, and New Hampshire). This form of research complements larger sample, quantitative studies. It is particularly suited to discovering new patterns of behavior and generating hypotheses that can then be tested in surveys or large-scale audience measurement research.

The people in this study had broadband service for periods ranging from 3 months to 2 years; the average was just over 1 year. Approximately one half were classic early adopters (Rogers, 1995). They wanted to be the first person in their neighborhood to have broadband service and some of them worked in computer-related professions. However, an equal number had only moderate interest in technology and did not have homes filled with electronic gadgets. One was a music teacher, another was a professional fisherman, and a third was a salesman.

The group in the study adopted broadband for a variety of reasons. Some recognized that it was the “latest and greatest” way to access the web. They actively sought out service providers in order to be the first to get high-speed web access. Others adopted cable modem service because their single telephone line was being tied up by Internet usage and this seemed to be a better alternative than getting a second phone line. And for some, broadband was adopted as the first web access service in their homes. A number of households were also influenced by the experience of high-speed web access at work or school. Most of the households were price sensitive, but they did a “back of the envelope” calculation and determined that cable modem service cost no more than dial-up service, once the additional telephone charges associated with a dial-up Internet service provider (ISP) were calculated.

It is important to note that no one in these homes used the term “broadband” or adopted cable modem service in order to receive services (e.g., video) that require broadband for an acceptable user experience. Rather, they talked about “high-speed” web access and adopted the service simply to get faster connections to the regular web content. Most understood the concept of broadband service, but it was not part of their everyday lexicon.

Location of Computers

In the homes visited, computer(s) were located in a number of different rooms, including bedrooms, living rooms, and dens. In three of the households, a new type of room emerged—the computer room. To an outside visitor, these computer rooms appeared to be a spare bedroom or a den, but household members identified the room by name (they called it, the

“computer room”) and by association with a computer that defined the space and how it was used. One person, who had recently purchased a house, said that when he was looking for a new home it was important that a potential house have a space that could become the computer room. This behavior is much the same as when people select a new house based on kitchen size or the layout of living room and dining room spaces.

However, household space is a much more complex phenomenon than the simple labeling of rooms such as kitchen, den, living room, or even computer room. One important dimension is integration or openness versus seclusion. That is, some rooms are isolated from the rest of the house in terms of traffic patterns and used primarily by one person, whereas others are open to traffic and use by multiple family members. The computer(s) in these broadband households were located in both open and secluded areas, but the usage patterns were quite different based on their location. In secluded areas, they were a “cave for the hacker” and used primarily by one person. Also, the computer defined many of these rooms and other objects in the room were situated to support the central focus of the room—the computer. In open areas, the PC was used by multiple family members and the computer was integrated within the room rather than a way of defining it.

The function of a room can change by time of day or the positioning of objects within the room. These dimensions in turn can affect the function of a computer in the room and how people use the web. For example, some households in the study included people who work at home. They used the computer for their work during the day in a home office, but after work hours the room’s function changed to a den and the computer was used for entertainment. Others reported that they too visited different Web sites based on time of day. Television usage also varies by time of day. However, most television programming, which is scheduled, changes by time of day to meet the interests of different user groups who are watching at that time as well as the changing interests of audiences over the course of a day. Relatively little web content is scheduled and therefore does not change much based on time of day. Nonetheless, the functionality of the web for many users changes by time of day.

In one household, the computer was located in a bedroom and was enclosed within an armoire that had two glass doors with curtains. The primary broadband user was a male, whose wife did not like technology in the bedroom. When the computer was not in use, the curtained doors to the armoire effectively closed off the computer from the bedroom.

A number of the computers in the broadband households were decorated with stuffed animals on top of the monitor or next to it. Some people placed family photographs and other memorabilia next to the monitor. These forms of decoration are probably not related specifically to broadband, but to a longer term trend of accepting the computer as a social and

entertainment object within the household and not just a work tool. This treatment of the computer as a person or friendly object has been documented by Reeves and others in a variety of settings (Reeves & Nass, 1996). It is significant because it mirrors the treatment of televisions within households in the 1960s and 1970s, when family photographs, trophies, and other personal memorabilia often adorned the top of the TV set. These personal objects were later moved to the side of the TV and replaced by cable boxes, VCRs, or videogame consoles that were connected to the TV.

Colocation with Other PCs and TVs

Nearly all of the households in this study had multiple PCs (some had three or four PCs, including laptops); one in three of the households had two PCs linked together in a home network. More remarkable, many homes had two PCs in the same room. In some cases, this facilitated the home network, but in other cases they were not linked. Rather, the two PCs in the same room indicated an intensive use of PCs by multiple family members in a room that was defined by the presence of the computers. This is not to suggest that they were all work spaces like multiple cubicles in an office setting. Typically, they were assigned to different family members who shared the space and used them for multiple purposes. This is another important dimension to computer use in homes. As households accumulate multiple PCs, some are shared and some are used primarily or exclusively by one person. TV sets in multiple TV households (a common pattern in the United States) also share this characteristic: Some TVs are used by multiple family members and some are “personal” TVs used primarily by one person.

In addition, people in households with multiple PCs made a clear distinction between online and offline computers. Typically, offline computers were older legacy systems assigned to small children for game playing or to household members with less need for or interest in computers. Online computers were newer and had a higher status by virtue of their faster speed and access to the web.

In three quarters of the homes, there was a TV in the same room as the PC or an adjoining space (e.g., in many U.S. homes, the living room and dining room are both part of one shared space). The distances from the PC monitor to the TV varied from 4 feet to 15 feet; most were from 5 to 8 feet apart. PCs and TVs were frequently on at the same time in these households. The orientation of the PC monitor and the TV set was as important as the distance between them in determining how or if the two were used together (shared TV and PC uses are discussed later in this chapter). In some cases, a person at the PC could glance slightly to the left or right and see the TV screen, whereas in other cases the TV was completely behind a person seated at the PC.

The Changing Behavior of Broadband Web Users

In the households studied during this research, there were many new ways that people are using the web and many changes from earlier patterns of web use. The underlying appetites for web content and services have not changed dramatically (i.e., people still want information, entertainment, shopping services, and communications with others), but the ways in which these appetites are satisfied have changed and many other behaviors have emerged based on the characteristics of broadband web access.

Perhaps the most significant characteristic of the broadband web is not high speed but the fact that it is always connected. In most of the broadband households studied, the computer was on and connected to the web whenever anyone was in the house, much like TVs in many U.S. households (Bouvard & Kurtzman, 2000, p. 1). When the web is always on, it is possible to get e-mail throughout the day, to go to the web quickly for simple information such as a weather report or to check movie listings, and to use the web for background entertainment while doing something else (e.g., playing radio from the web while reading). All of these activities were common in the households studied.

When people get e-mail throughout the day, it starts to take on some of the functionality of a telephone. First, in order to know that new e-mail was coming in, many households set a tone to ring or an artificial voice to speak whenever the e-mail arrived. In this way, they could hear the tone or voice even if they were in another part of the house, much like a telephone ringing. Second, the constant availability of e-mail encouraged some to develop a relationship with others that relied on near real-time communication. That is, others learned over time that these people in broadband households would get messages almost instantly and could reply very quickly. For example, a professional fisherman in one broadband household used e-mail to schedule his work. This required a quick back and forth negotiation that formerly was done through telephone calls. Indeed, some people in these broadband households used the word "talk" when referring to their e-mail exchanges with others. For example, one woman said, "I talk to my dad in Seattle" when referring to her regular e-mail exchanges with her father. In addition, the constant reliance on e-mail led one couple to use it as a replacement for household notes. Previously, if one of them went out to the store, that person would leave a note on the refrigerator door for the other. They now used e-mail, knowing that the other would check e-mail on entry into the house, much as they used to check for notes on the refrigerator door. This constant use of e-mail was not without problems. A few people reported that junk e-mail was now a greater hassle because it got their attention right away; at least one person had turned off the e-mail alert sound as a result.

The “always on” feature of the broadband connection, along with the more pleasant experience of high speed access, encouraged many to spend much more time on the web—approaching the time many spend with TV. Other research supports these reports of greater time on the web with broadband access (Bouvard & Kurtzman, 2000, p. 3). Many said they were on the web for 3 or 4 hours per day, including brief sessions throughout the day and extended sessions at a few points during the day or evening. One person who worked at home (he was a day trader of stocks) said that he was on the web 14 hours per day. Spending more time on the web was not necessarily a positive experience for everyone. A few people indicated that they were concerned about managing their time and the web seemed to make great demands on their time.

Impacts on Web Navigation and Features

The characteristics of broadband web access along with the evolving behaviors of broadband web users have led to several changes in how people in these households navigate the web and use certain types of sites. The first and most obvious observation in watching these people use the web is that many no longer have a home page and all rely less on home pages compared to dial-up web users. Less reliance on home pages is related to the always on condition of broadband web when people are at home. Unlike dial-up, where you start at a home page each time you access the web, the broadband web user finds the computer sitting at the site where it was left during the last session. In this sense, it is like television that remains on the last channel watched when it is turned on. However, some of the broadband users went beyond this and eliminated a home page completely. When they turn on their PC and click on a browser, it displays an empty screen. Others, especially those with less web experience, did use the home page of their broadband service provider (BSP). They found the home page a useful starting point for sessions, especially for accessing e-mail and local weather. Collectively, these patterns suggest that the future of BSP home pages may be challenged as broadband becomes more commonplace. At a minimum, the home page will have to compete for the attention of users by providing needed and wanted services.

Other observed navigation patterns and use of web features may be related to the experience of the web users in this study as much as broadband access. These patterns included the use of multiple browsers (many recognized that one browser performed better at certain sites and another browser performed better at other sites); less searching than they did in the past (they have found favorite sites and tend to stay within them); a frustration with bookmarks that have grown over time, often to 100 or more, and become unwieldy (some abandoned bookmarks, others orga-

nized them into categories, and a few cut back sharply on the number of bookmarks); and the formation of clear paths across sites that they use regularly (often there is more than one path based on time of day or functional needs, e.g., monitoring stocks). They did use some portal sites, but not so much for searching as for content. For example, many used Yahoo! for financial information, shopping, and games. It served more as a mall than a portal. Some of the more experienced web users opened four or five sites at a time, then reduced them. A web session consisted of circling round the four or five sites, opening and closing them. One person had two monitors in order to display two sites at a time. In addition, most of the web users in the study had a relatively small number of anchor sites that they would visit multiple times during the day. In some ways, these patterns of web use resemble radio usage, where people have a few preset favorites that they listen to regularly. With these web users, however, their usage behavior included a combination of regular visits to a small number of anchor sites plus occasional searches outside those anchor sites.

Integrating Broadband Web Usage Within Family Patterns

Usage of broadband web services is shaped by existing family patterns and, in turn, it influences some everyday family behavior patterns. One notable observation was that some children used web services, especially broadband games, as a group. Two children would sit together at the PC and play a game together or alternate turns. Further, they would talk about the games—for example, giving tips about how to get past an obstacle. The broadband service was also used as a babysitter by some parents, who sat a child down in front of a game or other activity while the parent did household chores. Although adults did not share the broadband computer at the same time, some adults sat in the same room where there was a PC and a TV, talking about what each was watching. In addition, adults reported that parental controls were very important for controlling web access by their children, but no one actually used the parental controls that were available on the broadband service.

The location of the broadband PC or PCs appeared to follow from existing family patterns of communication and previous use of PCs. That is, in some cases the broadband PC was in an open family area and was used by multiple family members whereas in other cases it was in a secluded area and used primarily by one person. Although existing family patterns may have influenced where the broadband service would be located, the heavy use of broadband may be strengthening existing patterns of social integration or isolation. The hacker in his cave is now spending more time away from the family and those who integrated broadband among multiple family members are now using broadband for intra-family communication, sharing broadband content and, in some cases where a PC and TV

are colocated, spending more time together. That is, some people reported that previously they often split up to watch separate TV programs in separate rooms, but now they spend more time together in the same space with one using the broadband PC and the other using TV.

Multitasking with Other Media

The effects of the web on the use of TV and other media are complex (DiMaggio, Hargittai, Neuman, & Robinson, 2001). Nearly everyone in the study reported here said that they were using television less as they increased their web usage. This is probably correct. However, much observed behavior and discussions with them about the details of media usage suggested that there is a lot of multitasking or consumption of the broadband web along with TV, radio, and other media. Further, there is some multitasking within the broadband web itself (e.g., playing a web radio station in the background while exploring other sites on screen or watching a web video in a small frame on a Web site while taking in other content on the same screen).

Based on observations within homes and discussions with broadband web users, there are at least eight ways that the web and TV are used together:

1. The TV is used as a background sound while surfing the web.
2. A person alternates in small or large blocks of time between watching TV and surfing the web (here, the TV and PC monitor can be located anywhere in the room, as long as the person can move his head or swivel a chair to view either one). For example, a person watches TV while waiting for a Web site to load, then uses the TV as background until something catches his ear and he turns to the TV again.
3. A person simultaneously takes in TV and the web (here, the TV and PC monitor must be within the peripheral vision of the user). For example, a person watches a sporting event on TV and surfs entertainment sites simultaneously.
4. A person watches TV and waits for e-mail to arrive.
5. Different people in the same room are watching TV or surfing the web.
6. A person chats online about a TV program that is currently on and that he or she is watching.
7. A person watches a TV program or channel and simultaneously visits the Web site for that TV program or channel.
8. A person goes to the Web site of a TV program or channel at some point after watching the TV program or channel.

There are a number of variations to these patterns. For example, in some households, there were two PCs and a TV in the same room, with complex interactions among users and media. Also, in one household, there were two TVs and two PCs in the same space (an apartment with an open floor plan for the kitchen, dining room, and living room). It should also be noted that there was a high awareness of Web sites for TV channels among people in these households.

Survey research has indicated that there is more streaming and downloading of audio than video on the web (Bouvard & Kurtzman, 2000, p. 10). This was the case in the broadband homes that were visited for this study. There were four observed patterns of multitasking with audio: listening to over-the-air radio while surfing the web (this was reported to be declining), listening to a web radio station in background while surfing the web (this was reported to be increasing), listening to audio files such as news clips or music while surfing other web content, and downloading MP3 files in background to a recorder while surfing the web. Much of the multitasking with audio was completely within the web. In addition, a few people used the web to time shift radio programs (e.g., listening to previous episodes of *Prairie Home Companion* at the National Public Radio Web site).

TV Over the Web

No one in the households that were part of this research adopted broadband to get television over the web. They adopted it to get faster access to regular web content. However, many discovered video content over time and began to use it. They accessed video news clips, sports clips, and some short films. They also valued the ability to get video from TV stations in other markets (where they lived previously) and they looked to the web for video when there was a breaking news story as well as for news activities that were scheduled (e.g., a space shuttle launch that was scheduled for a specific time). In addition, some believed that video of a breaking news event was likely to be placed on the web before it was telecast.

All of this video viewing on the web involved relatively short clips. They did not watch any full-length motion pictures or television programs. In addition, a few households had sent short video clips of family activities (recorded on a camcorder) to other family members in distant cities. Reactions to video on the web were mixed. Some people liked the video clips a lot, even though they were in small boxes on the screen. These people tended to be younger and spent the greatest amount of time on the web. Reactions to sending video clips were also positive among those who had tried it. Older users and people with high-end home theater TVs were less enthusiastic about video over the web. They wanted to see television that looked like television, not a small box within a web screen. In

addition, some people pointed out the limitations of older PCs in accessing video over the web, even through a broadband connection. Older PCs lack the processing power to handle video and they do not have the storage space for large video files.

CONCLUSIONS

This review of broadband users suggests that there is a latent appetite for video delivered over the web based on the evolving behavior of broadband web users. However, in order for this to become active demand by a mass audience, web video will have to meet a higher standard than is currently delivered under most conditions. This higher standard includes full screen video, a frame rate that approaches regular television, and a delivery method that is close to real streaming as opposed to long downloads. To achieve this, streaming video will most likely have to be delivered from servers at the edge of a network in cable headends, satellite network operating centers (NOCs), and DSL central offices, and it may require advances in compression algorithms. The work required to achieve this should not be underestimated and expectations should not be set too high, as has been done often in the past. Setting unrealistic expectations can lead to judgments of failure for a technology when in fact the technology simply needed more time to develop. Along with this, it will be important for program distributors and other video content providers to not penalize end-users with complex access procedures or added hardware in order to protect copyrighted material and manage digital rights. Such concerns and the resulting roadblocks that were placed in front of consumers delayed the widespread use of videocassettes, CD-ROM software, and video-on-demand (VOD), among other technologies.

It is also important to recognize where the current broadband market is located and how people are using it, as well as how the broadband web is evolving. Many broadband users are located in work environments and many are located in universities, although the home broadband market is growing at a rapid pace. Some groups (e.g., Yahoo! Finance Vision) have developed video services for the workplace and others are aiming at the growing home environment of broadband users. Further, most current broadband users adopt the service for high-speed access to regular Web sites, not video. Many discover video once the service is in place, but broadband users in general do not yet have a high awareness of web video. Indeed, if current broadband users tried web video when they had narrowband dial-up access to the web, they were probably disappointed and may not actively seek it now. At the same time, web usage behavior has changed for many of those in a broadband environment: People spend more time on the web; it is likely to be always on when they are at home; a number of people use it heavily for entertainment; many use the broad-

band web with television to complement and enhance the television experience; and there is some group consumption of the web by children. These patterns of usage support the evolving use of the web for video entertainment once it is a robust experience.

What about interactivity, customization, and other features that broadband video could provide? Do people want these added features? There is no simple answer. Some video-related services that have fared poorly in the past (e.g., video telephones) will face the same obstacles in the new broadband environment, such as concerns about answering a video telephone when people are in their underwear. However, some new variations of video telephones may prove to be popular (e.g., Fox Sports and MTV in the United States are experimenting with quiz programs in which people at home can participate in the TV game show by transmitting voice and images over the web via webcams).

Interactive television has been tried many times before, with mixed results (e.g., Warner-Amex's Qube system in Columbus, Ohio, and Time Warner's Full Service Network in Orlando, Florida) (Carey, 1996). However, the concept of interactive television has evolved to include a broad spectrum of applications with only moderate interaction (the concern in the past was that television usage was relatively passive and people would not want to press a lot of buttons while watching TV) such as video-on-demand and interactive TV program guides. Further, the web environment is inherently interactive. People interact with content all the time. So, the web may be a more benign environment to test various forms of interactive television. Indeed, some have suggested that the web could serve as a bridge from passive television to interactive television because it is an interactive medium (Cairncross, 1997). The same argument may be advanced for customization and personalization of video content. Customization and personalization of web content have been popular. Expectations for these features are likely to carry over to web video.

Audience behavior in a broadband environment can also inform discussions about convergence. To some degree, there has been a technological convergence of the personal computer and the television set (Forman & Saint John, 2000). However, there is no evidence that in the near term audiences will abandon one medium for the other. Rather, it appears that televisions are adding some PC features, computers are adding some video features, and the two will compete for the time and attention of audiences seeking entertainment. However, there may be as much parallel activity and complementarity as competition in the near term.

Discussions about advances in web technology, dealmaking by program distributors, and marketplace analysis of consumer behavior should not obscure the need for creativity and discovery of new content models for web television. In the short term, web video will borrow content models from television and film. However, the broadband web is an evolving,

multidimensional space of text, rich multimedia, audio, and video with changing navigation and usage patterns. Over the longer term, creative artists must be given the opportunity to explore new program models that flow from an understanding of this multidimensional space and to build exciting new content that has never existed before.

The development of video over the web is in a very early stage. As with television in the late 1940s, nobody knows where it is headed. What impacts will a next-generation web have on individuals, families, business, politics, and society? It is not too early to begin asking questions and to set an agenda of research topics to explore. Hopefully, this series has contributed to setting such an agenda and this chapter has contributed to an understanding of one piece of the puzzle: audience behavior.

REFERENCES

- Bouvard, P., & Kurtzman, W. (2000). *The Broadband Revolution: How Superfast Internet Access Changes Media Habits in American Households*. New York: The Arbitron Company and Coleman.
- Carey, J. (1996). *An Ethnographic Study of Interactive Television*. Edinburgh, Scotland: University of Edinburgh UnivEd.
- Carey, J., & Elton, M. C. J. (1996). Forecasting the demand for new consumer services: challenges and alternatives. In R. R. Dholakia, N. Mundorf, & N. Dholakia (Eds.), *New Infotainment Technologies in the home: Demand-Side Perspectives*, (pp. 35–57). Mahwah, NJ: Lawrence Erlbaum Associates.
- DiMaggio, P., Hargittai, E., Neuman, W. R., & Robinson, J. (2001). The internet's impact on society, *Annual Review of Sociology*.
- Goffman, E. (1959). *The Presentation of Self in Everyday Life*. New York: Anchor Books.
- La Franco, R. (2000, November 13). Hollywood's funk. *Red Herring*, pp. 93–98.
- Marriott, M. (2000, September 28). Merging TV with the internet. *New York Times*, p. G10.
- McLuhan, M. (1964). *Understanding Media: The Extensions of Man*. New York: McGraw-Hill.
- Moores, S. (1996). *Satellite Television in Everyday Life*. Luton, UK: John Libbey Media.
- Mowrey, M. (2000, October 2). Streaming bleeds cash. *The Industry Standard*, p. 173.
- Neel, K. C. (2000, October 9). Starz! Targets Web Viewers. *Cable World*, p. 28.
- Noll, A. M. (1999). The evolution of television technology. In D. Gerbarg (Ed.), *The Economic, Technology and Content of Digital TV* (p. 11). Norwell, MA: Kluwer.

- Noll, M., & Woods, J. (1979, March). The use of a picturephone in a hospital. *Telecommunications Policy*, pp. 29–36.
- Reeves, B., & Nass, C. (1996). *The Media Equation: How People Treat Computers, Television and the new Media Like Real People and Places*. Cambridge, UK: Cambridge University Press.
- Reynolds, M. (2000, August 14). TV targets the Internet. *Cable World*, pp. 18–22.
- Robinson, J., & Godbey, G. (1997). *Time for Life: The Surprising Ways Americans Use Their Time*. University Park, PA: The Pennsylvania State University Press.
- Rogers, E. (1995). *Diffusion of Innovations* (4th ed.). New York: The Free Press.
- Silverstone, R. (1994). *Television and Everyday Life*. London: Routledge.
- Wilde Mathews, A. (2000, September 5). The web's first fall season. *The Wall Street Journal*. p. B1.