New Media and TV Viewing Behavior: Implications For Public Broadcasting

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Many analysts assessing the future of media focus on technology as the driving force shaping the new media environment and determining the services that will be provided to the public. Certainly, technology is an important component in shaping the future, but it is just one component. Content, user behavior, business models, and regulations are also key pieces in the puzzle. Further, there is a crucial synergy among these elements that is overlooked, namely, the relationship among user behavior, content, and technology. New technology often leads to changes in user behavior over time. For example, the remote control led to more frequent channel changing.[1] As behavior shifts, new forms of programming are created to appeal to the altered behavior. In the case of channel changing behavior, it led to revisions in the design and placement of commercials, greater segmentation of content within programs, and imposing icons in the corner of the screen to communicate the channel name to high-speed channel surfers. Programming and behavior changes may then create an opportunity for a new generation of technology that takes advantage of the new environment. The cycle of interactions among technology, behavior, and programs can continue over many years or decades.

This article focuses on television viewing behavior beginning in the earliest days when TV was first available to the public and traces changes in the use of television in our current environment, concluding with some observations about implications for the future. It draws from historical photographic archives and academic research, current research studies, and the author's ethnographic research in hundreds of U.S. homes, observing and studying people as they used new media. Ethnography is a form of qualitative research that was developed by anthropologists who wanted to study distant cultures. It has been adapted in recent years to the study of media in developed countries.[2] The research methodology involves intense observations over extended

[1] Robert Bellamy and James Walker, *Television and the Remote Control*. New York: The Guilford Press, 1996.

[2] See for example, Roger Silverstone, *Television and Everyday Life*. London: Routledge, 1994.

periods and interviews in natural settings such as homes.[3] This article emphasizes TV viewing behavior in the United States, where the author's research has been centered, but some examples from Japan and Europe are cited as well. A concluding section discusses the implications for public broadcasters of these newly emerging patterns of media usage.

TV VIEWING BEHAVIOR IN PAST DECADES

Archival photographs of TV watching when television was first introduced in the United States show people sitting relatively close to the screens—one to four feet away. This was associated with the small size of the screens (typically, 10 to 14 inches in the late 1940s through the early 1950s) and fuzzy images. Typically, there was only one television set per household and a limited number of channels. During these early years, there was little channel changing and people often watched television in groups consisting of family members and, commonly, neighbors who did not yet have a television. In the late 1940s, the price of a television in the United States was equal to many weeks salary for an average household. In spite of the high cost, television penetration rose very rapidly, and more than half of U.S. households owned a TV by the mid-1950s.[4]

Early photographs also show that people often watched television in public places, including department stores, which kept a television set on in their show room or other prominent place as a way of selling TVs. Television sets were also located in bars and in the windows of many different types of stores to draw people near the store. Bars, in particular, used television to attract customers who did not have a set at home. Public television watching nurtured an appetite for the new medium and helped spread word of the attractions of television that led to increasing adoption in homes.

Television continued to serve as a significant group medium through the 1960s and into the 1970s. Although the number of channels available to the average household rose to 5 or 6 in the early 1970s (up from 2 or 3 in the early 1950s), there was relatively little channel changing, and programs on the three broadcast networks in the United States accounted for up to 70 to 90 percent of viewing time. The seeds of change for TV viewing patterns were planted, however, by a series of technological innovations. First, the average screen

[3] Dean Takahashi, "Doing Fieldwork in the High-Tech Jungle," *The Wall Street Journal*, October 27, 1998, p. B-1.

[4] Christopher Sterling and Timothy Haight, *The Mass Media: Aspen Institute Guide To Communication Industry Trends*. New York: Praeger Publishers, 1978, pp. 372-74.

size increased from 14 inches to 17, then 19 inches, and by the 1970s to 21-inches. A bigger screen allowed people to sit farther back from it. Second and multiple TV sets began to appear in many households. In 1955, only 3 percent of U.S. households had more than one television set. By 1975, this proportion had increased to 40 percent, and by the mid-1990s, more than 70 percent of U.S. households had two or more TVs.[5] Also, in the 1970s and early 1980s, cable TV systems were introduced into many large cities and the first cable-originated channels appeared. This gave viewers an increasing number of channels to watch, rising to 33 for an average American TV household in 1990, 45 in 1995, and 89 in 2003.[6]

Among the most significant technological innovations introduced during this period was the remote control. While remote control devices were available in the 1950s, they did not reach a significant number of households until the 1970s. Penetration then rose very rapidly and remote controls were used in nearly every household by 1990. With multiple sets, remote controls, and a larger number of channels available, television viewing became more personalized and people were by now routinely changing channels more frequently. Individuals could now watch separately from other household members, viewing programs with special niche appeal on a bedroom, den, or TV-room set. Such changes occurred gradually from the early 1970s through the 1990s, and group viewing did not disappear. It simply became one of many TV-viewing patterns. Further, group viewing itself evolved. A family sitting together in the living room watching television in the evening was just one form of group viewing. Families also watched as a group in the kitchen or dining room while eating a meal, or in smaller groups, such as a group of children gathered together watching in a den or bedroom. Interestingly, the number of channels people actually watched grew much more slowly than the number available to them. Forty-five channels were available to most households in 1995, but the average household watched only seven channels in a given week.

During the 1970s and 1980s, television set use changed in another significant way. The television became a display monitor for VCRs and video games as well as for viewing regular television. Now televisions were connected to multiple devices, and the multiple remote devices for controlling them lay on a coffee table, couch, and floor, often at risk of getting lost. While a helpful tool for viewers, the remote control misplaced could become the source of much consternation. It could easily drop out of sight or be buried with other

[5] U.S. Department of Commerce, *Statistical Abstract of the United States*. Washington, D.C.: U.S. Census Bureau, multiple years.

[6] A. C. Nielsen data.

household items. Viewers also encountered "mode" problems when they lost track of which mode the television was operating in (television, video, auxiliary device, etc.) and which remote should be used to control which device or function.

The VCR is also instructive because its use changed significantly over time. In the first several years of VCR in households, most people used it for time shift recording (recording broadcasts for watching at a later time). In the early 1980s, the average household with a VCR recorded five hours of television per week.[7] Over time, videocassette rentals and purchases surpassed time shift recording as the major use for VCRs. Twenty years after VCRs were introduced, only one in five U.S. households used a VCR for time shift recording.[8]

By the 1990s, TV viewing encompassed a complex and elaborate set of behaviors. Traditional TV watching was still the dominant use of television, but people also used the TV screen to display many different video services (such as videocassettes and videogames) using different rooms at home, with different mixes of viewers. In the average American household television was on for seven hours a day. People watched it and listened to it—as they got dressed, prepared dinner, or did housework. In that way, TV took on some of the functions that had been served by radio in earlier decades. It filled the house with sound and images and created an environment for everyday life that people liked. TV was also a device of multi-tasking, as many people opened mail, read newspapers, talked on the phone, and so on, while watching or listening to TV. Similar patterns of TV use have been identified in Japan.[9]

The size of television sets continued to grow in the 1990s. The average "main" set had a 27-inch screen and one in four households had screens 30 inches or larger. This was also the era of what was called the "home entertainment center." Approximately one in six households had a giant screen (40 inches or larger), stereo speakers, and multiple devices attached to the TV. Visiting homes with home entertainment centers, it was not unusual to find six, seven, or even eight remote controls on a table in front of a large-screen TV that occupied a place reminiscent of an altar or shrine. The enormous TV both dominated and defined the room.

During the 1990s and into the new century, TV reemerged as a significant

[7] Paul Lindstrom, "Home Video: The Consumer Impact," in Mark Levy ed., *The VCR Age: Home Video and Mass Communication*. Newbury Park, CA: Sage Publications, pp. 40–49.

[8] Russell Shaw, "Cable, Satellites Clash Over VCRs at Meeting," *Electronic Media*, December 1995, p. 1.

[9] Tomomune Yumiko and Hara Yumiko, "Television as a Diversion Device," *NHK Broadcasting Studies*, Number 1, 2002, pp. 21–50.

device in public locations, such as offices, building lobbies, airport waiting areas, and others. Unlike the late 1940s and early 1950s, however, when sets located in public places provided many people with their main or only access to television, by the 1990s watching in public locations had become a complement to viewing at home. The recent tendency to watch TV in public locations, moreover, may rather be a sign of how dependent people have become on television. They now seem to desire constant access not only inside but outside the home. On September 11, 2001, the majority of Americans first learned about the terrorist attacks from televisions, many of which were turned on at their workplace or school.[10]

One way to grasp the changes in U.S. television viewing from 1950 to the end of the 1990s is to think of the TV in mid-century as a fireplace or hearth. Families gathered around and were mesmerized by the magic box. By the end of the 1990s, television had become part of the environment that surrounded people no matter where they were in the house and, often, outside the home. People consumed TV constantly, for different purposes, depending upon the time of day or location of viewing.

HOW PEOPLE USE NEW MEDIA

In discussing how people use new media, it is useful to begin with some of the general issues. The first of these relates to time: the time required for new media to be widely adopted and differences among users and uses of new media over time. Typically, when a technology is first introduced it is expensive. The demographics and the content interests of early users who are willing to pay a high price for the technology are often different from the mass market that may follow three, five, or twenty years later. Early uses and users of new media, therefore, do not necessarily inform us about mass market uses and users. Second, new technologies increasingly have to compete for space in the household with other electronic devices. This is a more significant issue today in technology-dense households than it was in the 1950s. In my research in households, the question frequently raised was: where am I going to put another electronic box? Also, some technologies turn out to be particularly difficult for the consumer to understand. Personal video recorders (PVRs) are a case in point. Many find their features difficult to grasp, and some marketing materials make them sound like high-end VCRs. Word-of-mouth can be effective in explaining the uses of new media and spreading

[10] Jeffrey Cole, *UCLA September 11 Survey*. Los Angles: UCLA Center For Communication Policy, February 2002.

awareness but this works better when the dissemination of a technology reaches a certain threshold (five thousand people understanding and encouraging a technology are not as effective as five million). While widely talked about in the United States and loved by those who own them, PVRs have had a relatively modest user base. For consumers, figuring out how to use the new media is increasingly difficult. A basic television set is easy to use. However, as features are added, and a television becomes more like a computer, users can become confused and perplexed by many of the features it offers. This is often the case with older people who have less experience with computers.

A third general issue is how people use a new medium when they acquire it, and, specifically, whether they change existing habits. My research revealed that when new technologies and services enter a household, usually the people already have fixed media habits. They use certain rooms for electronic equipment; they sit in a favorite chair while using a medium; and existing schedules dictate when they use media. Initially, people make very few changes to their existing patterns of media use to accommodate new technology, such as sitting closer to a screen that displays menu items in small text. In my studies of interactive television (ITV), I found that at first people usually did not change where they sat or when they used ITV compared with regular television. Changes in behavior do occur, but generally they evolve slowly. This leads to a general finding about the impact of new media on behavior: we generally overestimate the impact in the short term but underestimate it in the longer term. Television is a good example. When it was first introduced, many forecasters predicted that it would replace radio and movies. It did not have such a dramatic impact in the short term but its longer term impact on behavior, entertainment, and society has been extraordinary.

EMERGING VIEWER BEHAVIOR

The unprecedented proliferation of technologies is changing the television landscape. The long term effects of these new media are hard to predict, but early patterns of viewing behavior are emerging. Below, I examine some of the TV viewing behavior associated with five of these new technologies, based upon my own research and other published studies.

Digital Television

Digital television development in the United States was slow to start but has begun to accelerate. In early 2003, approximately one in three households had digital television service, split more or less equally between cable and satellite. Very few homes were receiving digital signals from over-the-air broad-

cast and only seven percent of households had a digital television set.[11] Others received a digital signal through their cable or satellite box, which converted it to an analog signal for regular TV sets.

Digital television has supported two primary applications: increasing the number of regular channels available by compressing signals (five or more channels can be compressed and transmitted in the place of one uncompressed channel), and providing high-definition television (HDTV). Cable and satellite operators have used increased channel capacity to provide additional special-interest channels, more pay-per-view channels and multiple versions of one channel (e.g., four versions of a pay movie channel, each with the same movies scheduled at a different time) so that the same video content is available more frequently to meet the varying schedules of viewers. Consumers have responded very positively to more convenient scheduling of programs. When hundreds of channels have been offered to them, they have also begun to watch a larger number, but the actual increase in number of channels viewed has been modest. In cable and satellite services with 150 or more channels, the average household watches 15 channels.[12] Further, when digital television users are asked what they like best about the service, the most frequent answer is "better pictures," even among those who have multi-channel digital TV, not HDTV.

HDTV has a long and complex history.[13] Japan led other nations in developing this technology and is currently one of the few countries where it can be viewed via dedicated satellite. Early high prices for HDTV sets slowed consumer acceptance, but prices have declined recently. In the United States, the average price decreased from $9,000 in 1998 to $2,000 in 2002.[14] Lack of content for HDTV broadcasts was also a limiting factor in the late 1990s, but today more than half of the primetime broadcast network schedule in the United States is offered in HDTV. So, the bottlenecks of price and available content have been overcome. The remaining bottleneck in the United States is a lack of widespread carriage of HDTV programming on cable and satellite, which are the main ways people receive television. HDTV is carried on many over-the-air TV stations but less than 15 percent of American households receive television service from over-the-air broadcast signals.[15]

[11] Kagan data, published in *Cable World*, January 13, 2003, p. 24.

[12] "Power in Your Hand," *The Economist*, April 13, 2002, p. 9.

[13] See Joel Brinkley, *Defining Vision: The Battle For The Future of Television*. New York: Harcourt Brace, 1997.

[14] Eric Taub, "The Big Picture in Digital TV: It's Still Fuzzy," *The New York Times*, September 12, 2002. *The New York Times.com*

[15] Taub 2002.

The most positive part of the HDTV story is the enthusiasm of consumers who have seen it. Sales of HDTV sets increased sharply in 2002, even though many people initially purchased them primarily to watch DVDs. High-definition television could learn a lesson from the history of black-and-white television more than fifty years ago, when many people first experienced the technology in public places such as a department store or bar. Most American consumers have still not seen HDTV, and many electronics stores still show, not HDTV programs, but regular broadcast programs on the HDTV sets in their showrooms. The potential of this technology to change television viewing through large, ultra-sharp pictures has not yet been realized, but may be on the cusp of widespread adoption.

Interactive Television (ITV)

ITV includes a broad range of new services that allow many ways to interact with the TV, including video-on-demand, interactive games, polling, interactive program guides, multiple camera angles in sporting events, and various new uses of text or graphics over a TV picture, among others, and they are all under the control of the viewer. Like HDTV, ITV has a long history.[16] Japan conducted one of the early trials of interactive television—the Hi-Ovis Project—in Ikoma city, Nara during the late 1970s and early 1980s.[17] Other early trials were conducted in Biarritz, France and Columbus Ohio, in the United States. Currently, Europe is ahead of the United States and Japan in deploying interactive television, but development of ITV is still in the nascent stage.

There does not appear to be a single driving feature that attracts people to ITV. Indeed, some people who subscribe to ITV are not sure what it is or what it can provide them. The word "interactive" may itself be a problem in conveying what these services offer; some service providers have dropped the word "interactive" and now refer to the new content as "enhanced services." The words for component services within ITV, such as video-on-demand, program guide, and games, seem to be more readily understood. Initially, viewers do not change where they sit while using ITV, even though in some cases they could more easily read menu screens if they moved closer. This potential problem is in abeyance at the moment because ITV is not widely available on household sets. It is generally installed on the "main" household set, which is larger than other televisions in the home. Chairs and other furniture tend to be

[16] See John Carey, *A History of Interactive Television: 1927 to 1997.* Amsterdam: Van Dusseldorf and Associates, 2002.

[17] *A Summary Version of the Comprehensive Report on the Hi-Ovis Project.* Tokyo: New Media Development Association, 1988.

more purposefully oriented toward the main TV and watching more attentive to its screen than for some other household sets, which may be placed in a corner of a room. Installation of ITV on the main household TV also encourages more group use of ITV services. Existing unwritten rules in the household about who controls the remote control do not change when it is an ITV remote. This means that males are more likely to control the ITV remote,[18] although this varies with the program and time of day.

Expectations of ITV are another important issue, especially when Web-related or actual Web screens are offered as part of an ITV service. When the screen design or wording of an ITV menu give users the "feeling" that it is like the Web, viewer expectations are raised. Some think they will get everything that is on the Web, but in an interactive video format. Service providers have tried to control expectations with a "walled garden" approach that provides a limited range of services but maintains high quality within that range.

What do people like and use within ITV? First, most ITV services provide digital signals and extra channels. People have responded well to better picture quality and more channels. EPGs (electronic program guides) are also liked and used. Video-on-demand (VOD) is appealing to those who have experienced it. The single most attractive feature of VOD seems to be the Pause function, which allows a viewer to stop a movie to answer the telephone or go to the bathroom. Not having to return a rented videocassette has also been very appealing. However, ITV user expectations for VOD content are high. They expect the same movies that are available at the video rental shops, and this has not been the case so far, limiting the use and appeal of current VOD services.

An alternative form of video-on-demand, subscription video-on-demand (SVOD) is also being tested. With SVOD, a viewer can access all the movies available on pay movie channels such as HBO in a given month—at any time and with full VCR controls. SVOD inherently meets viewer expectations about available content, since it does not promise to deliver any content other than that listed on the regular schedule of the pay movie channel for that month. The perceived benefit of SVOD is convenience. Viewers do not have to fit their schedules into the time frame of the movie service provider. Other ITV content such as interactive shopping, games, and multiple camera angles of sporting events have been limited so far, at least in the United States. In Europe, betting and polling have been two of the most popular applications of ITV.[19] Many of the popular polling applications are not about politics, but the

[18] Robert Bellamy and James Walker, *Television and The Remote Control*. New York: The Guilford Press, 1996, pp. 125–43.

[19] "Power in Your Hand," p. 5.

selection of a favorite music video on MTV. Further, in many cases, the program producers solicit votes via text messaging from cell phones and receive part of the revenue generated from the text messaging.

Navigating through ITV menus and finding services is a not-so-surprising challenge. In the past, television channel organization was linear. Channels started at 1 and went up to 12, 40, or 200. If a new channel was introduced, sooner or later a viewer was likely to stumble on it. With many ITV services, a viewer accesses choices from a tree-and-branch structure menu or a button on the remote control. Since there is limited screen space on which to display ITV services and channels, there is often a need to provide a main menu and sub menus. A person may have to make three or four choices before reaching some services. In extreme cases, a viewer may have to view 7 to 10 screens of listings to reach a desired choice. Further, since a single household can collect numerous remotes, each with dozens of buttons, a dedicated ITV button may not stand out in the forest of buttons provided. An important challenge remaining is to design easy-to-use menus for a new generation of remote control devices.

The words people use in describing ITV are revealing. Curiously, they do not use "interactive" as much as "control" or "convenience." That is, ITV gives them a sense of control over television watching. ITV can be made to fit their own convenience, rather than requiring them to follow a fixed television schedule, as in the past. Another interesting word usage that crops up when people talk about their ITV experience is that of "go." When talking about regular television channels, they say, "I watch PBS" or "I watch NBC." However, when talking about ITV, many say, "I go to the Guide" or "I go and order a movie." Apparently, the ITV experience gives them a feeling that ITV services are *places* they go to. Some teenagers even say, "I hang out at (such-and-such ITV service)."

Personal Video Recorders (PVRs)

PVRs have had an extraordinary impact on the television viewing behavior of those who have this new technology. People with PVRs quickly move away from real time viewing of scheduled programs and either watch programs that have been stored on their hard drive or turn on the PVR and start watching programs ten to fifteen minutes later so that they can skip ahead if they wish. Many PVR owners call the latter "building a buffer," and they use the time delay to skip commercials or scenes that bore them. They also report that television via PVR is a more enjoyable experience because they can watch more of the programs they like rather than have to settle for what is on at any given time. The group that seems to benefit most from PVRs is those with limited

time to watch TV and whose schedules are inflexible. They report that the full twenty-four-hour schedule is now available to them even though they may be able to watch TV for only one hour a night. This flexibility also appears to have a modest benefit for programs that are not in prime time and therefore not available to the largest audiences. However, published reports on PVR usage indicate that people tend to record the most popular shows.

There are many early indicators of the side effects of PVR usage. One is that PVR owners do less channel surfing, since they have already found what they want from the full week's schedule that is now available to them. There also appears to be slightly more group viewing in PVR homes, since it is typically installed on one television set, and more than one person in the household wants to get the benefits of the PVR. The impact on commercials has been discussed at great length—people with PVRs watch fewer commercials. However, there are several important nuances to this behavior. Many people report that they have stopped watching commercials completely, but follow-up discussion with these people indicates that they still watch some commercials, such as TV program promotions, funny "favorite" commercials, and commercials with visuals that catch their eye as they fast-forward through the video recording. Indeed, it was reported that during the Super Bowl in 2002 and 2003, the most common use of the instant replay on PVRs was to watch commercials a second time.[20]

Given the positive reaction to PVRs by those who have purchased them, it is not clear why they have been adopted relatively slowly (only about one million users in the United States after four years in the marketplace). The large size of the first generation of PVR boxes, $10 monthly subscription fees, and poor understanding of PVR functions among consumers may be contributing factors. More recently, PVR capability has been built into other devices, such as the satellite receiver, in order to reduce the volume of new equipment a household must acquire. In the long term, if PVRs are widely adopted, the impact on TV viewing could be dramatic, freeing viewers from program schedules except for live events, and influencing the ways advertising is delivered.

Electronic Program Guides (EPGs)

EPGs are "quiet" new services compared to PVRs and broadband video, yet they have had a broad impact both in terms of adoption rate and TV viewing. In the United States, EPGs are provided within digital cable or satellite services, or are part of a larger ITV package, and reach approximately 30 million

[20] "Power in Your Hand," p. 7.

viewers. They replaced older TV guides that scrolled rather than allowing viewers to select for the time period and channels displayed. People who have EPGs like them, use them increasingly over time, and say that they would not give them up. However, EPGs have received less press attention than more exciting interactive services such as PVRs and full ITV packages.

EPGs are used most frequently at the beginning of a session of TV watching, during program breaks, and during commercials. EPGs differ somewhat in design. One feature attractive to viewers is a TV window within the Guide that displays whatever channel (video and sound) a person was watching before he/she entered the Guide. This lets people go into the EPG during commercials or a break in action of a sporting event and return when regular programming or the next play in the event starts. This has the side effect of exposing people to commercials (even though within a window on the TV screen) that they might otherwise not view. Many EPG users report that previously they would channel surf during commercials, but now they go into the Guide instead. EPG users also report less channel surfing generally. They now find channels to watch from the Guide rather than by channel surfing.

Most EPG-user behavior involves searching for programming information in the next hour or a couple of hours later in the day. Advanced searches and browsing through program schedules days ahead are used much less. Most EPGs have a related feature, sometimes called Info or Display, which brings up information about a specific program in the bottom or top third of the screen, superimposed over the regular video of a program. This feature is also used a great deal in EPG-equipped homes, often as much as the main Guide. Viewers report that they bring up the Info or Display feature when they first turn on a TV set, to anchor their viewing and tell them where they are as well as the content on that channel. Later, many use these features also when channel surfing. It provides more information than they are likely to get by watching a program for two or three seconds.

In the long term, EPGs could become a mechanism for steering viewers to certain programs or channels, based upon the prominence given to those programs or channels within the EPG screen menus. In addition, EPGs appear to be organizing the way viewers group channels in their minds. The more people use EPGs, the more likely they will think about television in terms of the EPG model of channels and programs. This has important long-term implications.

TV and Broadband PCs

In the late 1990s, a number of media analysts declared that interactive television was dead and, in its place, the broadband Web would become the sole

delivery vehicle for interactive TV. Broadband has been slow to deliver interactive streaming video (that is, video downloaded like a computer file over a high-speed Web connection), but the pace of activity has increased. People who experience video on PCs are more likely to do so through high-end video games. The PC in some homes has also become a secondary DVD player for movies, used mostly by children when the primary DVD player in the household is occupied by someone else.

There has been a sharp spread within the United States of PCs with broadband connections, although a number of countries such as Korea have higher broadband household penetration. Broadband usage patterns differ significantly from households with slower dial-up connections. Typically, broadband PCs are on whenever anyone is in the house, and people use them twice as much as dial-up PCs.[21] In some cases, there is an easy chair in front of these PCs rather than an office chair, perhaps because they spend so much time there. The area on top of or around the monitor is often decorated with stuffed animals or family photos, much the way the surroundings of televisions were treated in the 1960s and 1970s.[22] Also, I have been in a number of homes where a broadband PC is located in the "computer room," much as people used the term "television room" a few decades ago to describe certain rooms that were used predominantly for TV watching. This tendency to treat technology in a personal way, almost like a member of the family, has been documented by Reeves and Nass, among others.[23]

Rather than replace television, broadband PCs are increasingly likely to be in the same room and to be used alongside it. I have observed a number of patterns of use for TVs and PCs located in the same room. The first clue to how the two devices are used together is where each is placed—side by side, against opposite walls, or spaced widely apart against the same wall. In some cases, people use a PC and television at the same time, viewing, for example, the Web site of the channel that they are currently watching on TV. Some game shows promote this as a form of interactive television. In other cases, people surf the Web during commercials or send "instant messages" (short messages exchanged in real time) to friends while watching TV. These mes-

[21] Peter Grant and Bruce Orwall, "After Internet's Big Bust, Broadband Shift Went On," *The Wall Street Journal Online*, January 8, 2003, p. 1.

[22] John Carey, "Audience Demand For Television Over The Internet," in Eli Noam, Jo Groebel, and Darcy Gerbarg, eds, *Television Over The Internet*. Hillsdale, NJ: Lawrence Erlbaum Associates, 2003.

[23] Byron Reeves and Clifford Nass, *The Media Equation: How People Treat Computers, Television and New Media Like Real People and Places*. New York: Cambridge University Press, 1996.

sages may be about the show they are watching, or other topics. In addition, some people surf the Web and listen to the TV, turning around to watch the screen when something interesting catches their ear. In other cases, one person uses the PC while others watch TV in the same room. The use of a PC and TV in the same room may also vary by time of day, the broadband PC receiving more usage during the day (e.g., in a home office) and the television receiving more use during the evening. These multiple patterns of use are likely to evolve over time and may be reduced to a smaller set of uses for the two media. However, there are no concrete signs yet that the two devices will merge, as has been predicted.

IMPLICATIONS FOR PUBLIC BROADCASTERS

Public broadcasting models vary widely throughout the world. Some are state broadcasters with a national network, others are local community stations funded largely by contributions. And some are educational networks that provide instruction for schools in a local area or region, or nationally. Some public broadcasters combine elements from each of these models. Whatever the case, the changing media environment and changing viewer behavior have important implications for all public broadcasters.

The first issue is timing of market entry. Those decisions hinge partly on the costs associated with developing content and services for each of the new media. Some new media will fail, while others may take decades to achieve widespread adoption. At what point should public broadcasters develop services for any of these new media? From a commercial broadcasting perspective, there are advantages and disadvantages to early entry; it could mean, for example, either capturing a market or wasting money that could be used more efficiently by waiting to see how a technology is received. For public broadcasting, however, for which innovation is such an important part of its mission, early entry makes sense. However, public broadcasting is also mandated to serve the entire community, not just elite early adopters who can afford new technologies when they are first introduced. This consideration supports a slower path of development in new media. In some cases, there are niche user groups, like schools, that public broadcasting can serve at an early stage of technology deployment, while waiting to develop services for the mass market that will require a longer adoption curve.

A second broad issue for public broadcasting is information sharing. It is very difficult to keep up with all the new media and understand which ones can best serve the public, but many public broadcasters have valuable experience that could help others. For example, digital broadcasting provides an

opportunity for all public broadcasters to offer multiple channels to the public. Public broadcasters such as the Britain's BBC and Japan's NHK have extensive experience in multichannel broadcasting that could benefit others. Similarly, NHK is a leader in satellite HDTV, and U.S. public broadcasting has extensive experience in interactive television for schools. Information sharing within regions of the world is often active and fruitful, as in the case of the European Broadcasting Union, but this does not hold true for communication across regions.

It is also important to recognize that in the new media environment, over-the-air broadcasting is much less important than it was in past decades. Today, there are many ways to receive public broadcasting content, and each year fewer people rely on traditional over-the-air signals to receive television. Public broadcasting needs to distribute content through all appropriate channels and become "public telecommunications" (using the term telecommunications in the broad sense of all means of electronic communications). This endeavor is well underway. However, as the actual transition to cable, satellite, broadband Web, and so forth takes place, there is a need for a change in "mindset." The broadcasting mindset heretofore assumed that a relatively small number of organizations are licensed by the government to operate television stations and transmit content to everyone. A telecommunications mindset assumes that there are many distribution channels and content providers, which are highly competitive. The audience, furthermore, is sometimes a unified mass public and sometimes narrow segments seeking specialized content. To foster the new mindset, some public broadcasting organizations in the United States have changed their names, replacing "broadcasting" with "telecommunications."

In the new media environment, one requirement has not changed: the need for high quality content. This is a core attribute of public broadcasting's mission and it will not change as technology changes. The challenge for public broadcasters will be to maintain the highest standards as they develop content in the new media environment. In addition, the definition of high quality content will have to expand. High quality content will still include excellent writing and high production values, but it will also expand in many cases to include the quality of the experience for viewers as they engage the content in interactive formats.

Opportunities

Among the opportunities the new media environment provides for public broadcasters, many are in education, both for the general public and for

schools. Public broadcasting began with education as its core mission.[24] The new media environment supports many educational services that were difficult or impossible in the traditional broadcasting world. For example, digital broadcasting can support ten to twenty channels of distance learning courses in the same bandwidth as one traditional channel. Further, these channels can be interactive, allowing students in schools or adult learners at home to interact with live instructors. The Web provides extraordinary storage space for written content that supports video instruction as well as interactive tutorials. Video-on-demand can give teachers access to large archives of instructional videos, and PVRs can free them from the hassle of programming a VCR to record programs. Generally, the new media environment provides extraordinary opportunities for public broadcasters to better serve the needs of education.

In the past, one of the limitations of public broadcasting content was the schedule. While a station could transmit content twenty-four hours a day, most of that time was not convenient for viewers to watch. Many people may have only one hour a day free to watch television. So they could not watch the other twenty-three hours of content, unless they tried to program their VCR to record it, which some could not do and others declined to do. PVRs and VOD can make the entire schedule available to anyone, at any time. One way to think about a PVR is as a video server for the home. Video-on-demand provides a video server at the cable headend. If both PVR and VOD are accepted within the marketplace, TV schedules could become a part of the history of TV viewing. This could happen, but it is likely to take a decade or more. However, what are the implications for TV viewing as well as program production and distribution in such an environment? While it may take some time, it is possible that schedules will eventually be eliminated, except for live events.

In the long term, HDTV may have an important impact on how programs are produced and even what types of content will be produced. The higher resolution images and larger screens that people use to watch HDTV may lead directors to produce TV programs the way they now produce movies. HDTV could also affect the appeal of certain types of content, such as nature-related programming, which lends itself to detailed, wide-angle panoramas. We may even find that some performers are more effective in HDTV than others, much as some performers are more effective in movies than in television programs. In addition, the digital-quality sound that is a component of HDTV (and the home theater stereo systems that many people buy along with their HDTV sets) should enhance the appeal of music programming.

[24] John Witherspoon and Roselle Kovitz, *The History of Public Broadcasting.* Washington, D.C.: Current Newspaper, 1987, p. 5.

The new media environment will also support many approaches by public broadcasters to create a "community" through programming. In the past, high quality programming helped to create communities among viewers through their sharing of a common experience with program content. In the new interactive environment, viewers can communicate with each other and with content producers, expanding the opportunity to form communities of common interests. For example, viewers watching a program about a medical condition can communicate through the Web with others who have watched the program and share experiences about the medical problem.

CHALLENGES

Along with many opportunities, the new media environment and changing viewing behavior present many challenges, some of which are completely new to public broadcasters. One of the most basic is difficulty of operation—some people may find the new models of televisions hard to master. We have taken for granted that a television set is easy to operate: turn it on, change channels, set the volume, and sit back to watch. In the new media environment, some televisions have multiple modes, inputs, outputs, and remote devices to control different functions. Some viewers, such as older people or others with little or no computer experience, may have trouble operating these televisions and finding programs that are a few steps down in a menu tree. One approach is to broadcast programs expressly created to train viewers in the use of new media. This would be new for public broadcasting. A complementary approach would be to lobby electronics manufacturers to keep the design of new media simple.

A second challenge is the lack of compatibility across many of the new media systems. Part of this is a technical issue, amply demonstrated in the need for a consumer to have numerous different electronic devices at hand in order to view content of various types. However, content producers are often required to package content for many different user interfaces. For example, some digital television systems use a traditional linear channel lineup accessed by up/down arrows on a remote control device or direct entry; an on-screen menu; or special keys on a remote control. The linear channel lineup becomes problematic because of its hundreds of channels/services; special keys on a remote are problematic in an environment where a household must keep several remote control devices, each with dozens of buttons; and menus often require sub-menus, raising the possibility that some people will get lost while trying to find channels. For a content provider like a public broadcaster, the challenge is to package content to work effectively through different user

interfaces, but that could be more difficult than it seems. At this early stage, given the few conventions about the design of user interfaces for television, existing user interfaces differ radically.

Electronic Program Guides and new "home pages" for digital TV systems present another challenge. EPGs and digital TV home pages can give better positioning to some channels while putting other services deep in a menu structure where they are hard to find. Clearly, there is an incentive for the owners of these new television "entry points" to give better menu space to channels they own (or channel operators who are willing to pay for better positioning). In addition, menus may classify channels as "movie channels," "sports channels," and so on. How will public broadcasting channels be classified? Most public broadcasting channels provide many different forms of content and cannot be easily classified under one label.

Some traditional broadcasters ask whether consumers really want any of these new media. They claim that television is a passive medium, and people do not want to do the work required in new interactive systems. There is a growing body of research indicating that people do want to interact with TV in new ways, with an important qualification: some people want to interact a lot and some want to interact only a little. Further, the amount of desired interaction is likely to vary by type of program (higher for a game show, lower for a drama) and even time of day. The new media environment can serve high and low levels of interactivity. For example, in a VOD service, a person interacts with a menu of movies and program listings, selects one and then sits back for thirty minutes or more to watch the movie or program, perhaps pausing at some point to go to the kitchen for something to eat.

New media can also have an impact on traditional linear programming. It is useful to ask how the design of traditional linear television programs might change as viewers gain experience with interactive programs, PVRs, and the broadband Web. In the United States, some regular television programs look like a website or menu for a digital television service, with multiple video windows, although the viewer does not control the video. Many cable news programs and MTV use multiple video windows. Some producers dislike these formats, arguing that they disrupt the integrity of core content. However, the formats feed the appetites of people who seek many inputs at once and have become accustomed to receiving them on the Web or through digital television.

Will new media change the core functions of television? It is unlikely that the core functions—to inform, to entertain, and to help people relax after a hard day of work—will change.[25] This is important to remember as public

[25] See Tomomune and Hara, p. 25.

broadcasting moves into a high-tech world and producers are tempted by many new gadgets to move away from the simple but very important functions that television serves in people's lives. In the end, new media are tools to help public broadcasting fulfill its core mission in a changing technology environment.