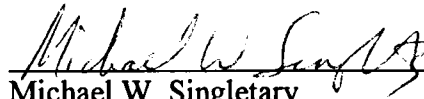
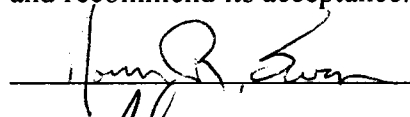


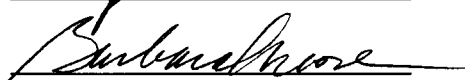
To the Graduate Council:

I am submitting herewith a dissertation written by Robert E. Gwynne entitled "Radio Broadcasting and the World Wide Web: An Exploratory Study." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Communications.


Michael W. Singletary
Major Professor

We have read this dissertation
and recommend its acceptance:





Accepted for the Council:


Associate Vice Chancellor
And Dean of the Graduate School

RADIO BROADCASTING
AND
THE WORLD WIDE WEB:
AN EXPLORATORY STUDY

A Dissertation
Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Robert E. Gwynne

August 1998

In memory of Dr. Harriet Broeker who started me on this adventure.

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ABSTRACT

Radio broadcasters have recently been confronted with the World Wide Web, a possible source of competition or an extension to broadcasting. Since 1994, broadcasters' adoption of the Web has grown exponentially along with the growth of the Web in general.

This study examines the reasons why broadcasters have adopted the Web, their perceived advantages and disadvantages of adoption, when they adopted, their plans for future use of the Web, and how they are actually using the Web. The study is divided into two parts: (1) a survey consisting of 13 Likert-type questions probing reasons for adoption and four open-ended questions probing their attitudes toward the Web and plans for its use, and (2) a content analysis of the respondents Web sites to ascertain how they actually use the Web.

Data were collected from 199 respondents from during the first two months of 1997. The most cited reason for creating a station Web site was fear of losing out to competition in case the Web turns out to be successful. Promotion was the second most cited reason for establishing a Web site. Most stations had a technologically knowledgeable employee who persuaded management to establish a site. The vast majority of managers were satisfied with their site once established. However, management found that the major disadvantage of having a site is the amount of time it takes to maintain the site. This suggests that radio stations may have to add employees especially to maintain a successful site, give up on maintaining a site, or continue with an inferior site. Most stations plan to broadcast over the Web via audio

streaming. Although audio streaming allows stations to broadcast content worldwide, it does not lend itself to targeting a local audience. In addition, audio streaming can create competition for radio stations because anyone with a Web server and a CD player can broadcast via audio streaming. Finally, few stations use their site to generate revenue from advertisements. Instead, they offer advertisements on the Web as “value-added” to on-air advertisements for their clients.

Content analysis of the respondents’ sites indicates that few stations do enough to motivate visitors to their site. Although many stations report that they plan to enable audio streaming, at the time of this survey fewer than 15% actually utilize it. Many stations, on the other hand, include biographical information about their on-air staff. In addition, most stations include some kind of feedback mechanism such as an email address, telephone number, etc., on their site.

The results have important implications for station managers. Sites need to be maintained with fresh content that motivates their audience to visit the site. Because this takes time and manpower, stations will have to either hire new staff or free current staff to work on the site.

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CHAPTER I

INTRODUCTION

Theoretical Approaches

This study uses a modified uses and gratifications approach to examine how and why radio stations establish World Wide Web sites. In addition, this study seeks to determine what makes radio station managers satisfied or dissatisfied with their Web sites. The uses and gratifications approach is modified in the sense that this study attempts to find the uses and gratifications that a medium gets from use of the Web instead of the uses and gratifications that the audience/user gets from the Web. Usually the uses and gratifications approach focuses on the audience. More generally, the study seeks to establish baseline information about radio stations' use of the Web so future researchers can have data for comparison. In addition, this dissertation will utilize the diffusion of innovations adoption process outlined by Rogers (1986; 1995).

Rationale

When radio broadcasting began in the 1920s there were no contemporary studies of this sort. Instead, later historians had to construct their histories from the memory of broadcasters. The development of the Web is analogous to the development of broadcasting. Individuals and organizations, including radio stations, are establishing Web sites at an ever-increasing rate; however, there is a paucity of information about the reasons for the adoption of this new medium and about how radio stations are using the Web. The information provided by this study will be

useful both to future broadcast historians and to current broadcast practitioners who want to know what other broadcasters think about their use of the Web and about how they are using the Web.

Origin of the Web

The idea for the World Wide Web that was originally developed in March 1989 by Tim Berners-Lee (Berners-Lee, 1992; Brody, 1996) of the European Particle Physics Laboratory (known as CERN, a collective of European high-energy physics researchers) to aid communication among physicists, is now revolutionizing organizational communication and marketing. Hughes (1994) writes, “originally the Web was to be used as a means of transporting research and ideas effectively throughout the organization.” Because its members were located in a number of countries, effective communication was a goal of CERN for many years. The initial project proposal outlined a simple system of using networked hypertext to transmit documents and communicate among members in the high-energy physics community. There was no intention of adding sound or video, and the capability to transmit images was not considered. Approximately two years later, at the end of 1990, the first piece of Web software was introduced on a NeXT machine. One could use it to view and transmit hypertext documents to other people on the Internet, and came with the capability to edit hypertext documents on the screen. It did not have a graphical user interface (GUI). In 1992 small groups of software developers began development of software to make the Web more graphical.

Media Coverage

The Wall Street Journal (Carnevale, 1993) was the first nationally distributed newspaper to write a story about the Web in 1993. The story described how the Internet started as a government experiment, what the Web was, and how it might be used in the future. However, it was not until late 1994, when eight articles appeared, that the national media began covering the Web in earnest. In October of 1994, the Wall Street Journal (Anonymous, 1994) reported that Digital Equipment Corporation would broadcast the results of the California election via the Web. In November New York Times feature writer Peter Lewis (Lewis, 1994) wrote an article about how corporations were beginning to use the Web. By the end of 1995 those media were among the corporations that had established their own Web sites. A newspaper strike in San Francisco during the Fall of 1994 was the impetus for newspapers' move to the Web. Striking managers and editors of the San Francisco Examiner and San Francisco Chronicle demonstrated the effectiveness Web publishing to the rest of the newspaper industry when they published The Gate, an online newspaper (King, P., 1994). Popular magazines also started paying attention to the Web in 1994. The Reader's Guide to Periodical Literature listed no articles in popular magazines about the Web in 1993, 25 in 1994, and 206 in 1997.

Internet Growth

In answer to the question, "Why should communication researchers study the Internet," Rafaeli (Newhagen and Rafaeli (1996), says that "the Net is new, loaded with content, crowded, and seemingly a great business prospect." He adds that "content of all sorts abounds, from pornography to timely news, from scientific journals to mass entertainment to high-brow culture, and from the very public to the

very intimate.” In addition, in recent years the Internet has doubled in size every year. Although there is no way of knowing exactly how many Internet users exist (Lotter, 1996). International Data Group has estimated that in 1995 there were 38 million Internet users in 150 countries (Auger, P. & Gallagher, J. M., 1997). CommerceNet/Nielsen Internet Demographics Survey (CommerceNet/Nielsen, 1997, July) has estimated that there were 50.6 million users in 1997 and project 116 million users by 2000. However, in its press release from December, 1997, Nielsen (Nielsen Media Research, 1997, December) reported the figure to be 58 million, including Canada. The same survey indicates that Web users are increasing at a faster rate than Internet users. In 1995 there were 14.3 million people using the Web. By 1997 that number had increased to 38.5 million. The estimate for 2000 is 110 million people using the Web. The number of content providers, which can be accurately measured, is increasing at an even faster rate. Lotter (1996) found that in 1981 there were 218 Internet hosts (a machine that lists a host name and IP address on the same server), 617,000 in 1991, and 21,000 in 1993. By July 1997, there were 1.3 million hosts. According to Semich (1995) the growth of the Web is doubling in size every two months. By March of 1997, Network Solutions, the company that registers Internet domain names, (Network Solutions, 1997) announced that it had registered its one-millionth domain name. The company (Wired News Daily, 1998) says that it signed up 960,000 new names in the .com, .org, .net, and .edu domains in 1997. That was within a whisker of doubling 1996 registrations, when 489,000 names were signed up. In 1997, NSI says, 90 percent of its registrations were in the .com domain.

According to Press (1995), the Internet will continue to grow because of its ability to transfer a wide variety of data, including audio and video. However, bandwidth, the ability to transfer data, is limited by telephone lines and the speed of modems that use the lines. On the other hand, Rafter (1997) reports that very fast cable modems will alleviate the narrow bandwidth problem. "Hyped for years, broadband Internet access became a reality--albeit a small one--in 1997, with an estimated 100,000 U.S. households signing up for cable-modem service. That number could double by the second quarter of 1998 and reach 1 million by mid-1999." According to Raftner, AT&T is investing \$1.25 billion in development and marketing of cable modems, and Time Warner Cable and US West Media Group, the companies that operate the number 1 and number 2 cable modem services respectively are merging their Internet services in order to meet future competition.

As the speed of modems increases, more people will use the Internet, and it will bear a heavy load. Bob Metcalfe (1996), the inventor of Ethernet, warns that the Internet will break down under the heavy load of users projected in the future. Others such as Siegmann (1997) argue that free market forces will come into play to strengthen the Internet so that it will be able to handle the 300 million plus users the ITC predicts for 2001.

Web Commerce

The principal motivation for establishing a web site is commercial. According to Lotter (1996) commercial sites using the ".com" extension account for the fastest growth of Web sites. Commercial sites accounted for one-quarter of Web sites in

1995. However, as Hoffman and Novak (1995, p.1) point out that, “virtually nothing is known about how to develop commercial Web sites to maximize profit.” In addition, they state that “the Web has the potential to radically change the way firms do business with their customers by blending together publishing, real-time communication broadcast, and narrowcast.” Traditional mass communication models (e.g., Lasswell 1948; Katz and Lazarsfeld 1955) hold that mass communication is one-way from a single source such as a newspaper to a large group of consumers. There is little or no interaction between the source, e.g., an automobile company advertising on television, and the consumer. According to Hoffman and Novak (1997):

The new model underlying ... communications... in the Web is a many-to-many communications model in which consumers can interact with the medium, firms can provide content to the medium, and in the most radical departure from traditional marketing environments, consumers can provide commercially-oriented content to the medium. In this mediated model, the primary relationships are not between sender and receiver, but rather with the CME [computer-mediated environment] with which they interact.

One can easily imagine a radio station, or anyone else for that matter, that broadcasts music over the Web setting up a page with a list of songs that allow listeners to click on a radio button to request a song to be played by a computer connected to a multiple CD player. Information about both the request and the listener could then be stored in a database for future reference. In addition, the computer could aim specific

ads based on demographic information at the listener. A radio station could even get a percentage from purchases ordered from its Web site.

According to a study by Kennedy and Dietsch (1995), "Company size had little bearing on success on the Internet." Auger and Gallagher (1997, 56) point out that "the cost of gaining a presence on the World Wide Web is remarkably low and continues to fall," making Web affordable to small businesses as well as large corporations. The principal cost component is the time and expertise of the Web site developer. However, even the smallest low power radio station can reach as many people as the largest stations. Auger and Gallagher also point out that publishing that publishing information such as catalogs, brochures, and other printed information on the Web can be done for a fraction of the costs of paper publication. Kambil (1995) estimated the cost of disseminating a 30-page document via the Internet to be less than a penny.

Demographics

The Gvu Center's 8th WWW User Survey (GVU Center, 1997) found that 47% of all Web users have completed a college or advanced degree. The percentage drops to 47% when only United States users are included. The study also found that a higher proportion of females than males have a college degree (35.03% of females compared to 31.01% of males). Forty-one percent of Web users are female, a proportion that has been increase over the last three years. The average income of USA users is \$54,000, which would be even higher if college students were factored out. On average, 20.63% of respondents reported being in a computer

related field, 23.14% in education, 21.4% in professional, 11.69% in management, and 23.14% in other occupations. The study found that the proportion of users in computer related fields is decreasing. In a separate survey of Web consumers, Gupta (1996) found that 59% have completed college or an advanced degree, and that the average annual income for non-college students was \$69,000. As with the GVU survey, he found that females are more likely to be in education and “other” occupations, and less likely to work in computer related jobs. He also found that men are more likely than women to buy software and hardware; whereas women are more likely than men to buy music. There is currently no survey available probing how many people of either sex listen to audio streaming or access radio station Web sites. In general the studies found that the average Web user is better educated and more affluent than the average citizen, and that the proportion of women using the Web is increasing.

It should be noted that Hoffman and Novak (1995b) have criticized the CommerceNet/Nielsen surveys for over-representing the highly educated and affluent in their survey. They also claim that the surveys over-represent people between the ages of 35-54 and strongly under-represent people over the age of 55. Novak and Hoffman (1997) argue that standardizing and improving Web measurement is critical to commercial development of the medium.

To that end, December (1996) has proposed six units of analysis for Internet communication: media space, Web space, media class, media object, media instance, and media experience. He defines media space as “the set of all servers of a particular type that may provide information in one or more protocols, the corresponding clients

that are capable of accessing these servers, and the associated content available for access on these servers.” A protocol is a set of rules for exchanging information. Some examples include: (1) TCP (Transmission Control Protocol) which breaks data into packets that allow portions of information to travel the Internet through paths of least resistance and then puts the packets back together at the destination; and (2) HTTP (Hypertext Transfer Protocol) which is the native protocol of the Web used to transfer hypertext documents. Web space is the set of all HTTP servers, clients, and content. A media class is the set of servers, clients, and content that share a defined set of characteristics such as all the information available on the Internet accessible via Netscape Communicator 4.0. December defines a media object as “a member of a media class for which the server, client, and content are completely and unambiguously specified. A media object is concrete, whereas a media class is a template for defining media objects. The BRS Webcasters Directory of radio stations broadcasting on the Web at server brsradio.com accessible via Microsoft Internet Explorer 4.0 is an example of a media object. A media instance is a media object specified at a particular point in time; for example, all of the content available at www.cnn.com January 19, 1997 at 1459 GMT accessible via Internet Explorer 4.0. A media experience is a particular user’s perception of a set of media objects; for example, Jane Doe’s emotional reaction to a headline on the CNN site about four people, including two children, being shot while participating in a Martin Luther King Day parade in Baton Rouge, Louisiana. In general, according to December’s taxonomy, the Internet can be regarded as a mass medium and the individual sites, computers, etc., are the components of which it is comprised.

The question regarding December's above taxonomy becomes "so what?" He answers the question (p. 34) by writing:

Using the multiple levels of abstraction inherent in these definitions, communication researchers can define a variety of research settings with a consistent treatment of units of analysis. The overall benefit of this definition of Internet communication is that the diverse landscape of Internet communication can be defined, opening up possibilities for cross-study comparisons as well as theoretical integration.

Whether communications researchers will follow December's advice remains to be seen.

CHAPTER II

LITERATURE REVIEW

Uses and Gratifications

This study uses a modified uses and gratifications approach to analysis of radio stations' use of the Web. Morris and Ogan (1996) suggest that researchers use a uses and gratifications perspective to analyze the Web because of its "comprehensive nature in a media environment where computers have not only home and business applications, but also work and play functions" (p.47). However, uses and gratifications is problematic. Some, such as Lin (in press) claim that uses and gratifications is one of a few theories that communications researchers can claim as their own. Others suggest that it is not a theory, but a perspective or research approach. According to Katz, Blumler, and Gurevitch (1974a, p. 21), the uses and gratifications approach "simply represents an attempt to explain something of the way in which individuals use communications, among other resources in their environment, to satisfy their needs and to achieve their goals..." The focus is on audiences, which are considered to be active and goal directed, seeking to explain the psychological needs that motivate people to use specific media and to examine what gratifications they get from them. People are motivated to use media to satisfy certain psychological needs. As a consequence, because different people have different needs and psychological states at different times, individuals exposed to the same media will respond differently (Lin, in press). In addition, the uses and gratifications perspective is more concerned with what audiences do with media than what media

do to audiences. Furthermore, the theoretical approach sees media as having limited effects (Lin, in press). The media do not use audiences so much as audiences use media. Audiences are not passive masses of undifferentiated bodies ready to be manipulated by media. The introduction of the Web as a new communication medium invites taking the revolutionary perspectives of uses and gratifications even farther.

We are no longer limited to seeking to explain how audiences use the Web. Both organizations and individuals use the Web to “satisfy their needs and achieve their goals.” For example, an individual may use the Web at one minute to find the lowest airline fare between Atlanta and Seattle, and use it the next minute to create a Web page devoted to floral arrangements. The distinction between audience and performer, source and destination becomes blurred. An announcer at a radio station may at one moment post a joke on his/her station’s site and the next moment search the Web for new jokes to use on today’s show. Other distinctions blur. Radio can use the Web, but at the same time, it competes with the Web. On the Web, radio also competes with other traditional media—newspapers, television, books, and magazines. As a consequence, the traditional uses and gratifications approach may not be appropriate to use for examination of radio and the Web. On the other hand, individuals and organizations, including radio, use the Web to satisfy needs. Thus, we should take a look at the uses and gratifications approach as it has developed over the years using an audience based perspective even though there is not a direct connection between traditional uses and gratifications and this study.

To begin, Katz, Gurevitch, and Haas (1973) posited five categories of needs that audiences seek to satisfy:

1. Cognitive Needs that help us to understand and master our environment, and to satisfy our curiosity and exploratory drives.
2. Affective Needs that satisfy aesthetic, pleasurable, and emotional experiences. In other words, the pursuit of pleasure.
3. Personal Integrative Needs related to self-esteem, status, confidence, etc.
4. Social Integrative Needs related to desire for group affiliations, family, clubs, etc.
5. Escape Needs related to relaxation, tension release, entertainment, etc.

The five categories of needs are loosely based on Maslow's (1943, 1954) "Hierarchy of Needs" which Maslow arrived at intuitively rather than empirically (Yankelovich, 1981). As a consequence, Katz et al's topography of needs had little basis in empirical research. However, as McLuhan (1960) noted, "the advent of a new medium often reveals the lineaments and assumptions of an old medium" (p. 567). His statement applies as well to assumptions inherent in our theories. The uses-and-gratifications approach has almost exclusively focused on how people use media, not how media use other media or their audiences.

There are four additional basic assumptions of the uses and gratifications approach (Katz, Blumler, and Gurevitch, 1974b):

1. Media use is goal directed.
2. Audiences select media types and media content to fulfill their needs.
3. Mass media must compete with other sources of need satisfaction.

4. Audiences are aware of their needs and reasons for using mass media and can articulate them when asked.

Uses and Gratifications Research

Although research using the uses and gratifications approach did not gain popularity until the 1960s and 1970s, Berelson's research into why people read the newspaper was published in 1949 (Berelson, 1949). His survey of people who went without a newspaper during a newspaper strike found that people read the paper for vicarious experience, for useful information, and for companionship. It wasn't until 24 years later, in 1973, that research consciously employing the uses and gratifications approach was reported by Katz, Gurevitch, and Haas (1973). That study, cited above, first attempted to list needs taken from literature and from the researchers' own insights into the place of media in Israeli society. The needs were then classified into five categories (See above) consisting of a total of thirty-five need questions such as "How important is it for you to keep up with the way the government performs its functions?" Each question that was asked in relation to the part that various media (radio, TV, newspaper, books, magazines) play in the function. Respondents finally were asked an open-ended question about other sources of satisfying the need. The authors found that books were used to cultivate the "inner self; films and television give pleasure; and newspapers more than any other medium, give self-confidence and stability" (p. 169). Television was found to be a way of killing time, but not of combating loneliness or boredom. The problem with this conclusion, however, is that television in Israel was only on for three hours day

during the evening when most families were together. Thus, television became a way to spend time with the family. The researchers also found that media played less of a roll than interpersonal contact in satisfying needs. In addition, public lectures played a stronger roll than media did in satisfying socio-political needs. In fact, “for all of the needs examined, the non-media sources (combined) were deemed more gratifying than the mass media” (p. 180). Instead, friends, holidays, lectures, and work were more important sources of gratification. Although the Israeli study was an important milestone in uses and gratifications research, because of the nature of Israeli society (the 1967 invasion of Palestine, intense national pride, high political awareness, and a high literacy rate), its results cannot and could not be generalized to American society.

In addition, to research that has found that media play less of a role satisfying needs than do other forms of need gratification, Blumler (1972) found that different media satisfy different needs. In his study of English voters, Blumler found that “political-reinforcement seekers tend to rely on newspapers and vote-guidance seekers tend to rely on television because newspapers editorialize while broadcasting better serves the norm of political impartiality” (Katz, Blumler, and Gurevitch, 1974b). Robinson (1972) found that television was used for killing time and para-social interaction, e.g., with attractive and friendly talk show hosts and their guests. Rubin and Windahl (1982) found that the more motivated people are to seek gratifications from a medium, the more their gratifications are reinforced so that, consequently, they come to depend on a specific medium to satisfy specific needs. For example, several researchers (de Bock, 1980; Greenberg, 1974; Rubin, 1983;

Rubin & Rubin, 1982; Windahl et al., 1983) found that while television is used to satisfy companionship, entertainment, arousal, and relaxation needs, television does not play a major role in satisfying surveillance and information needs. Such findings, however, may be the result of the paucity of television content that satisfies surveillance and information needs during the years when the studies were done. Rubin and Rubin (1982) found that whereas viewing of daytime soap operas and game shows was associated with companionship, entertainment, etc., viewing of documentary magazines and talk shows was associated with surveillance and information needs.

Criticism of Uses and Gratifications

Tan (1986, p. 237) has criticized the uses and gratifications researchers for not relating audience needs to media functions or gratifications and for not explaining why needs were fulfilled by one medium and not another. Becker (1979) found that people cannot easily explain the gratifications they get from media use when asked open-ended questions, but have little difficulty identifying their gratifications from a list. In other words, people can't articulate why they use the media. They may say "to know what's going on in the world," but not know about people or major events in the news. McLeod and Becker (1981) criticize the uses and gratifications approach for lacking consistent concepts of motivation and media use, for being beholden to the hypodermic media model, for not attempting to develop broader and more complex models, and for focusing on individuals and not social systems. Elliot (1974) agrees that the approach needs to focus more on social systems. Tan (1986)

suggests that more work needs to be done defining and categorizing media-related needs and drives. Finally, according to Elliot (1974), uses and gratifications is nothing more than a data gathering strategy.

Palmgreen (1984) has stated that “a major challenge that confronts uses and gratifications research is the adaptation and molding of the current conceptual framework to deal with new communication technologies” (p. 49). In the past media have used media, for example, magazines and newspapers have used photography and art work; however, the digitization of media such as television, radio, recordings, newspapers, etc., has changed the landscape. Increasingly, differences among media are becoming blurred. A newspaper is digital information transformed into human readable form printed on paper. Music CDs are digital information. Soon television will be digital. Now, a television station can just as easily put information on the Internet as can a newspaper publisher, a radio station, or any other entity with access to the Web. According to Newhagen (1996), “Digitization democratizes information and yields all binary units equal, either as 0 or 1, regardless of the higher-order symbol systems they represent, such as text, speech, or icon” (p. 7).

Diffusion of Innovations

The principal work on diffusion of innovations is Rogers' Diffusion of Innovations (1995). In it the author defines diffusion, describes the four main elements of diffusion-of-innovations (the innovation, communication channels, time, and social systems), surveys the history of diffusion research, and cites criticisms of the research and findings. He also includes lengthy chapters about the generation of

innovations, the decision process, attributes of innovations and their rate of adoption, adopter categories, diffusion networks, change agents, innovation in organizations, and the consequences of innovations.

The earliest publication about diffusion of innovations was Tarde's (1903). Tarde recognized that rate of adoption often follows an S-curve with a steep ascent beginning when opinion leaders adopt an innovation. However, it wasn't until forty years later that diffusion of innovation research began to grow after Ryan and Gross (1943) published the results of their hybrid corn study. Hybrid corn was introduced to the marketplace in Iowa in 1928. It wasn't until 1941 that almost 100% of corn farmers adopted the new seed, with some farmers surrounded by highly successful crops not adopting for a period of thirteen years. Puzzled by why some farmers were slow to adopt such an advantageous innovation as hybrid corn, agricultural officials enlisted the help of rural sociologists Ryan and Gross (Rogers, 1995, p. 54) to research the matter. The researchers investigated four main aspects of diffusion: (1) the individual farmer's decision process, including stages of awareness, trial, and adoption; (2) the roles of communication sources and channels in conveying information; (3) the S-shaped rate of adoption, a curve tested to see if it fit a normal distribution; and (4) the personal, economic, and social characteristics of the farmers. These four concerns led later diffusion-of-innovation scholars to focus on research questions such as: Which variables are related to innovativeness? What is the rate of adoption? What communication channels play a role in diffusion? In addition, the hybrid corn study established the methodology for future diffusion-of-innovation

studies, i.e., one shot surveys in which the interviewees are asked to recall their decision process.

Results of the study showed that adoption followed the predicted S-shaped curve, with only ten percent adopting hybrid corn during the first five years. Thereafter, forty percent adopted in the next three years. Finally the rate of adoption leveled off as fewer farmers were left who had not adopted the innovation. Ryan and Gross also found that early adopters were more educated, had larger farms, higher income, and traveled more than late adopters. Early adopters first heard of the new corn seed from a salesman; however, neighbors were the most frequently cited communication channel leading to adoption. This pointed out the important role of inter-personal networks in the adoption of innovations.

Diffusion of News

Although communication is an important part of the diffusion process, the first study of diffusion specifically addressed to communications was not published until 1960 (Deutschmann and Danielson (1960). Because the diffusion of major news is rapid (For example, 95 percent of the public knew about the assassination of President Kennedy within one hour of the event), Deutschmann and Danielson created a general questionnaire and trained graduate students to administer the survey before the news events occurred. They were then able to begin telephone interviewing within twenty-four hours of the events: President Eisenhower's heart attack, the launching of the Explorer I Satellite, and Alaska's statehood. They found that radio, television, and newspapers were most often cited as first sources of the

events. Interpersonal channels followed. Newspapers provided the most detailed information; however, two-thirds of the interviewees reported that conversations with others were important later in the process. In general, diffusion of news was similar to diffusion of innovations: the more highly educated gained knowledge first; people of higher socio-economic status were early knowers; and the diffusion process followed an S-shaped curve over time.

Mayer, Gudykunst, Perrill, and Merrill (1990) found an even more rapid dissemination of news after the Challenger explosion in 1986. Half of their interviewees had learned of the explosion within thirty-minutes of the disaster. As cable television, along with coverage by CNN proliferated, diffusion of news became more rapid.

By 1986 most of the questions about diffusion of news had been answered (DeFleur, 1987). The answers are:

1. Changing media technologies lead to changes in the way news about important events is diffused.
2. Most people get their news from media rather than from other people.
3. News of deep concern to large numbers of people moves faster than unimportant news.
4. News that is very important to people is mainly spread by word-of-mouth.
5. Time of day regulates what sources people use for news.
6. Different kinds of people learn about events in different ways.

In addition, DeFleur points out that there is little in common between diffusion of news and diffusion of innovation except the word “diffusion.”

However, now that the Internet has become an established channel of news dissemination, with newspapers competing with television by publishing stories on the net before they publish in print, new studies are needed to determine whether knowledge is diffused even faster, who gains the knowledge first, and whether Internet users become opinion leaders by virtue of their knowledge. DeFleur (1987) also pointed out that, whereas typical front-page news is spread via television and newspapers, less important news affecting neighborhoods is spread via interpersonal channels. Ten years after DeFleur’s pronouncement it may be useful to examine how the Internet impacts diffusion of information.

Diffusion of Innovations

It is important to understand that diffusion of news is different from diffusion of innovations. Whereas knowledge of an event is the end result of diffusion of news, it is only the first step in the process of diffusion of innovations (Rogers, 1995, p. 162). As a consequence, diffusion of news is faster. Rogers postulates a five step model of the innovation diffusion process, with knowledge being the first step, followed by persuasion, decision, implementation, and confirmation. According to Hassinger (1959) selective exposure, the tendency to attend to messages that are consistent with our existing attitudes and beliefs (McGuire, 1968; Festinger, 1957), plays an important role in the knowledge stage. As a result, in Hassinger’s view, “the need for an innovation must usually precede awareness-knowledge of the innovation”

(Rogers, 1995). On the other hand, Rogers (1995, p.165) points out that “the innovation may create the need.” This is especially true of electronic innovations and many other types of consumer products. Generally, people who gain early knowledge of an innovation are knowledgeable in other areas. They have more formal education, are of a higher socio-economic level, have more exposure to mass media, more exposure to interpersonal channels, more social participation, and are more cosmopolite than those who gain knowledge later (Rogers, 1995, p. 167). As a result, they are more aware of new innovations, the knowledge of which contributes to their wanting the new products. It’s the “I-gotta-have-it” syndrome. According to Rogers (1995, p. 164), “a need is a state of dissatisfaction or frustration that occurs when one’s desires outweighs (sic) one’s actualities, when ‘wants’ outrun ‘gets.’” One can develop a need when he/she learns of an innovation. Thus, innovations can lead to needs, or needs can lead to innovations.

Persuasion is the second stage in Rogers' model. Rogers defines persuasion as an attitude formation and/or change, but not necessarily in the direction that the change agent desires (1995, p. 167). In addition, attitude is affective, a feeling about the innovation which is the result of perceived advantage or disadvantage, compatibility or incompatibility, and level of complexity. Because change often involves uncertainty, people are motivated to seek knowledge of the consequences of adopting the innovation-- usually seeking advice from peers rather than change agents. Although the main outcome of the persuasion stage is an change in attitude, there is often a gap between one's attitude and one's behavior. For example, a person may have a negative attitude toward the adoption of email, but be forced to use it to

keep employed. Or one may lean toward owning an electrically powered automobile but be prohibited from doing so because it is too expensive.

The decision stage occurs when an individual or group decides to adopt or reject an innovation. Most will not decide to adopt or reject until the innovation has been tried or its usefulness demonstrated either by the individual or by one's peers. Often a free trial offer speeds adoption. For example, Klonglan (1963) found that free trial of a new weed spray speeded adoption of the spray by about a year. Computer software makers are especially prone to use the free trial method of persuasion as a means of diffusion of new software. Major software manufacturers such as Microsoft, Netscape Communications, Sun Microsystems, and Symantec make beta versions (unpolished versions) of software available to opinion leaders such as educators, systems administrators, and sometimes the general public. As a result, they get early adopters into the habit of using their products, and they get feedback regarding bugs and needed enhancements (Varhol, 1998).

The implementation stage occurs when the innovation is put to use. According to Rogers (1995, p. 173) the implementation stage follows closely upon the decision stage and is often characterized by uncertainty about the consequences of the innovation. This is especially true of organizations because the people who make the decisions are usually not the ones who implement the innovation. In his study of companies using computer-aided manufacturing processes, Gerwin (1988) identified three types of uncertainty: technical uncertainty, financial uncertainty, and social uncertainty. The first, technical uncertainty, has to do with reliability and precision of the innovation and of whether the new innovation will soon be made obsolete by an

even newer innovation. This is especially true of computer technology where speed and capacity of computers increase every year as the price of the machines drops. For example, an article (Santoni, 1998) on the front page of Info World, the most widely read trade journal for enterprise computing, advises information system managers to hold off purchasing decisions because Intel will introduce a new microprocessor that will make the Pentium obsolete. What is more, the cost of the new processor is reported to cost half as much as the older, slower Pentium. The second, financial uncertainty, has to do with whether there will be a good return on investment and whether returns can be forecast accurately. For example, a station manager may be uncertain about whether Web advertising will offset the costs of maintaining a Web site. The third, social uncertainty has to do with the degree to which conflict is likely to occur during implementation of an innovation. For example, will employees oppose an innovation because it results in a restructuring of the workforce?

The confirmation stage is Rogers' final stage in the innovation process. According to Rogers (1995, p. 181), "the individual... seeks reinforcement of the innovation-decision already made or reverses a previous decision to adopt or reject the innovation if exposed to conflicting messages about the innovation." It is at this stage that the individual seeks to reduce or avoid dissonance. According to Festinger (1957) people are motivated in part to reduce feelings of internal disequilibrium or dissonance. As a result, during the confirmation stage, people seek reassuring information regarding the innovation so that they may reduce dissonance. If dissonance is high, one may discontinue use of the innovation. Leuthold (1967) found that there are about as many discontinuers as there are first-time adopters. He also

found that discontinuers have less formal education, are of lower socio-economic status, and are less cosmopolitan.

Organizations and Innovativeness

Mytinger (1968) found that size-- size of community and size of organization-- is the most important variable related to innovativeness. In addition, he found that the cosmopolitaness was an important variable. Rogers (1995, p. 380) has listed several other independent variables related to innovativeness. One variable is the degree to which an organization's management is negatively related to innovativeness. Complexity, the degree to which members of an organization have knowledge and expertise of technology, is positively related to innovativeness. In addition, the number of interpersonal networks in an organization is positively related to innovation adoption. The degree to which an organization is formalized by rules is negatively related to initial consideration of an innovation, but positively related to the implementation of innovation. Finally, the amount of money available for adoption of innovations is positively related to rate of adoption. Meyer and Goes (1988) found in a study of innovations in hospitals that perceived attributes of innovations and hospital environment were important variables related to adoption of new innovations. The attributes (observability, low risk, and low complexity) accounted for 40% of the variance, while environmental variables (organizational and leadership variables) accounted for 11% of the variance. Pro-innovation administrators, especially CEOs, had a major impact on adoption.

Van de Ven (1986) found that innovations not only adapt to the organizational environment, but also transform the structure and practice of organizations. In a study of the adoption of computer technology in organizations, Attelwell (1992) found that lack of technical knowledge impedes implementation of complex technologies. In order to understand and implement the new technologies, new organizations are created to lower the barriers to implementation. For example, service bureaus, consultants, software and hardware companies spring up to make implementation simpler. In the case of the Web, webmasters to create web pages are contracted or hired to make create Web sites.

Radio Broadcasting and Innovations

The first innovation to consider is radio itself. Radio broadcasting took eight years, between 1919 and 1927 to become established, although the first “broadcast” was made by Fessenden in 1906. The first adopters of the broadcasting medium came from the ranks of electronic engineers and amateurs who operated experimental stations. Dr. Frank Conrad, a Westinghouse engineer, was the first such engineer to begin broadcasting on a regular basis, broadcasting recorded music, sports news, and talk. Sensing that people would be willing to buy receivers that could pick up the amateur broadcasts, Horne’s department store in Pittsburg, began demonstrating and selling receivers. This helped expand the audience beyond the original cluster of amateurs. According to Head and Sterling (1990, p. 42), the government had issued 30 station licenses by the end of 1920, growing to 200 in 1922 and 576 early in 1923. In addition, 1922 saw 100,000 receivers sold—not counting crystal and other

receivers made at home. Not knowing how to support their endeavor, many broadcasters fell by the wayside. The two major ideas about how to support commercial radio came from two major corporations. Westinghouse's idea was to make money by selling receivers. AT&T, on the other hand, turned to toll broadcasting on its station, WEAf. WEAf leased time to businesses to broadcast their messages along with whatever programming the businesses could provide. It took four years for the ideas to develop into sponsored programs where the sponsor would pay for the production in return for the sponsor's name being mentioned frequently. Price and product were not mentioned. People were lining up to buy receivers (Banning, 1946).

FM was the second major innovation important to radio broadcasting. The adoption and diffusion of FM (Frequency Modulation) radio was slow. AM (Amplitude Modulation) radio was plagued by interference from other stations and from electricity in the atmosphere. In addition, it was low fidelity. Experimentation with FM began in the early 1900's and continued until 1920 when it was stopped because engineers could not solve the problem of how to lower its signal distortion. However, Edwin Armstrong solved the problem in 1930 and applied for patents that were issued in 1933 (Lewis, T., 1991, 247 ff.). Armstrong set up an experimental station under the auspices of RCA atop the Empire State Building. "Armstrong touted his system not as a means of solving static interference, but rather as a total replacement for AM" (Sterling & Kittross, 1978). As a result, he lost RCA's support. First, RCA had a huge investment in AM and did not want to undertake the costs of developing a competing system. Second, RCA was beginning to concentrate on

developing a new medium--television. Armstrong continued development on his own and gave the first public demonstration of FM in 1935. The results were spectacular. Whereas AM at its best had a signal-to-noise ratio of 30 to 1, Armstrong's FM signal-to-noise ratio was better than 100 to 1. By 1940 there were 20 experimental FM stations on the air. The FCC issued 15 construction permits for FM between 42 and 50 Mhz in 1941. Unfortunately, WWII slowed the adoption of FM when the total number of receivers was a mere 400,000. In addition, AM stations in the same location that lacked interest in developing a competing technology owned most FM stations.

FM suffered a major setback in 1945 when the FCC changed from the 40Mhz band to the current 88--108 band. The result was 400,000 receivers becoming obsolete. Stations were slow to accept the new frequency and 85% of FM stations were owned by AM stations wanting to protect themselves from possible competition. Whereas there were 2,006 AM stations operating in 1949, there were only 737 FM stations in operation. That number declined to 629 by 1952 at the same time that AM stations rose to 2,355. During the same period, FM authorizations declined even more rapidly. Except for a few classical music FM stations, most duplicated AM fare. During the early 1950's the number of FM stations continued to decline. However, after 1957, FM allocations began to increase as a result of AM reaching its growth potential. AM was crowded; so the only place for a new broadcaster to go was to the FM band. In addition, unlike AM, all FM stations could operate at night.

FM's rise began when the stations were able to increase their coverage area and add stereo. In addition, a 1963 FCC rule resulted in partial non-duplication of programming. As program duplication was phased out during the early 70's, some stations, not knowing what to do, but wanting to hold on to their investment, turned their FM programming over to "hippies" who worked for little pay and who programmed long selections by rock groups such as the Grateful Dead and Jimmy Hendrix. As a result, young people tuned in to FM. Finally, because of pressure from Congress and the FCC, automobile manufacturers began to install AM/FM receivers instead of AM only receivers in new automobiles. By the end of the 70's broadcasters had fired the hippies and the classical music DJs and established AM programming with lots of advertising on the FM band. Low fidelity AM began its decline. It had taken FM 40 years to become acceptable.

Radio stations did not adopt television so much a respond to it. Although the networks bought television stations, local radio stations were limited from acquiring television stations by both the limited number of channels in a coverage area and by FCC rules. Early radio featured network shows such as Cisco Kid in the afternoon and Amos 'n Andy during prime time. However, as television matured the network shows moved from radio to television. As a result, network advertising dollars decreased. Local radio had to depend more on local dollars and local programming. By the end of the 50s one third of AM stations were losing money. Even a greater percent of FM stations were operating in the red (Sterling & Kittross, 333). Stations adapted by playing music and news during drive time. Music programming

concentrated on "middle-of-the-road" (MOR), a little something for everyone without offending anyone. However, by the mid-fifties radio had adopted a new format: Top-40. Top-40 concentrated on playing just a few very popular tunes divided by spot commercials with frequent mention of the station's call letters or name. The music, rock and roll, was aimed at a young audience, the fastest growing segment of the population with the most disposable income. Thus, the answer to the question, "How did radio adapt to television?" is, "Top-40".

There were two other technologies that had an impact of radio: transcription recordings and the magnetic tape recorder. Many early radio stations adopted transcription recordings so that they could continuously air music or drama that lasted up to 15 minutes. 78-rpm records could contain no more than three minutes worth of information. Transcription recordings, on the other hand, turned at 33 rpm and were 15" in diameter instead of the standard 10" and 12" 78 rpm records. The magnetic tape recorder, however, was a more important and enduring technology. Captured from Germany during WWII and brought to the U.S., magnetic tape recording is still in use today. Originally shows that were not distributed via transcription recordings were live. In order to be aired during the same hour in different time zones, performers had to repeat their performance for each time zone. Bing Crosby did two live shows, one for the East Coast and another for the West Coast, for NBC. NBC forbade airing recorded shows, which irritated Crosby because airing two shows cut into his golf playing. He had seen the German tape recorders and liked the idea of putting his show on tape; so he moved to ABC where the rules were less stringent. As a result, he

proved the usefulness of the magnetic tape recorder. By the early 50s reel-to-reel tape recorders became standard equipment in broadcast control rooms. Tape recordings have the advantage of making data immediately accessible and of allowing the tape editor to cut data, move data, and insert data by using a razor blade and adhesive tape. Radio, as we see, has had a varied history of adapting to innovations, sometimes slowly and sometimes rapidly.

Summary

In sum, the Web is a new, fast growing communication innovation that people and organizations are currently finding out how to use. How they use it and what needs it satisfies are still to be determined because it is constantly undergoing change, development, and reinvention. Diffusion of innovation theory predicts that the Web's growth should follow an S-shaped curve and that it will be "reinvented" in ways not yet known. Radio's adoption of the Web is currently on the steepest part of the curve, and radio stations are still attempting to find how it can be used to make money. The history of radio's relationship to technological innovations, however, indicates that radio will once again adopt and adapt. The Web may be like television was to radio cause radio to change. On the other hand, the Web may have no effect on radio. Currently, radio broadcasters are adopting the Web—often hedging their bets as they did by applying for FM licenses. However, unlike FM, the Web might not meet the lofty expectations that many predict for it. This study examines those expectations, the reasons for adopting the Web, and the problems and changes that result from adoption of this new technology.

CHAPTER III

METHODOLOGY

This study is divided into two parts. First, it uses a survey to determine why radio stations establish web sites, how they plan to use them in the future, whether they are satisfied with their site, and what they perceive as advantages and disadvantages of using a web site. Second, it examines the content of the sites of those who responded to the survey. The survey asks respondents to answer thirteen Likert-type questions and four open-ended questions. Respondents are given five choices to the “Likert” questions: strongly disagree, disagree, don’t know, agree, and strongly agree. The variables or questions were determined by interviewing five radio station managers whose stations have web sites and by interviewing professors familiar with radio station management. A list of twenty-five variables was established, but reduced to thirteen forced choice questions in order to keep the survey short so that potential respondents would be more likely to complete the survey. The four open-ended questions were added to gather information that the forced choice questions might have missed.

Five hundred surveys were sent via email to radio stations selected randomly from “The MIT List of Radio Stations on the Internet” (Young, 1998). The MIT List arranges stations alphabetically by call letters. To make the list more convenient to download, it is divided into five separate lists: (1) KA-KM, (2) KN-KZ, (3) WA-WH, (4) WI-WP, (5) WQ-WZ. Randomization was achieved using a Microsoft Excel. First, all of the stations in each separate list were electronically copied and pasted into

respective columns in an Excel spreadsheet. Second, a column of random numbers was generated next to each column of station call letters. Third, the station call letters were sorted according to the adjacent random numbers. Finally, the first one hundred stations from each sorted column were sent requests between January 1, 1997 and February 28, 1997. The recipients were encouraged to fill out a version of the survey placed on the web or a version included with the emailed request. No surveys were sent via standard mail; however, the survey author's postal address was included in each request so that each recipient had three choices: answering in an emailed reply, answering via a form on the web, or answering via standard mail. Two hundred-five surveys were answered, of which one-hundred-ninety-nine were useful, a response rate of 40%. The error level for a sample size of 196 is approximately 7%. However, the response rate of 40% presents problems of validity because we do not know why non-respondents did not answer the survey. Perhaps they have a less favorable attitude toward the web than respondents do. Perhaps they have no opinions or are too busy to answer a survey. Indeed, several potential respondents sent email saying that they were too busy to fill out a survey form. Nevertheless, in this case, a sample size of 200 was the most convenient.

Forty percent of all US stations are located in the West. Thirty-three percent of the stations answering the survey are located in the West. Of the stations that responded 26% were non-commercial and 74% were commercial. This split reflects reality. Of the 2514 FM stations having a Web site, 653 (26%) are non-commercial (being assigned a frequency of 91.9 or lower). The case was similar for responses to the open-ended questions. 71% of the commercial stations responded, while 76% of

the non-commercial stations responded. The chi-square score was 0.58, insignificant at the 0.05 level. Thus, we can assume that the percentage of responses of non-commercial versus commercial stations reflects the real world (See Table 1.).

A crosstabulation of FM stations classified by power by whether they responded to open-ended questions reveals no significant differences. Table 2 shows that stations of low, medium and high power (based on the FCC's classifications into A, B, and C stations) responded at approximately the same rate. The chi-square score for the table is 0.51, which is insignificant at the 0.05 level.

A 2x2-crosstabulation table was also constructed to examine whether market size had anything to do with willingness to respond (See Table 3.). The top 60 radio markets according to the Arbitron Metro Survey Area Ranking (Broadcasting & Cable, 1997) were classified as major. All others were classified as non-major. The chi-square statistic for the table was 1.2, insignificant at the 0.05 level. Thus, we can assume that there was no significant difference between whether major or non-major market stations responded to the open-ended questions.

The second part of the study is an analysis of the content of the web sites of 199 of stations that answered the survey. Thirty-nine variables are examined. Three variables are continuous: number of web pages per site, number of external hyperlinks per site, and number of images per site. The remaining thirty-six variables are dichotomous. Either the site has a variable such as advertisements or it doesn't.

Table 1

Crosstabs of Commercial vs. Non-Commercial Stations That Responded to Open-ended Questions

	No	Yes	Total
Commercial	43 (29%)	105 (71%)	148 (74%)
Non-commercial	12 (24%)	39 (76%)	51 (26%)
Total	55 (28%)	144 (72%)	199

Table 2

Crosstabulation of FM Stations:
Power Classification by Responses to Open-ended Questions

		RESPONDED		
		No	Yes	Total
class	A	12 (26%)	34 (74%)	46
	B	19 (25%)	56 (75%)	75
	C	14 (31%)	31 (69%)	45
Total		45 (27%)	121 (73%)	166

Table 3

Crosstabulation of Market Size by Responses

		RESPONDED		
		No	Yes	Total
MARKET	Major	14 23%	48 77%	62
	Non-major	41 30%	96 70%	137
Total		55 28%	144 72%	199

Most variables were chosen by examining and noting the features of twenty-five randomly selected sites from the MIT list not included in the analysis. Other variables were derived from a book about Hypertext Markup Language (Musciano & Kennedy, 1996).

List of Dichotomous Variables

Ads	Media Links
Book Reviews	News Headlines
CD Reviews	NPR
CGI	Telephone
City Cam	Playlist
Classifieds	Political Links
Contests	Program Guide
Coverage Map	Promos
Download Audio	Radio Links
Download Video	Rates
Email	Audio Streaming
Mailer	Requests
Employment Ops	US Mail
Forms	Sponsors
Image Maps	Staff Photos
Java	Staff Bios
JavaScript	Studio Camera
Logo	Weather

CHAPTER IV

DATA ANALYSIS

Survey Questions

The first part of the study is divided into two parts: thirteen Likert-type questions and four open-ended questions. The scale for the first part is: (1) Strongly Disagree, (2) Disagree, (3) Don't Know, (4) Agree, (5) Strongly agree. The questions with frequencies of responses follows in Table 4. Table 5 shows the responses collapsed to three categories: "Agree," "Disagree," and "Don't Know."

Seven of the survey questions received strong agreement. Promotion is the most important reason for establishing a web site. Ninety-seven percent of the respondents agreed that they started a web site to promote their station, with sixty-seven percent strongly agreeing. Eighty-three percent of the respondents agreed that they created a web site to be early adopters of a new medium; however, only thirty-seven percent strongly agreed. Seventy-three percent agreed that they established a site to make their program schedule available, with thirty-six percent strongly agreeing. Eighty-four percent agreed they started a web site to improve listener feedback, with forty-two percent strongly agreeing. Seventy percent agreed that they started a site as a public service; however, only thirty-one percent strongly agreed. Employee enthusiasm was an important motivation for establishing a web site. Seventy-nine percent of the respondents agreed that employee enthusiasm was important, but with only thirty-one percent strongly agreeing. Eighty-six percent

agreed that the web was compatible with their station goals, forty-seven percent overwhelmingly.

Table 4

Responses to Survey Questions

Question	Responses					
	SD	D	DK	A	SA	Total
We created a web site to be early adopters of a new medium.	3 2%	18 9%	12 6%	92 46%	74 37%	199
We created a web site as a means of generating revenue from advertising.	32 16%	58 29%	21 11%	63 32%	25 13%	199
We established a web site for purposes of station promotion.	5 3%	0 0%	1 1%	60 30%	133 67%	199
We established a web site to make our program schedule accessible to computer users.	11 6%	23 12%	19 10%	75 38%	71 36%	199
We established a web site to improve feedback from our audience.	2 1%	14 7%	15 8%	84 42%	84 42%	199
We established a web site as a public service to our listeners.	12 6%	24 12%	23 12%	78 39%	62 31%	199
We established a web site to reach listeners of a high socio-economic level who can afford computers.	33 17%	71 36%	37 19%	38 19%	20 10%	199
We established a web site to better educate our listeners about public affairs.	32 16%	77 39%	35 18%	37 19%	18 9%	199
We established a web site because one or more of our employees was enthusiastic about the Internet	10 5%	19 10%	13 7%	95 48%	62 31%	199
We established a web site because group owners or a radio network, e.g., NPR, encouraged us to do so.	94 47%	61 31%	16 8%	20 10%	8 4%	199
We think that use of the web is compatible with our goals as a broadcast station.	5 3%	4 2%	19 10%	78 39%	93 47%	199
We think that the web is too complex for most of our listeners.	76 38%	86 43%	27 14%	6 3%	4 2%	199
We established a web site because of web demonstrations or information we saw or heard at the NAB Convention influenced us.	114 57%	57 29%	22 11%	5 3%	1 1%	199

Table 5

Responses to Survey Questions Collapsed into Three Categories

Questions	Responses			Total
	Disagree	Don't Know	Agree	
We created a web site to be early adopters of a new medium.	21 11%	12 6%	166 83%	199
We created a web site as a means of generating revenue from advertising.	90 45%	21 11%	88 44%	199
We established a web site for purposes of station promotion.	5 2.5%	1 0.5%	193 97%	199
We established a web site to make our program schedule accessible to computer users.	34 17%	19 10%	146 73%	199
We established a web site to improve feedback from our audience.	16 8%	15 8%	168 84%	199
We established a web site as a public service to our listeners.	36 18%	23 12%	140 70%	199
We established a web site to reach listeners of a high socio-economic level who can afford computers.	104 52%	37 19%	58 29%	199
We established a web site to better educate our listeners about public affairs.	109 55%	35 18%	55 28%	199
We established a web site because one or more of our employees was enthusiastic about the Internet	29 15%	13 7%	157 79%	199
We established a web site because group owners or a radio network, e.g., NPR, encouraged us to do so.	155 78%	16 8%	28 14%	199
We think that use of the web is compatible with our goals as a broadcast station.	9 4.5%	19 9.5%	171 86%	199
We think that the web is too complex for most of our listeners.	162 81%	27 14%	10 5%	199
We established a web site because of web demonstrations or information we saw or heard at the NAB Convention influenced us.	171 86%	22 11%	6 3%	199

It is interesting to note that not all answers to the survey questions are consistent with other data gathered in the study. Although eighty-three percent of respondents agreed that they started a web site to be early adopters, only half created their site before 1996, which in the fast paced world of the Internet means that they were not early adopters. Very early adopters, of which there are only twenty-two or eleven percent would have created their site before 1995. However, this does not necessarily mean that the data are inconsistent because the web did not start to become a popular medium until 1996 (Lotter, 1996). In addition, although ninety-seven percent of the stations report establishing a web site for purposes of station promotion, only seventeen percent of the stations surveyed include specifically promotional material on their site. Again, the fact that sites may not have specifically promotional material does not necessarily mean that the sites are perceived as not being promotional in nature. On the other hand, there is an inconsistency between the number of stations that report starting a web site to make program schedules accessible via the web and the number of stations that actually include program schedules on their web site. Whereas seventy-three percent of stations report starting a site to make program schedules available, only half of the sites analyzed include program schedules. However, cross-tabulation analysis (See Table 6.) indicates that answers to the survey question and whether a site includes program-scheduling information are positively related. Twenty-five of those who disagreed that they started a site to make their program schedule available have no program guide, compared to nine who do have a program schedule. In addition, eighty of those who agreed that they started a site to make their program schedule available include

program schedules compared to sixty-six who do not include schedules. The chi-square statistic is 9.3 with a two-sided significance of less than 0.01. Cramer's V is 0.217 with a two-sided significance of less than 0.01.

Table 6

Answer to Survey Question by Inclusion of Program Schedule

Agreement	No Guide	Have Guide	Total
Disagree	25	9	34
Don't Know	8	11	19
Agree	66	80	146
Total	99	100	199

Chi-sqr. = 9.3 $p < 0.01$

Eighty-four percent of respondents agreed that they started a web site to improve feedback from listeners, which is consistent with the fact that ninety-four percent of the sites include some way to send email, with twenty-percent of the sites including an email form to fill out and submit. Sixty-one percent of the sites include a standard mailing address, and sixty-three percent include phone numbers. However, only ten percent offer opportunities for feedback via from their audience via requests for songs.

Seventy-nine percent of respondents agreed that they started a web site because an enthusiastic employee motivated them. On the other hand, only six respondents reported that a demonstration at a National Association of Broadcasters motivated them. In addition, only fourteen percent were motivated by group owners to start a site.

Broadcasters do not think that using the web is too complicated for their listeners. Only ten respondents or one-half percent think it is too complicated. Most, fifty-three percent, did not establish their site to reach a high socio-economic group owning computers; while twenty-nine percent established a site to reach this group. Eighty-six percent perceive use of the web as compatible with their station's goals. It is remarkable that only fourteen percent perceive the web as complex. If public service is a broadcast goal, it is evidenced by the fact that seventy-percent agreed that they started a site as a public service. However, only twenty-eight percent agreed that they started a site to educate their listeners about public affairs. Finally, if one can assume that making money is a major goal of broadcasting stations, it is interesting to note that only forty-four percent agreed that generating revenue from advertising acted as a motivation for setting up a site. Indeed, forty-five percent disagreed that it was a motivation. Instead, station promotion is the principal motivation. It would be interesting to revisit this motivation in future research, assuming that the web, as was the case with cable television, becomes an important advertising medium.

Open-Ended Questions

The open-ended questions are:

1. How satisfied are you with your web site?
2. How does your station plan to use the web in the future?
3. Why did you establish a web site?
4. What specific advantages and disadvantages do you see in your use of the web as a communication medium?

Satisfaction

Forty-eight percent responded to the open-ended question “How satisfied are you with your web site?” The responses were divided into three main categories: those who were satisfied with their web site, those who were moderately satisfied, and those who were dissatisfied. Sixty-three percent of those who responded to the question were satisfied with their web site. Twenty-one percent were moderately satisfied, while sixteen percent reported that they were dissatisfied (See Figure 1.). Although, those who took time to answer the question may be composed mainly of true believers, it should be noted that 86% believed that using the web was compatible with their station goals. Nevertheless, the answers may be biased toward a favorable response.

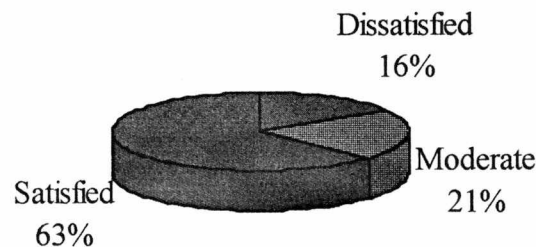


Figure 1 Satisfaction by Percent

The reasons respondents who were satisfied fell into ten categories: (1) feedback, (2) promotion, (3) convenience, (4) revenue, (5) information about listeners, (6) new audience demographic, (7) number of hits, (8) complementary service, (9) satisfied with reservations, (10) other.

Feedback

Thirty-five percent of those who were satisfied with their web site reported improved listener feedback as the main reason for their satisfaction. The general manager of a small market southwestern station reports that their web site is:

...a boon to firing our staff morale and is fast becoming a popular feedback vehicle for many of our audience. Because our site is interactive, many people are utilizing the Home Page on a daily basis. As we discover more uses, I feel it will become a vital tool in winning future ratings battles... and one day... REVENUES TOO!

The manager of a mid-market southeast FM station is satisfied because his site is useful for marketing as well as feedback:

The "Home Invasion" is an important marketing tool. It is one more way we can get into people's homes on a regular basis. We have been able to develop a database of email addresses of our listeners for future marketing projects, and really hear what our listeners think about us. Being a hot FM talk radio format, there are only so many hours in a day for people to call in an express their opinions. Many do not call in because they would never do that, but enjoy listening, can't get to a phone during the various shows or can't get through the busy phone lines. Our web site is designed to be as interactive as

our talk format. Two-way communications is what REAL Radio 104.1 is all about, on-air and on the web!

Feedback is not limited to local audiences. Two stations report that they receive feedback from audiences in other states and countries. Nor, is feedback limited to listeners. It can also come from CD producers and distributors. For example, the systems administrator of a small market northeastern educational station says, "We are starting to get feedback from record labels and the like, who find that interacting with e-mail etc, saves a lot of money over use of phone and fax." Putting obvious and easily used email connections on a station web site is, then, a good way to increase feedback and make the site more satisfactory.

Promotion

Eight percent of those who reported they were satisfied found their sites useful for station promotion. According to the webmaster at a major market west coast station, "The use of the web can increase the amount of information and promotion we can provide. We can also drive them back to the radio." Educational stations can also use the web for station promotion. The manager of a major southeastern university station says that the web

... has permitted us to promote our programming in a new and very effective way. We have streamlined our public service announcement system by permitting organizations to post their PSAs to us on the web. This saves both time and trees. We're also making contacts with promotional companies that were unaware of our existence. They can first of all find us by doing a simple

search, and then our site provides information on how to contact our music directors. We have a page that allows people previously associated with our station to post their e-mail addresses and get into contact with other alumni. I just think that kicks ass. Finally, because of our site, we get to do all types of nifty surveys.

Convenience

Nine percent of stations cited some form of convenience for listeners as a positive factor resulting from their web sites. The general manager of a small market AM station in the mid-west remarks that "Listeners appreciate the site because they can find information about the station at their convenience." The program director of a major market AM station in the southeast was very satisfied, saying "We are ... a good site for people looking for reference information." For the general manager of a mid-market mid-west AM station, it's an alternative way for people to reach the station:

We are satisfied as we are reaching people, or more specifically they're reaching us, in ways we couldn't do otherwise. Research indicates some people will mail you, call you, Internet you, email you, but seldom do multiple ways of contacting you. It is this means of newly developed means to interact with our station that has proven most beneficial to us.

Revenue Source

Although the web has not yet become a significant source of revenue for most stations, some are reaping rewards. Advertisements on the web are generally in the form of hyperlinked banners near the top of a page or as clickable icons located elsewhere on a page (See Figure 2). Improvements in web animation allow the banners to show dynamic information. The general manager of a small market mid-west FM station is especially happy with his web site. "We are enormously satisfied...it has gone better than our plans called for, and is generating money, which wasn't part of the original plan." The webmaster of a major market FM station in the northeast reports that his web site "...almost pays for itself now." Not everyone is entirely happy with current revenues, however. Although the operations manager of a small market northeastern station is satisfied with their site, he reports that he is disappointed that their site is not more widely used by potential advertisers.

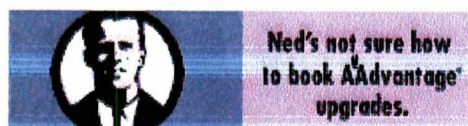


Figure 2 Example of Banner Advertisement

Listener Information

Stations are using the web to gather information about listeners. By adding a guest book which users fill out before accessing a page, stations can gather specific listener life style and demographic information for their clients. Users only need to

fill out the form only once because their identity can be stored in a cookie that is accessed each time the user visits the site. Cookies enable a server to store client-specific information on the client's machine, and use the information when a server or specific page is accessed again by the client. Cookies also make it possible to store data about what selections the user makes and what pages are visited. Cookies do not require the visitor to fill out a form; they can be used to access information about the visitor without his/her knowledge. In fact, if a user's email address is entered into a browser's "Preferences", a server can put the email address into a database on the server. The server can then retrieve the data to be used in a mailing list (Wong, 1997). Servers can also store other information, e.g., how many minutes a user listens to a station's audio streaming. It is also possible to automatically enter into a database the email addresses and names of people that send email to a station. Other possibilities include automatically keeping a tally of listener requests that can in turn be correlated with demographic data. Only two stations responding to this study indicated that they use their web site to gather listener information. Consequently, this is an area to watch for future growth as web programmers become more sophisticated at using the web for audience research.

Reservations

Even though they were satisfied with their web presence, several stations had reservations. These fell into two closely related categories: need for more development and limited time to devote to the site. Those who felt that their site needed more development sounded a positive note. A major market west coast

webmaster's comment was typical: "I am very satisfied with it-- but we need to be adding new features more often." The general manager of a Hawaiian station voices a similar concern: "We're very satisfied and continually looking for ways to improve its look and to gain as many hits as possible." However, maintaining a web site takes time, and some stations expressed concern about not having enough time to devote to their sites. The general manager of a mid-market southwestern station expressed this common concern by saying, "We are very satisfied, and we are utilizing it to the best of our ability given manpower and time." It is interesting to note that several respondents mentioned that new mergers and acquisitions were putting a brake on their web sites. The sales manager of a small market southeastern station noted:

We are satisfied, but it could be much much more if we (I) had the time to maintain it more often. Today, each radio employee is doing much more work

(duopolies, etc.), leaving less time for non-revenue producing activity."

The program director of a major market northeastern FM station voices a similar concern: "We are very pleased with the site. Only the rapid and frequent change of ownership this past year has kept us from making greater strides online." Having enough time to devote to a dynamic, changing site that will keep drawing visitors is, thus, a major concern. Time constraints were also cited as a major problem by stations reporting they were moderately satisfied or dissatisfied.

Twenty-one percent of stations responding to the open-ended question reported that they were moderately satisfied. Most of reasons for being less than

completely satisfied had to do with need for time constraints and more development (See Figure 3.). The webmaster of a northeastern university station expressed the desire to have more time to write CGI scripts and pages for the site. In some cases stations rely on outside designers or ISPs (Internet Service Providers) to keep their sites up-to-date; however, many site designers fail to maintain sites after initial creation. The general manager of a major market northeastern station complains about lackadaisical site designers by saying "Our designers could pay more attention to updating the site." The general manager of a small market mid-west station responds that he is "... partially satisfied, because we have had difficulty with the company that does our updates!" The program manager of a major market southeastern station complains of "sluggish designer response and corporate MIS department dragging its heels on RealAudio capability." In some cases management lacks knowledge of the Internet or motivation to use it. The webmaster for a mid-market northwestern station says, "I just wish we had some more feedback from station management about using it." The general manager of a major market AM station in the northwest reports that he is still trying to figure out what to do with the site. Those who are dissatisfied with their sites voice the same complaints.

Dissatisfaction

The most often cited reasons for being dissatisfied with their web site were lack of time to devote to the site and need for better site development. According to a station manager in the Rocky Mountains, "I really don't have the time, or the programs available to really make a nice one, I just know basic HTML

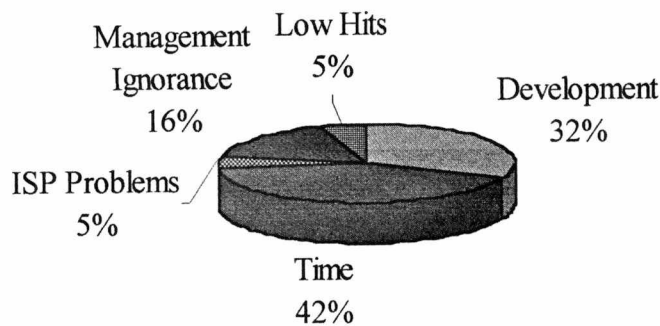


Figure 3 Moderate Satisfaction

programming. I would like to do more with it." The manager of a volunteer FM station in the northwest complains, "I don't have enough time to really make the site what it could be."

Consequently, being dissatisfied results from lack of time to devote to updating and developing the site, contracted site developers who do not develop the site, and management that lacks knowledge and motivation to allocate resources to the development of an attractive site. This implies that stations may consider creating a new position of web developer who devotes his/her full time to developing and updating the station web site. On the other hand, stations may conclude that the effort is too expensive and time consuming to continue adoption of the Web.

The third reason cited by those who were dissatisfied was low number of visits to the site. A major university station on the West Coast reports that "the number of hits to the page are considerably lower than we expected." The manager of a small market northeastern station says that his site is poorly maintained because not many people visit it. Finally, the general manager of small market AM station in

the southeast reports that "the web is somewhat overblown as far as growing an audience." Clearly, web sites that have few "hits" breed dissatisfaction, which in turn, breeds lack of interest in developing an interesting site that people will visit.

Plans

Answers to the open-ended question, "How does your station plan to use the web in the future?" fell into five general categories: (1) Audio Streaming, (2) Revenue Generation Through Advertising, (3) Promotion, (4) Contests, (5) Complementary Services. Seventy percent of the respondents addressed the question.

Audio Streaming

The desire to add audio streaming was mentioned most by those who responded to the question about plans. Audio streaming allows the computer user to listen to real time audio via a computer modem. The technology is new and undeveloped, often producing broken, out of sync reception with 28.8 kbs and slower modems. However, as modems become faster, e.g., 56.3 kbs, reception improves. The result is that radio stations or anyone with the proper equipment has the ability to conduct a live audio broadcast over the Internet. Radio stations that use audio streaming are no longer confined by the limitations of the broadcast spectrum and signal attenuation. With adequate equipment, one can listen to radio stations anywhere in the world. Answers to the open-ended question about plans indicate that Internet broadcasting is the wave of the future. For many stations audio streaming is a current reality.

The principal reason most respondents give for planning to institute audio streaming is to reach a wider audience than currently reached. The station manager of a southern university station said, "by using audio streaming, many of our former listeners will again be able to receive our programming." A major market southeastern AM station reports that "no matter where our South Florida listeners go, if they have access to a computer and a sound card, they can find out what's going on at home." The station manager of a university station in a major northeastern market reports that "as a public station with great, unique programming we'd like to extend our reach as much as possible." KBLA AM in Los Angeles, California may signal the future for reaching niche or ethnic audiences that are spread around the globe. It broadcasts over the Internet in Korean, reaching Korean communities around the world. In addition to increasing reach, some stations want to use audio streaming for interactivity. The station manager of a small northeastern station writes that he wants to use real audio to get "full interaction with air talent to create a sense of community and to expand our listening range." The station manager of a mid-market talk station in the northeast wants to add live cameras, do special web programming, and increase interactivity through games and listener comments. In addition to interactivity, station promotion motivates plans to institute audio streaming. The sales manager of a small market FM station in the south reports that he would like to add audio streaming to "offer continually updated information on station promotions and advertisers." Other respondents were more vague, only mentioning that they plan to add audio streaming in the future. Some cite the bandwagon effect, i.e., wanting to do what others are doing. Writing about plans to use audio streaming, the webmaster at a major market

northeastern FM station points out that “this is where the web is going anyway.” The webmaster of a small-market FM station writes: “We feel people would like to be able to hear local news, ball games and so forth via the net. I guess we will continue to follow the natural Internet evolution to see where it takes us.”

Advertising

Many stations plan to generate revenue through advertising. Advertising on the web is usually accomplished by including banners on a page. Banners are ½ inch by 6-inch graphic images that the computer user can click on to go to the advertiser’s page. However, some respondents wrote that they planned to add contests and cyber malls as part of an advertising effort. Cyber malls are more sophisticated than banners. With the cyber mall, the user clicks on different areas of an image, for example, a window or door that opens another web page (See Figure 4.). The sales manager of a northeastern Top-40 station plans to sell station apparel, clothing printed with station logos or pictures of disk jockeys. Some stations reported that they desired to include web advertising as a “value-added” feature for their current advertisers, their sales staff offering advertisers free web advertising as part of an advertising package. The webmaster at a major market station in the southwest added that station management wants to include electronic sales that would allow advertisers to download or view an electronic brochure.

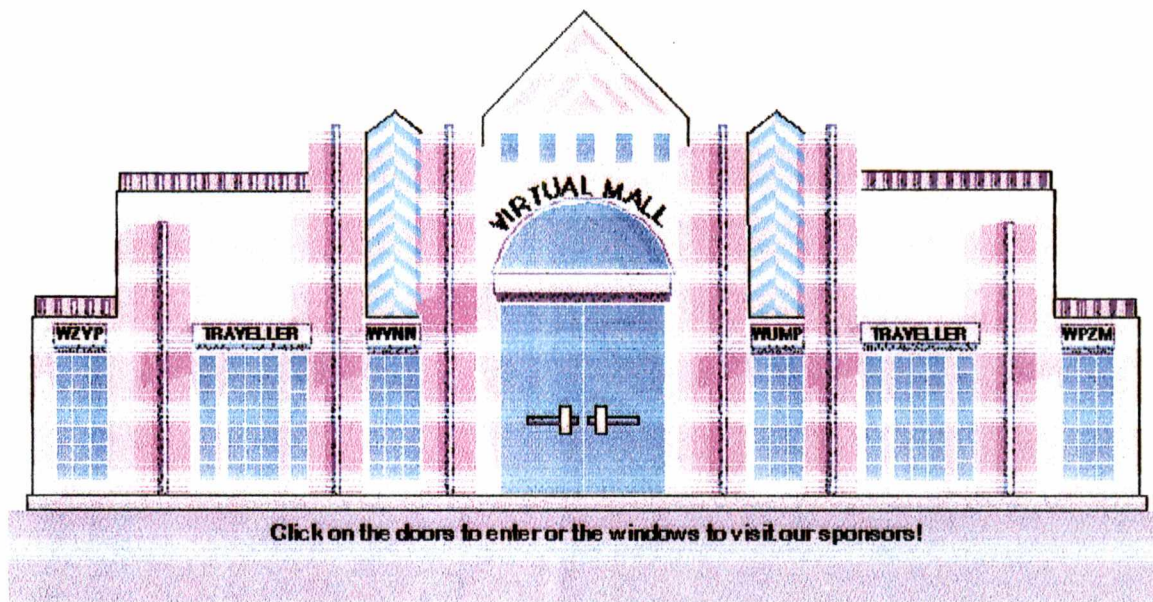


Figure 4 Cybermall

Promotion

A few stations plan to add promotional material to their site. A research director at a mid-market southeastern station plans to add a guestbook for visitors to fill out so that the station can keep track of what demographic groups visit the site and can use the information to create a mailing list to use in station promotions. The sales manager at a major market southwestern station also writes that he plans to use email addresses to contact listeners regarding future events. Other stations plan to utilize their web pages themselves as promotional devices. The station manager at a small AM station in the northeast plans to use the station site to inform listeners about station happenings, to program guides available, and to get feedback from listeners. The program director at a mid-sized northeastern college station wants to use their web site to promote the station through more elaborate descriptions of new programming and with interviews of bands.

Contests

It's difficult to use web sites for promotion and advertising unless computer users visit the sites. One way to motivate listeners to visit a web site is to add contests to the sites. Not only can stations motivate visits with contests, they can also motivate listeners to fill out a form probing life-style and demographic information before they are allowed to participate in a contest. Instead of having visitors fill out a form each time they want to participate in a contest, the station can put a cookie on the visitor's hard drive. Cookies store specific information about the client's machine, and use that information when the web server or a particular page is accessed again by the client. To solve the problem of motivating listeners to visit their station web site where they can see the advertisements and promotional material, the general manager of one station suggests having listeners participate in contests on the site, but only be able to win a prize by listening to the station.

Complementary Service

Some station managers view their web site as an extension of their radio station. The program manager of a Hawaiian station writes, "We can use the web for information that we'd rather not clutter our air with. We can simply refer to our web site, rather than broadcasting it over the air, which is important in a music-intensive format." The webmaster at a small market mid-west station wants his site to become

...the primary place that our listeners will come to in order to get more information about the artists and music we are playing. We want our web site to be an extension of our station, to be able to do more than we are able to do on air and to be available when our listeners want it.

The webmistress at a mid-market southeastern talk station reports that:

Being a hot FM talk radio format, there are only so many hours in a day for people to call in and express their opinions. Many do not call in because they would never do that, but enjoy listening; can't get to a phone during the various shows; or can't get through the busy phone lines. Our web site is designed to be as interactive as our talk format. Two-way communications is what REAL Radio 104.1 is all about, on-air and on the web! Our on-air personalities are able to communicate off-air with many more listeners, one-on-one, than ever before. There is a free flow of ideas, questions, and even criticisms, which our listeners do not have the courage to express on the air. It is a forum for many who are not able to express themselves live on the air.

The program director of a small market southern station plans to include winter weather closings, traffic delays, etc. By including information important to people who may be at work with a computer connected to the Internet, but with no radio, stations can promote themselves by providing vital information about school closings,

traffic delays, and news headlines, information that many radio stations have access to.

Why

Replies to the open ended question, "Please comment about why you established a web site," fell into eight categories: (1) Revenue, (2) Promotion/Marketing, (3) Improved Reach, (4) Employee Motivation, (5) Bandwagon, (6) Service, (7) Extension of Station, (8) Other. Sixty percent of the respondents answered the question. See Figure 5.

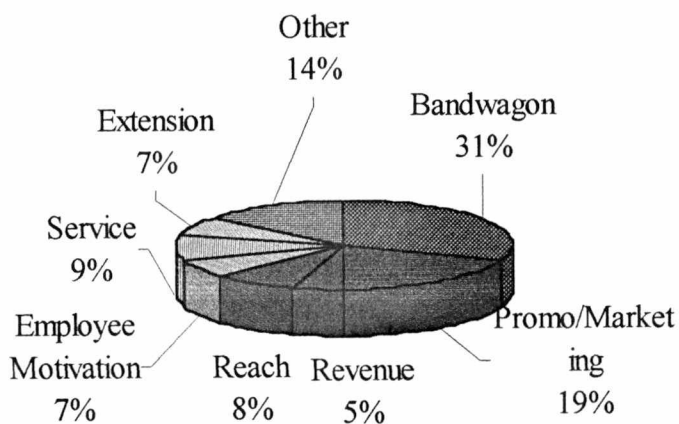


Figure 5 Why Stations Establish Web Sites

Bandwagon

Thirty-one percent of those who answered the question said they established a web site to keep up with or to beat other stations in establishing an Internet presence.

"To stay competitive," remarked a sales manager from a mid-market northeast station. The webmaster of a mid-market western station gives a similar reply: "It's something 'cool' for our listeners and we can get a competitive advantage by staking our claim on the net." Some just want to keep up. "It was a 90's kind of thing to do" says a general manager of a mid-market eastern station. However, He goes on to add:

Actually, we view it as one more off-air opportunity to reach potential new listeners and as an online way to maintain brand loyalty by giving our listeners more than they can get on-air. It also allows us to show some of the things we've only been able to describe to our listeners.

The station manager of a small market northeast station compares the web to FM in its infancy:

The Internet is like FM in its infancy. There are relatively few people equipped to take advantage of it yet, but it is going to be big. The sooner we stake our claim, the better will be our position to reap the benefits down the road.

Others are more interested in establishing a positive station image. The station manager of a small market southeastern station replies that he wanted his station to "have a hip image." "Everyone has to have a web site," he writes. Others see the web as a matter of survival. "Those who don't adapt, die," warns the station manager of an eastern small market station. "At first it was cool to be on the web. Now we are a source of information on demand." Finally, the station manager of a mid-market northwestern station sums it up: "The web is all, succumb or be left behind."

Promotion/Marketing

Promotion and/or marketing were the second most cited reasons for establishing a web presence. Nineteen percent of those who responded to the question cited these as most important. The manager of a large market southwest station:

We wanted to promote what [the station] is doing on a local, regional, national, and international basis. We want to reach our listeners with updates and printed material they couldn't get from simply listening to [the station].

The general manager of a major market rock station in the southwest answers by saying, "to have another mode of promoting the station to a passionate group." For a low power university station in the southeast, it's "to have name recognition." The manager of another low power school station says he established a site because "it is nice PR for the school."

Some, such as a research director for a major market northeast station, it was "to recruit research respondents in the demo that we are searching for." The manager of a mid-market station in the southeast says they established a web site because, "We like to try new marketing tools. The Internet is one of many." Finally, some employees may create web sites not only for marketing but because they are a creative outlet. "We think of it as yet another way to promote the station in a creative way," replies the manager of a major market northeastern station. "There are so many people who use the Internet now, and the numbers grow each day, plus it's fun!"

Employee Motivation

Seven percent of those who responded to the question said that an employee motivated the creation of a station site. In some cases, it's the technical employees who motivate site creation. The manager of a major market southwestern station says his station "... first got into it because our chief engineer was so enthusiastic. He is now gone, but we are now seeing it as a tremendous way to communicate to a new generation of computer users." In other cases, on-air personalities take the initiative. A mid-market northeastern disk jockey states, "I was very interested in it and took the initiative myself." Management can also become involved. The general manager of a major market southwestern station notes that "a few of us are computer junkies." The sales manager of a small market southeastern station: "I personally got involved with the Internet and began working with a local ISP to trade web site space and service. I wrote the code and scanned everything." In not all cases is it a station employee who initiates the creation of a site. According to one manager it was a company mandate. However, according to several open-ended comments, upper-management often lacks knowledge of computers and the Internet. In general, motivation comes from the bottom.

Reach

Eight percent of those who told why they established a site said that they did it to increase their station's reach. This is especially true of lower power educational stations. The manager of a 6,900-watt educational station in the southwest points out

that the site allows his station to “expand our signal worldwide.” Religious stations also establish web sites to increase their reach. A 7,000-watt Lutheran station with audio streaming simply replies: “To expand our outreach of the Gospel.” The manager of a more powerful station in the southeast is more expansive:

We want every tool possible to reach our listeners. We print a monthly newsletter, we host concerts and do live remote broadcasts to meet our listeners. A web page is a natural progression of something we are already doing. It’s another way to let our listeners know we care and want to stay in touch with them. Plus, the web page is fun and interesting.

Educational and religious stations are not the only ones that want to increase their reach; low-powered commercial stations also establish web sites to increase reach. The manager of a 6.9 kw station in a major northwestern market wrote, “because our signal lacks power, we wanted a presence with real audio.” Stations located in markets with a substantial population of computer users establish sites to get an audience of streaming audio listeners. The general manager of a commercial station in the mid-west wrote, “We are in a big 12 college town. Over half of the residents in the area have Internet access.” According to Todd Wagner (1997), founder of AudioNet:

Radio, as we all know, has traditionally been a mobile medium, and there’s no real way to reach the in-office workers. Either they don’t have radios on their

desks, or they can't get reception. So what we're finding is that people are using it to connect with their radio station all day long, and they're listening to shows at their desks.

Not only can stations extend their reach, they can extend their services. According to the Vice President of Marketing at a mid-market mid-western station, "We started on the Internet because we think it's a great new opportunity to combine the two media."

Service

Nine percent of those who responded to the question about why they started an Internet site replied that they did it to extend their station's service to their listeners. A small-market mid-west station manager responded that he did it to establish a "wider variety of listener interaction beyond that of on-air contesting." He said, "the listeners can feel they are a part of the station." Stations in areas with a computer savvy population mentioned service as motivating factor. For one educational station, it was "as a service to listeners who live in Silicon Valley." The manager of a university station in the northeast mentioned his station's "affiliation with a university and a significant portion of listeners who use computers." The manager of a small market 100 kw mid-west station says that he established a web site to share strong community ties. On the other hand, a non-commercial subscriber based station in a major northwest market established its web site to act as a clearinghouse for activists groups, with links to well over one hundred such groups.

Revenues

Only five percent of those who responded to the “why” question mentioned making money as a motivation. Two-thirds of those said that they established a site to generate not current revenue, but future, possible, revenue. One station manager said that he wanted to generate value-added revenue through advertising by offering to advertisers the added incentive of advertising on the web in addition to advertising on the air. By giving away web advertising, stations are able to motivate advertisers to use the web as an advertising vehicle. In addition to advertising other’s products, some stations are beginning to advertise their own products such as T-shirts. A sales manager for a small market mid-west station mentioned that his station wanted to market web products. To date, establishing a web site to generate revenue through advertising or selling products such as T-shirts and other items of clothing with station logos, CDs, coffee mugs, etc., has not currently been a major motivating factor.

Other

Fourteen percent of the responses to “Why did you start a web site?” were classified as “other.” These ranged from “for the heck of it” and “the web was there and I had nothing to do one evening” to receiving a grant from the Corporation for Public Broadcasting. Others were similar to “because we could,” and “for the fun of it.”

Advantages and Disadvantages

One hundred-eighteen of two hundred stations commented on "... comment

about the specific advantages and disadvantages you see in your site as a communication medium." Of the 118, 78 discussed advantages and 72 mentioned disadvantages. Advantages fell into seven categories: (1) reach, (2) marketing and promotion, (3) feedback, (4) bandwagon, (5) extension of station, (6) targeting, and (7) other (See Figure 6.). Disadvantages also fell into seven categories: (1) time, (2) limited audience, (3) poor development, (4) expense, (5) tracking ratings, (6) slowness, and (7) other (See Figure 7.).

Reach

Twenty percent of those who commented on the advantages of having a web site stressed the advantage of reaching a wider audience. Of those, two-thirds mentioned the ability to reach a worldwide audience, particularly with audio streaming. For example, a small market station in Wyoming notes that, although it's in a small market, it's communicating with the world. A Christian station located in the largest market in Southern California and using audio streaming cites a worldwide audience as a major advantage. College stations as well find being able to reach a wider audience advantageous. The webmaster of a mid-market southeastern college station reports the following:

A huge advantage is the massive size of the Internet. I can reach millions of people, not just thousands. I can do everything the station is involved with via the Internet: Promotions, Sales, Public Affairs, Music Broadcast, the list goes

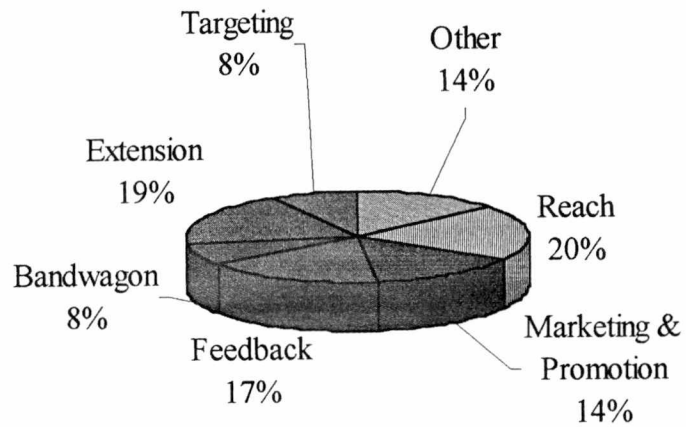


Figure 6 Advantages by Category

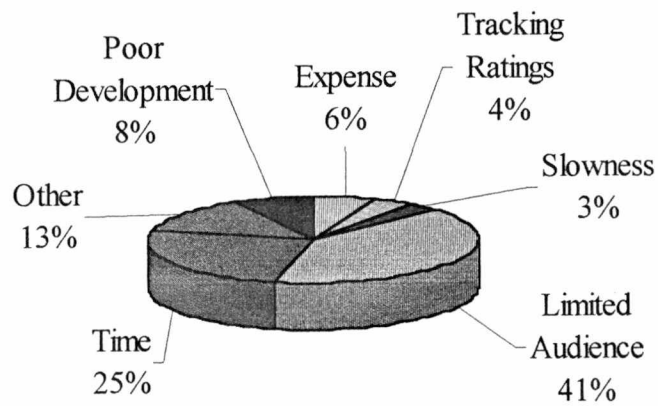


Figure 7 Disadvantages by Category

on. A radio station with a capable web staff can make an incredible and fun site.

On the other hand, forty-one percent cited a small audience as a major disadvantage of web sites. However, only thirteen percent of those having audio streaming reported a limited audience as a disadvantage, compared to twenty-five percent having audio streaming who cited extended reach as a positive factor. In general, stations using audio streaming see the web in a more positive light than stations that do not broadcast over the Internet. The general manager of a small market station in the southwest that does not broadcast on the Internet says:

One glaring disadvantage is that GOD only knows who will visit. I've been amazed at the geographic spread. France, Germany, The Netherlands, Mexico and all points in between. This is definitely a shotgun blast approach, but if promoted on air, it can have an immediate impact locally!

One problem is that access is complicated and limited to those who have computers. The general manager of a small market Midwest station complains that the Internet is:

...only accessible to people with computers and to the Internet, which is not always easy in rural America. Also, these rural Internet nodes are frequently ill equipped for high data flow and often are routed in ways that make Internet communications difficult.

Furthermore, often those who have Internet access, find the intricacies of the net too complicated. The general manager of a major market northeastern station that broadcasts online voices the following:

People in general are clueless as to how to use the Internet. AOL or CompuServe sells 'em a cheapie account; but they don't know what they're doing; and they won't take the time to try to learn how to use the medium. Much time is spent spoon feeding people information they could readily read on the site, if they took the time to read it on the site. One must weigh whether or not one's mission on the web is to merely provide station information and sell banners or to be something of an Internet school as well - which takes resources. Though we are not supposed to be a kindergarten, not to be alienates the audience one is trying to reach via the Net. They don't want to hear "That's a question for your Internet provider." Most don't know what that means, anyway. Damned if you do, damned if you don't. And... as there is only one person on staff who codes html as well as acts as the system administrator-- including maintaining the streaming audio server (and that's just the internet stuff) -- the extra time one must devote to answering how-do-you-do-it questions can be an unnecessary burden at times.

The general manager of a mid-market northeastern station that uses audio streaming voices a similar complaint:

Individual users' technical abilities create some frustration at times for them when it comes to listening via the net and getting the best view with browser and dial-up restrictions. Also, web presence requires a new attitude and set of communications skills for information providers on staff.

Targeting

Although a general manager at a medium market southeastern station says that "the Web still plays to a relatively small, elite audience," many see an elite audience in a positive light. A major market station in the northwest reports that it "... allows us to target a specific educated computer savvy group." Another major market northeastern station likes "... keeping in close touch with the younger, and more technologically aware members of the audience." A small market southeastern AM talk station, unlike some stations, reports that it has lots of computer users in its market. In the northeast, the general manager of a small market station says, "You can reach people who are seeking information. They usually are good listeners to have on your side."

Marketing and Promotion

Along with targeting, the ability to use the web as a marketing and promotion tool is seen as an advantage. Small stations such as college stations find the web useful for making CD distributors aware of their stations and their playlists. A small-market southern station remarks that, "Distributors are asking if they can send us CDs instead us having to ask for them." Another small market station, a southwestern

commercial station, reports that "... record companies can see what we play without calling." An additional advantage is the ability to gather listener and visitor information. The research director for medium market southeastern station replies: "We don't have to purchase leads through metro mail and pay \$1,000 for names, addresses, and phone numbers. We get the names from people who registered online." In some instances, web sites substitute for newsletters. A small market Christian station in the northeast says that it is "able to promote the station with lots of text that couldn't be done with a newsletter or on-air broadcast." Advertisers can also be directed to a station site. The station manager at a small market northeastern station says "... national advertisers can get a better idea of the nature and character of the stations in a particular market as they consider buying ad time." The sales director of a medium market Midwest writes that he can "direct potential advertisers to our site for the same kind of media kit we normally send out." That station includes pages with demographic information, coverage map, Arbitron ratings, description of format, account executive information, etc., in other words, a complete media kit.

Time

Developing a site that draws viewers and promotes a station takes time. One-quarter of the people who responded to the question about advantages and disadvantages said that a major disadvantage of maintaining a web site is consumption of time. A web site that brings people back must be kept up-to-date with interesting content. The general manager of a major market northeastern station says that "... it is hard to make staff resources available in an ongoing way to make a truly

excellent site." This is backed up by a manager from a major market west coast station: "The very demanding nature of web content means a full time job keeping the content dynamic and up to date." The sales manager of a northeast mid-market news/talk station agrees: "It's time intensive - we could devote two full time employees to maintaining and expanding our web sites and it still wouldn't be enough." Not only does site maintenance take time, so does increased interactivity. A small market West Coast college station complains about a "disproportionate amount of time taken on what is basically an accessory to the station" and of "a certain amount of 'unwarranted' attention from listeners, potential listeners, bands, etc. For example, '... why don't you play <so-and-so>,' or '... when will you be broadcasting on the net?'" Responding to email can become a full-time job. The manager of a small market southwestern Christian station replies that maintaining a web site is "a lot of work... both in maintaining and responding to hundreds of emails." These complaints indicate that managers of stations that want web sites that will draw visitors will have to hire additional staff to maintain the sites or out-source the maintenance of their sites.

Poor Development

Out-sourcing can be a problem, however, if independent site developers do not do their job. One small market mid-west station manager says, "we cannot make our own changes to our web site." If a station decides to do in-house development, lack of knowledge becomes a problem. The research director at a mid-market southeastern station:

Our sales staff and Sales Management aren't offering "Links" as an added value because they don't realize or understand the impact the Internet has. Another disadvantage is that our station's GM doesn't understand the Internet, and how the station benefits from it and the time I spend editing web pages.

The promotions director of a small market southeastern station says that he needs people with different talents:

As a radio station, we have many creative employees... People with blessed with imaginative, creative ideas. We're never at a loss for content. But, as a radio station, our people are used to expressing themselves verbally. We're finding ourselves at a loss for an artist (one that works in a visual medium as opposed to spoken word).

Thus, the time, expense, and talent that it takes to develop and maintain a web site that draws visitors is an important problem that stations will have to solve in the future. Before that can happen, however, management must be motivated and possess the knowledge necessary to hire staff with talent to keep the site up-to-date.

Web sites are not billboards that are created once and forgotten, but continuing enterprises that need constant updating and links to the outside world, especially to advertising. Not only do stations need employees who can write HTML code, they also need people with imagination who can develop sites with content that will attract their listeners.

Feedback

Stations can benefit from listener feedback if listeners visit their sites. The promotions director of a small market mid-west top-40 station says that "less than one percent of listeners will ever call a request line and that's probably the same with promotional events. Our web site is a great tool to connect with even more listeners." The webmaster of a mid-market northeastern station that has a sophisticated web site replies that "we can get instant feedback from test songs, hear live comments in the chat room from listeners and hopefully market the site as a separate advertising tool." Although some respondents perceived lack of ratings and listener information as a disadvantage, others liked the instant feedback that is available on the web. The respondents who complained about lack of ratings, probably did not understand the possibilities of gathering information about web site visitors. In addition, to having listeners fill out "guest-books" or questionnaires, it is also possible to gather information that can be gleaned from the client browser. With some browsers it is even possible to glean the visitor's email address which can automatically be stored in a database. A program that stores the total number of visits to a site can be written in twenty lines of computer code. The time of the visits can also be accounted for with a graph showing the number of visits per hour (Gundavaram, 1996, p. 95).

One can also count the number of visits and the time a specific visitor accesses a site by storing cookies (persistent information stored on the client's computer) on the visitor's computer. Cookies can even be used to keep track of other web sites a client visits. In addition, it is a simple process to identify what browser and version a visitor

is using. Nor does one have to pay a rating service for the information. According to Todd Wagner, the founder and president of AudioNet, a web broadcasting service:

...the great thing about the Internet, obviously, as compared to the traditional media right now, is that we can give them precise numbers on how many listeners they might have and at what time it's more crowded than others, and be able to ascertain where their audience is coming from, and create a database of listeners that they can connect with. And that's very powerful. You know, traditionally radio connects during drive times, be it in the morning or at the end of the workday. This is a way to connect with our audience in the office and during the workday, and that's a whole new area for them to exploit and explore (Wagner, 1997).

Extension of Station

Many perceive the web as an extension of their station and as a way of enhancing their image. The webmaster of a major market west coast station says that "It's becoming widespread and has a 'cache' of high tech and 'being with it.'" The program director of a medium market mid-west station says, "We view our site as a gateway to rock on the www." For others, "it gives listeners a visual handle for the station." The general manager of a major market southwestern station puts it nicely:

Instant communication with e-mail. Also, on Radio...people hear a feature, then want more information...but a self-addressed, stamped envelope is such a hassle. With a web site, virtually any feature story, recipe, ticket sales outlets, etc. can be posted on the Internet. This way, if you're headed home from

work....hear about some of our personalities being at a remote broadcast this Saturday....but you don't have a pen to write down the address in the hectic traffic.....then the guy on the radio says "and you can get all the details from our Internet web site."

The manager of a mid-market northeast station:

Listeners have the opportunity to get a visual impact of the station by means of a virtual tour or pictures that allow for true cross medium communication. Furthermore, it is a fixed cost for your site. No matter if you have one page or a hundred on your server, it only takes up a few megabytes of disk space. It also allows for the intermixing of text, video, sound, and images, and will allow in the near future even more interaction.

Others cite easy access as an advantage. The manager of a major market college station in the northeast sees the "availability of information about the station whenever listeners need it as a big plus." Finally, an assistant manager of a small market northeast station cites the advantage of "having an opportunity to be a part of something bigger than just a radio station."

Content Analysis of Web Sites

The second part of this study is a content analysis of the web sites of the radio stations that responded to the survey. The content is analyzed using thirty-eight variables. Thirty-five of the variables were bimodal, either "yes" or "no". Two are divided into three categories: high, medium, and low. The definitions of the variables follow. Table 7 shows the bimodal results of the content analysis of station Web sites.

Variable Definitions

Ads:	Whether or not a web site includes advertisements.
Book Reviews:	Whether or not a web site includes book reviews.
CD Reviews:	Whether or not a web site includes music CD reviews.
CGI:	Whether or not a web site makes use of CGI (Common Gateway Interface) technology. A CGI program resides on the Internet server, not on the user's computer, and processes data sent from form entries to the server.
City Cam:	Whether or not a web site includes a connection to a video or digital camera that records still photographs of an outdoor scene. A tower-mounted camera continually directed at The Golden Gate Bridge is an example.
Classifieds:	Whether or not a web site includes classified ads.
Contests:	Whether or not a web site includes contests.
Coverage Map:	Whether or not a web site includes a map of the area covered by the station's signal.
Download Audio:	Whether or not a web site includes the ability to downloading audio files to the client's computer.
Download Video:	Whether or not a web site includes the ability to download video files to the client's computer.
Email:	Whether or not a web site includes the station's email address.
Emailer:	Whether or not a web site includes a form for sending email to the station.
Employment Ops:	Whether or not a web site includes a list of positions open at the station.
Forms:	Whether or not a web site includes forms. Forms allow the user to get data from or post data to the server. A typical example is a form that allows the user to type in a word and has the server search a database for files containing that word.
Image Maps:	Whether or not a web site includes an image map. An image map is an image that has sections that are clickable. A typical example is a picture of a room that the user can click on to go to a separate page such as a page about the station's recording studio.
Java:	Whether or not a web site uses Java applets. Java is a computer language, and applets are small applications written in Java. The applets are loaded onto the client computer and run from there. Applets are separate from the browser.
JavaScript:	Whether or not a web site includes JavaScript. JavaScript is a scripting language that taps the native functionality of the browser.
Logo:	Whether or not a web site includes a logo.
Media Links:	Whether or not a web site includes links to other media such as

	magazine sites, television network sites, other radio station sites, etc.
News	Whether or not a web site includes news headlines.
Headlines:	
NPR:	Whether or not a station includes NPR programming.
Telephone:	Whether or not a web site includes the station telephone number.
Playlist:	Whether or not a web site includes a list of songs that it plays.
Political Links:	Whether or not a web site includes links to political parties or other political sites.
Program Guide:	Whether or not a web site includes a program guide.
Promos:	Whether or not a web site includes information having to do with station promotion.
Radio Links:	Whether or not a web site includes links to other radio stations.
Rates:	Whether or not a web site includes a rate card.
Audio	Whether or not a web site includes audio streaming such as
Streaming:	RealAudio.
Requests:	Whether or not a web site includes forms for sending requests to the station.
US Mail:	Whether or not a web site includes a standard mailing address.
Sponsors:	Whether or not a web site includes mention of sponsors.
Staff Photos:	Whether or not a web site includes photographs of on-air staff.
Staff Bios:	Whether or not a web site includes biographical information about on-air staff.
Studio Camera:	Whether or not a web site includes a view from a camera located in the studio.
Weather:	Whether or not a web site includes weather forecasts or links to weather forecasts.

Table 7

Results of Content Analysis of Station Web Sites

	No	Yes	% No	% Yes
Ads	43	156	22%	78%
Book Reviews	199	0	100%	0%
CD Reviews	194	5	97%	3%
CGI	126	73	63%	37%
City Cam	196	3	98%	2%
Classifieds	197	2	98%	2%
Contests	148	51	74%	26%
Coverage Map	178	21	89%	11%
Download Audio	149	50	75%	25%
Download Video	198	1	99%	1%
Email	12	187	6%	94%
Emailer	159	40	80%	20%
Employment Ops	187	12	94%	6%
Forms	132	67	66%	34%
Image Maps	139	60	70%	30%
Java	180	19	90%	10%
JavaScript	172	27	86%	14%
Logo	12	187	6%	94%
Media Links	120	79	60%	40%
News Headlines	186	13	93%	7%
NPR	187	12	94%	6%
Telephone	73	126	37%	63%
Playlist	118	81	60%	40%
Political Links	186	13	93%	7%
Program Guide	99	100	50%	50%
Promos	166	33	83%	17%
Radio Links	158	41	79%	21%
Rates	194	5	97%	3%
Audio Streaming	171	28	86%	14%
Requests	179	20	90%	10%
US Mail	78	121	39%	61%
Sponsors	176	23	88%	12%
Staff Photos	90	109	45%	55%
Staff Bios	130	69	65%	35%
Studio Camera	196	3	98%	2%
Weather	144	55	72%	28%

No station in the sample includes book reviews on its site, and only five include CD reviews: three college stations and two commercial stations. Only one station, KBXX, a Houston, TX, urban contemporary station includes downloadable video. The station web site is sophisticated. In addition to using downloadable video of their staff for station promotion, the site includes downloadable audio clips of CDs that it promotes, live audio streaming with video patterns that are synchronized with the music, chat rooms, and animated advertisements and images. Studio cameras and “city cams” are similar to video, but less sophisticated because they show still images that are periodically updated. Three stations use “studio cams”, and three use “city cams.” San Jose State University’s KSJS, located in the heart of Silicon Valley uses a still video camera mounted on the ceiling of the studio that updates the image every five minutes. Duquesne University station WDUQ keeps a camera on their transmitter tower overlooking Pittsburgh. KPIX in San Francisco maintains three city cameras: one of the city, one of the Golden Gate Bridge (See Figure 8), and one of the Bay Bridge.



KPIX: Golden Gate Bridge

Figure 8

Whereas over three-quarters of the sites have ads—usually banners, a mere two stations in the sample include classified ads. WJQK, a Christian station in Holland, MI, has classified advertisements on its web site; however, at the time of this writing, there are only six ads on the site. The other, WFWB, a CBS affiliate in Los Angeles, provides links to sites that include classified advertisements such as employment opportunities and real estate advertisements. Twelve stations list employment opportunities at their own stations. Several stations list part-time positions or intern positions; however, Woodward Communications lists job openings at all of the media it owns.

One-hundred-ninety-three stations agreed that they established a web site for purposes of promotion; however, fewer actively include promotional devices such as rate cards, promos, and coverage maps—information which advertisers would find useful. Twenty-one stations in the sample included coverage maps, and thirty-three included promotional information. Some, such as KCBS in Los Angeles, CA, lists remote sites from which the station will broadcast:

Who doesn't want anything for free? This is America for goodness sakes!

Remaining true to an American tradition, Arrow 93 is committed to traveling the streets of Southern California to pass our exclusive free goods. Keep your eyes peeled for the arrow crew. Times of appearances are subject to change so check back often for the latest.

KEDJ in Phoenix, Arizona promotes concerts that it sponsors and also promotes a station card that can be used for contests and discounts. KFOG of San Francisco asks site visitors to register for free merchandise and sells clothing with KFOG graphics. WRTI, an educational station owned by Temple University, promotes itself by telling users how they can advertise on their web site and includes a description of their promotional material.

One of the survey questions asks about whether the station established a web site to get feedback from listeners. Contests, email addresses, standard mail addresses, telephone numbers, ability to use the browser to make requests, etc., are a measure of interactivity and feedback. Contests, along with the use of forms, are a way of getting information about a station's audience. Forms are a way for the user to fill in fields with information to be stored in a database on the server for later retrieval or to be emailed directly to the station. A station can use forms to gather demographic and lifestyle information about an audience while ostensibly asking them to participate in a contest. Few stations that run contests use this technique of information gathering, however. Many, such as WQLR only post contest rules on their site. On the other hand, KDWB in Minneapolis asks for web site visitors to click on a Disney logo to go to a contest page that asks a trivia question about a Disney movie. In addition, they ask for basic demographic information: gender and age. KFYZ in Bismarck, North Dakota also asks only for age and gender. KKLA, a Christian station in Los Angeles, asks for more specific information such as occupation, address, telephone number, etc., in addition to basic demographic data.

However, WBLI in Long Island, New York only asks for the entrant's email address. To enter WBZE's contest, one must indicate the time slot when he/she usually listens to the station. Contests are an excellent way to motivate listeners to visit a station's web site, become more involved in the station, and gather data about listeners. However, the majority of stations do not use contests for data gathering. More stations should consider using contests effectively.

Forms are also used for posting listener requests. Ten percent of sampled sites have the ability to send requests via forms. Some sites such as that of WQLR in Kalamazoo, Michigan ask for demographic information along with the listener request. In order to keep the same people from making repeated requests some stations such as WTKX in Pensacola, Florida require an email address, which they use to screen out more than one request per day. A station site can also use a Perl script to identify and screen the client browser or to keep a database of where requests are coming from.

Whether a site includes contact information such as addresses, telephone numbers, and email addresses is an indicator of interactivity. Sixty-one percent of the sites in the sample include standard mailing addresses. However, ninety-four percent include email addresses. Of those, twenty percent include an emailer, a form that the user can type, hit a submit button, and send the mail to the station. There are three ways of dealing with email addresses: include an email address with no capability of sending a message from the browser, include the emailer or form method, include the email address with the capability of opening a mail application on the user's computer. The latter is the most popular method, but assumes that web browser is set

to open an email application. Many browsers have their own email capability; so the majority of the time this is no problem. Many users of older browsers without built in email applications, however, find it inconvenient to have to open a separate application manually. In addition, four email addresses in the sample would not automatically open the default email application because the HTML code incorrectly included a space where there should none. Sixty-three percent of the sites sampled included telephone numbers, including fax numbers.

Answers to the survey question about whether the station established a site to make their program schedule accessible to computer users indicated that seventy-three percent agreed. However, only fifty percent of the stations surveyed actually make their program schedules available on the web. Forty percent both agree that access to program guides is important and have a program guide on their web site. However, thirty percent agreed that access to program guides is important, but have no program guide on their site. Playlists are another means of making station information available to listeners. Forty percent of the stations surveyed put their playlists on the web. However, if we count only the one hundred sixty-six stations that play music, the percentage increases to forty-nine percent. Including staff photographs and biographies is yet another way that stations can provide information about the station. Fifty-five percent of the sites inspected included staff photos; however, only thirty-five percent included information about individual staff members. Some stations such as WIZM in LaCrosse, Wisconsin provide "real" information such as employment history, marital status, birth date, etc., whereas others include items such as "favorite food," "things I like," "things I don't like," etc.

One of the survey questions asked about whether the station was motivated to create a web site to inform listeners about public affairs. Twenty-nine percent answered in the affirmative. An analysis of station web sites, however, reveals that seven percent include news headlines. Looking at it another way, though, thirty-nine percent of the news/talk stations include news headlines. The same figures are true for inclusion of political links. Although not "public affairs," weather forecasts are important information that can motivate people to visit a web site. Twenty-eight percent of the sites examined included weather forecasts or links to weather forecasts. Links to other media including radio, television, newspapers, and magazines were found on forty percent of the sites analyzed. However, only twenty-one percent included radio links. Except for stations affiliated with National Public Radio, radio station links are confined to sister stations.

This study also looked at the complexity of station web sites. The number of pages at a site, plus whether the site uses Java, JavaScript, image maps, CGI, and forms can be used as a measure of complexity. CGI and forms have already been discussed; however, the other measures have not. The use of Java applets is a good measure of how technologically advanced a site is because programming in Java requires advanced computer programming skills. On the other hand, many pre-written Java programs such as tickertape applets are readily available on the web. Currently ten percent of radio station sites use Java applets, small applications that accomplish a single task. For example, KEVA in Evanston, Wyoming uses an applet that scrolls messages across the top of the screen in tickertape fashion. KBXX in Houston, Texas

uses a Java applet to present a series of animated advertisements in a single window on the browser. This analysis revealed no other types of applets.

JavaScript is another way to place tickertape banners on a web page. Like Java, JavaScript goes beyond the capabilities of HTML scripting; however, unlike a Java applet, which is executable content separate from the browser and HTML document, JavaScript taps the native functionality of the browser. Only browsers such as Netscape 3.0 and later, and Internet Explorer 3.0 and later support JavaScript, however. All of the sites analyzed used JavaScript to place tickertape type messages on the main screen or in the information box at the bottom of the screen. Fourteen percent of the sampled sites use JavaScript compared to ten percent that use Java applets.

Use of image maps is another means of adding advanced functionality to a web site. Image maps allow the user to click on a section of an image that is a hyperlink. Doing so sends the coordinates of the cursor to the server or client computer for processing. For example, a user might click on a part of an image such as the door to a studio that opens a page containing an image of the interior of the studio. Or, the user may click on the door of the station lounge that opens another page with a picture of the staff sitting in the room. By clicking on a staff member, the user would then be led to a biography of the person. Image maps are also used as a way to create buttons of custom fonts in a fixed layout. Since the fonts available in HTML are limited to the fonts that a particular browser has available, and since the web page creator cannot strictly control position of where the fonts will be on the screen, image maps are a way to gain more control over the way the page looks.

WLYF in Miami, Florida makes use of this method to create a clickable logo. The logo is divided into three separate images. The first is Image 1 (Figure 9).

[Lite Brigade](#) [Lite On-Location](#) [Contest](#) [Lite Frequent Listener](#) [Litelines On-Line](#)

Figure 9 Image 1

The second is Image 2 (Figure 10).



Figure 10 Image 2

The third is Image 3 (Figure 11).

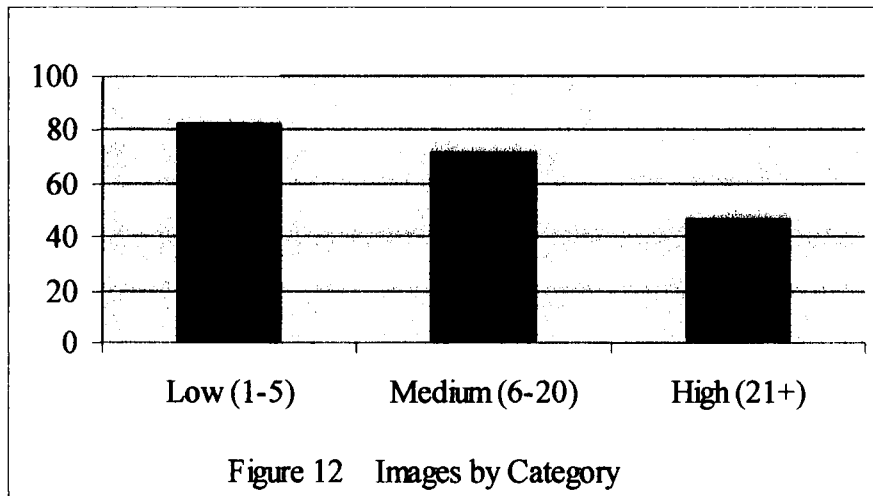
[Lite Listening](#) [Lite Newsroom](#) [Lite FAQ's](#) [South Fla. De-Lites](#) [Search-Lite](#)

Figure 11 Image 3

The first and third images are image maps. If the user clicks on "Lite Listening," he goes to a page about music played by the station. In order to control the look of the

logo, the three sections are combined into what looks like one image. Thirty percent of web sites analyzed use image maps.

This study also analyzed the sampled station sites according to the number of images per site, the number of external hyperlinks per site, and the number of pages per site. In order to make the data more comprehensible, the number of images was divided into three categories: low, medium, high. The range of the original data was from zero to one hundred, with one hundred representing one hundred or more. Only one site in the sample had one hundred or more images. The mean was 13.4, the median 7, and the mode 1. Zero to five was determined to be a reasonable for the “low” category. Six to twenty was considered medium, and more than twenty was determined be high. There were eighty-two sites categorized as low, seventy-one as medium, and forty-six as low (See Figure 12.).



The number of external hyperlinks per site was also categorized into low, medium, and high, with low being one to ten, medium eleven to twenty-five, and high more than twenty-five. The original data had a range of zero to one hundred, a mean of twenty-one, and a mode of zero. Forty-five sites (twenty-two percent of the sample) had no links to external sites. Fifty-two percent had between zero and ten links. Twenty percent had between ten and twenty-five, and twenty-eight percent had more than twenty-five links to external sites. Sites tended to fall into two main categories, low number of external links or many external links. There was no association between station format and number of links (See Table 8.). The two-sided significance of the chi-square statistic comparing station format and number of links was 0.78.

Table 8

Number of Links by Station Format

Format	High	Low	Medium	Total
Classical	2	6	1	9
Country	5	5	4	14
Jazz	2	3	2	7
Pop	31	47	17	95
Religious	4	5	2	11
Talk	5	14	7	26
Variety	6	23	8	37
Total	55	103	41	199

The number of pages per site was also divided into three categories: low (1-5), medium (6-20), and high (greater than 20). The range of the original data was 1 to 79, with a mean of 14.4, a mode of 7, and a median of 10. There were thirty-one sites (15.6%) classified as having a low number of pages. One hundred twenty-three or

sixty-two percent of the sites had a medium number of pages, and forty-five or twenty-three percent of the sites had a high number of pages. As might be expected there is a positive correlation between the complexity of a site and the number of pages. In fact the correlation is 0.53, with two tailed significance at less than 0.01.

CHAPTER V

CONCLUSION AND DISCUSSION

The reader should keep in mind the fact that this is an exploratory study of a slice of time in a rapidly changing medium, the Internet. At the time of the study, enthusiasm runs high among many who have adopted the Web as a medium. Thus, the reader should pay attention to the disadvantages as well as the advantages summarized below. We do not now know if the Web will be a commercial success or will languish once initial enthusiasm wanes. The number of radio stations available to an audience has always been limited by spectrum limitations. The Web, however, is not limited by the spectrum. As a result, the Web can make much more information available. It is conceivable that every radio station in the U.S. could utilize live audio streaming. Nor does one have to be a radio broadcaster to use audio streaming. Currently, anyone with access to the Web can choose between hundreds of newspapers around the world, many utilizing audio and video. As a consequence, the increase in information may overload the market, with radio stations being mere dots in ever expanding and competitive cyberspace. We need to look upon the data in this study as baseline data and compare them to future developments in radio broadcasting's relationship with the Web. The uses and gratifications approach to research may be useful, but it needs to be expanded to investigate, not only how people use media, but also how media use other media. The conclusions of this study offer some possibilities.

Currently, keeping up with or beating other stations to the Web was the most cited reason for establishing a Web site. Although most cited keeping up with competition, some think it's the "cool" thing to do. Promotion is the second most important reason for establishing a Web site, with making program schedule available, feedback, and public service following. Often, an employee within the organization promoted adoption of a site. In general, station managers do not believe that connecting to the Web is too complex a task; however, they do believe that maintaining a site is a complex and time-consuming task.

Overall, stations are satisfied with the implementation of their Web sites, most importantly as a medium of promotion and audience feedback. Notably, using the Web to generate revenue was the fourth most cited reason for being satisfied. Only a small percent were dissatisfied, mainly because they do not have enough time to maintain and develop a site. Some contract with outside developers, but find that site developers do not pay enough attention to their site.

Audio streaming, i.e., broadcasting over the Internet, if not already implemented, will be implemented by more and more stations in the near future. However, radio stations are not the only players in this area. Although most Web sites that feature audio streaming are maintained by radio stations, non-broadcasters and television stations are increasingly turning to Web broadcasting. In fact, any one with an Internet server, CD player, and an inexpensive sound card can get in on the action. On the other hand, radio stations that wish to reach a wider audience have an advantage because they have personnel and infrastructure already in place for simulcasting over the Internet. Currently, the problem with audio streaming is lack of

bandwidth, resulting in interruptions in the flow of the broadcast, monophonic only reception, and general poor quality. However, telecommunications companies, along with cable and computer companies, are currently competing to increase bandwidth as soon as possible.

Advertising on the Web is in its infancy, but some stations are already advertising promotional material such as T-shirts, coffee mugs, and bumper stickers on their site. Others are using the Web to garner more advertising accounts by offering clients "value-added" advertising, i.e., ads both on-air and on the Web. On the other hand, there is nothing to stop a station from selling directly via the Web. A station could easily sell CDs that it features in its broadcasts. Or, it might conceivably sell concert tickets on its site.

Promotion via the Web is underway and may become more important in the future. Using the Web for promotion is a "chicken/egg" problem. The problem is getting people to visit the site, which requires promotion of the site by the station so that the site can, in turn, promote the station. In addition, there has to be a reason for visiting the site. Stations that use audio streaming can present programming that people can listen to while working at their computer at work. Contests, daily jokes, interactive topics for discussion, gossip about performers and on-air talent, etc., are ways that stations may use to draw an audience to the Web. Asking visitors to fill out guestbooks or questionnaires to enter a contest can provide information for putting visitors on e-mail lists to promote the station and the site. In addition, stations can use questionnaires to gather demographic and lifestyle information about their audience.

Cookies can be used to create a database of other sites audience members visit, thus, allowing a station to create an audience profile to be used by the station's sales staff.

Not all respondents found Web sites to be all advantages and no disadvantages. The most cited disadvantage was the time involved in maintenance of a site. This suggests that radio stations should create a new position of webmaster within the organization, or at the least, have a creative employee devote part of his/her time to maintaining an up-to-date site. Other disadvantages are limited audience, expense, slowness, and lack of ratings. The latter, however, is not a real disadvantage. Never before has it been easier to keep an up-to-date record of who and how many are in the audience. The size of the available audience is, of course, limited to those who have computers capable of accessing the Internet; however, that number is increasing exponentially every year. In reality, reach is global instead of local, with every computer that is connected to the Internet in the world having access to station sites.

In general, the majority of station Web sites do not do enough to motivate people to visit the site. If one is looking for a way to write or call the station, he/she is likely to find an email address and a telephone number. However, if one is looking for entertainment such as listening to the station via audio streaming or participating in a contest, chances are he/she will not be satisfied. Fewer than 15% of stations have audio streaming and only about a quarter of them include some kind of contest. On the other hand, slightly more than half include staff bios and photos so that audiences can put the voices with the faces. However, once an audience member sees a photograph and read a bio, there is no reason to return to the site for that reason.

Studio cameras can add a visual dimension, but only a very few stations broadcast live video of their on-air personalities. News and weather information may motivate people to visit, but little more than a quarter of the sites include weather and fewer than 10% include news. Gossip columns, music reviews, and chat rooms having to do with recording artists played on the station may motivate some audience members to visit; however, there is little being done in that area.

More than three-quarters of the stations surveyed include advertising, but fewer than 20% include promotional material. Surprisingly none included CD reviews. The reviews could easily be coupled with a "shopping cart" allowing visitors to buy CDs reviewed by the station. At the very least, a station could collect money from online businesses accessed from the station's links. Nor are enough stations selling promotional T-shirts, bumper stickers, coffee mugs, etc. Clearly, more stations need to create ways to produce revenue from their sites. This requires both creative thinking and knowledge of how the Internet works.

Anytime an organization adopts a new technology, the technology is likely to change the organization and the organization is likely to change the technology (Rogers, 1995, p. 395). First, station management needs to realize that the time and effort that it takes to create a Web site that regularly attracts visitors requires staff that can devote time to Web development. Creating a Web page that is not constantly updated and that does not motivate people to visit is a waste of time and money. Therefore, stations that cannot afford the time and money to create an effective site, should consider abandoning the site. Sales staffs need to be trained to understand the nature of Web advertising. Thought has to be put into creative, new ways to generate

revenue. On-air personalities need to learn how to use email to answer visitors' mail. They need to make themselves as interesting on the Web as they are on the air. In other words, the technology needs to be reinvented to meet the needs of broadcast stations.

The Internet is in its infancy. So far there is only a hint of how the child will grow in the 21st century. Most likely there will be no difference between one's computer, television set, radio, telephone, CD player, etc. It will all be one. It is even likely that we will be able to stay connected to the Web in our cars or as we take a walk in the park. As a result, broadcasting will go through revolutionary changes, and communications scholars should document these changes. On the other hand, the Web may not be the success that some envision. We need to trace the organizational changes that occur as a result of adopting the new technologies. We need to trace how Web commerce as it relates to broadcasting develops over time. We need to trace how the use of the Web by clients (audiences) and broadcast stations develops over time. Finally, we should not forget to study why broadcasters do not choose to establish a presence on the Web. The 21st century will be an exciting time for broadcasters and for researchers.

Diffusion of innovation theory predicts that the Web's growth should follow an S-shaped curve and that it will be "reinvented" in ways not yet known. Radio's adoption of the Web is currently on the steepest part of the curve, and radio stations are still attempting to find how it can be used to make money. The history of radio's relationship to technological innovations, however, indicates that radio will once again adopt and adapt.

The most important lesson for station managers is that, if they want to have a Web site that will draw visitors, they will have to include content that will motivate visitors to access the site. Doing this requires time and a commitment to keeping content fresh. This means that a station should, at the very least, have a webmaster and graphic artist devoting enough hours to keep the site up to date. Web sites are good ways to gather audience data; however, the data are limited by the demographics of people who own computers. Managers should also consider the costs of maintaining a site that may not pay for itself with advertising dollars. On the other hand, they should also consider how much value a site can add to a station in terms of promotion and audience feedback. Web sites may well be a passing fad that will not ultimately generate revenue or other types of value. In addition, because one does not have to be a broadcaster to establish a site using streaming audio, broadcasters should look upon the Web not only as an opportunity, but also as competition. Caveat emptor.

BIBLIOGRAPHY

BIBLIOGRAPHY

- Anonymous (1994). Internet plans to provide California voting results. Wall Street Journal, October 25, p. B13.
- Attewell, P. (1992). Technology diffusion and organizational learning. Organization Science, 3(1), 1—19.
- Auger, P. & Gallagher, J. M. (1997). Factors affecting the adoption of an internet-based sales presence for small businesses," The Information Society, 13, 55—74.
- Banning, W.P. (1946). Commercial Broadcasting Pioneer: The WEA Experiment, 1922—1926. Cambridge, MA: Harvard University Press.
- Banta, T. J. (1964). The Kennedy assassination: Early thoughts and emotions. Public Opinion Quarterly, 28, 216-224.
- Bantz, C., Petronio, S., & Rarick, D. (1983). News diffusion after the Reagan shooting. The Quarterly Journal of Speech, 69, 221-230.
- Bass, F. (1969). A new product growth model for consumer durables. Management Science, 13(5), 20—24.
- Becker, L. (1979). Measurement of gratifications. Communication Research, 6, pp. 54—73.
- Berelson, B. (1949). What "Missing the Newspaper" means. Communications Research, P. Lazarsfeld and F. Stanton, editors, New York: Harper.
- Berners-Lee, T. (1992). Electronic publishing and visions of hypertext. Physics world, 5(6), pp. 14-18.
- Blumler, J. (1972). Information and democracy: the perspective of the governed. II Politico, 37.
- Broadcasting & Cable (1997). Broadcasting & Cable Yearbook. New Providence, NJ: R. R. Bowker.
- Brody, H. (1996). The Web maestro: an interview with Tim Berners-Lee. Technology Review, 99 (July), pp. 32—40.

- Carnevale, M. (1993). World Wide Web: Begun as a government experiment, what is now called the Internet has taken on a life of its own. Wall Street Journal, November 15, p. R7.
- CommerceNet/Nielsen (1995) The CommerceNet/Nielsen Internet Demographic Survey: Executive Summary
[http://www.commerce.net/information/surveys/exec_sum.html].
- CommerceNet/Nielsen (1997, July). Internet population.
[<http://www.commerce.net/stats/wwwpop.html#WWWPOP/>].
- De Bock, H. (1980). Gratification during a newspaper strike and a TV blackout. Journalism Quarterly, 57, pp. 61—66, 78.
- December, J. and Ginsberg, M. (1995). HTML & CGI Unleashed. (Indianapolis: Sams Publishing), pp. 6—8.
- December, J. (1996). Units of analysis for Internet communication. Journal of Communication, 46(1), pp. 14—38.
- DeFleur, M. (1987). The growth and decline of research on the diffusion of news, 1945—1985. Communication Research, 14(1), 109—130.
- Deutschmann, P. & Danielson, W. (1960). Diffusion of knowledge of the major news story. Journalism Quarterly, 37, 345—355.
- Elliot, P. (1974). Uses and gratifications research: A critique and sociological alternative. The Uses of Mass Communications, J. Blumler and E. Katz editors, Beverly Hills: Sage.
- Ferranti, M. (1996). Style sheets to ensure HTML interoperability: Consortium calls for standard tags. Info World, 18(16), p. 6.
- Festinger, L. (1957). A Theory of Cognitive Dissonance, Stanford, CA: Stanford University Press.
- Fliegel, F. & Kilvin, J. (1966). Attributes of innovations as factors in diffusion. American Journal of Sociology, 72(3), 235—248.
- Gantz, W. (1983). The diffusion of news about the attempted Reagan assassination. Journal of Communication, 33(1), 56—66.

- Gerwin, D. (1988). A theory of innovation process for computer-aided manufacturing technology. IEEE Transactions on Engineering Management, 35(2), 90—100.
- Gray, M. (1997). Web Growth Summary [<http://www.mit.edu/people/mkgray/net/web-growth-summary.html>].
- Greenberg, B. (1964). Diffusion of news about the Kennedy assassination. Public Opinion Quarterly, 28, 225—232.
- Greenberg, B. (1974). Gratifications of television viewing and their correlates for British children. In J. Blumler & E. Katz, editors, The Uses of Mass Communications: Current Perspectives on Gratification Research, Beverly Hills: Sage, pp. 71—92.
- Gupta, S. (1996). The fourth WWW consumer survey. [<http://www-personal.umich.edu/~sgupta/hermes/survey4/>].
- GVU Center (1997). The Gvu Center's WWW user survey. Georgia Institute of Technology, Atlanta [http://www.gvu.gatech.edu/user_surveys/survey-1997-10/].
- Hanneman, G. J., & Greenberg, B. (1973). Relevance and the diffusion of news of major and minor events. Journalism Quarterly, 50, 433-437.
- Hassinger, E. (1959). Stages in the adoption process. Rural Sociology, 24, 52—53.
- Hill, R. J., & Bonjean, C. M. (1964). News diffusion: A test of the regulatory hypothesis. Journalism Quarterly, 41, 336—342.
- Hoffman, D. and Novak, T. (1995). Marketing in hypermedia computer-mediated environments: Conceptual foundations. Project 2000 [<http://www2000.ogsm.vanderbilt.edu/cmepaper.revision.july11.1995/cmepaper.html>].
- Hoffman, D. and Novak, T. (1995b). The CommerceNet/Nielsen Internet demographics survey: Is it representative? [<http://www2000.ogsm.vanderbilt.edu/surveys/cn.questions.html>] (Text of speech for the Interval Research Corporation Friday Forum, December 15, 1995.).
- Hoffman, D., and Novak, T. (1997). A new marketing paradigm for Electronic Commerce. Information Society, 13(1) [<http://www2000.ogsm.vanderbilt.edu/novak/new.marketing.paradigm.html>].

- Hoffman, D., Novak, T. P., and Chatterjee, P. (1996). Commercial scenarios for the Web: Opportunities and challenges. Journal of Computer Mediated Communication, 1(3) [<http://shum.huji.ac.il/jcmc/vol1/issue3/hoffman.html>].
- Hughes, K. (1994) , Entering the World Wide Web: A guide to cyberspace., (Enterprise Integration Technologies) [<http://www.eit.com/web/www.guide/guide.toc.html>].
- Katz, E. Blumler, J. and Gurevitch, M. (1974a). Utilization of mass communication by the individual. The Uses of Mass Communications, J. Blumler and E. Katz editors, Beverly Hills: Sage.
- Katz, E. Blumler, J. and Gurevitch, M. (1974b). Uses of mass communication by the individual. Mass Communication Research, Davison, W. and Yu, F., editors, New York: Praeger, pp. 11—35.
- Katz, E. Gurevitch, M. and Haas, H. (1973). On the use of mass media for important things. American Sociological Review, 38, pp. 164—181.
- Katz, E. and Lazarsfeld, P. F. (1955). Personal Influence, Glencoe: Free Press.
- Kennedy, W., and Dietsch, J. (1995). How to make money online. Sunsite [<http://www.sun.com/sunworldonline/swol-09-1995/swol-09-webbiz.html>].
- King, P. (1994). On strike, but on-line too. Newsweek, 124, November 21, p. 106.
- Klonglan, G. (1963). Roll of Free Sample Offer in the Adoption of Technological Innovation. Ph.D. Thesis, Ames: Iowa State University.
- Lasswell, H. D. (1948). The structure and function of communication in society." The Communication of Ideas, a Series of Addresses, Bryson, L., ed., New York: Harper and Brothers.
- Leuthold, F. O. (1967). Discontinuance of Improved Farm Innovations by Wisconsin Farm Operators, Ph.D. Thesis, Madison: University of Wisconsin.
- Levy, S.G. (1969). How population subgroups differed in knowledge of six assassinations. Journalism Quarterly, 46, 685—698.
- Lewis, P. (1994). Companies rush to set up shop in cyberspace. New York Times, November 2, p. C1.
- Lewis, T. (1991). Empire of Their Own: The Men Who Made Radio. New York: Edward Burlingame Books.

- Lin, C. (in press). In Singletary, M.; Stone, G.; and Richmond, V. Clarifying Communication Theories.
- Lotter, M. (1996, July). Internet Domain Survey. Network Wizards [<http://www.nw.com/>].
- McGuire, W. (1968). Selective exposure: A summing up. In R. Abelson et al., editors, Theories of Cognitive Consistency: A Sourcebook, Skokie, Ill.: Rand-McNally.
- McLeod, J. and Becker, L (1981). The uses and gratifications approach. Handbook of Political Communication, D. Nimmo and K. Sanders, editors, Beverly Hills: Sage, pp. 67-99.
- McLuhan, M. (1960). Effects of the improvements of communication media. Journal of Economic History, 20, pp. 566—575.
- Maslow, A. (1954). Motivation and Personality, New York: Harper.
- Maslow, A. (1943). A theory of human motivation. Psychological Review, 30, pp. 370—396.
- Mayer, M., Gudykunst, W., Perrill, N. & Merrill, B. (1990). A comparison of competing models of the news diffusion process. Western Journal of Speech Communication, 54, 113—123.
- Metcalfe, B. (1996). Are your Internet packets going to head for a lost and unstable horizon? InfoWorld, November 25.
- Meyer, A.D., and Goes, J.B. (1988). Organizational assimilation of innovations: A multilevel contextual analysis. Academy of Management Journal, 31(4), 897--923.
- Miles, I. (1992). When mediation is the message: How suppliers envisage new markets. In M. Lea, editor, Contexts of Computer-Mediated Communication, pp. 145—167.
- Morris, M. and Ogan, C. (1996). The Internet as mass medium. Journal of Communication, 46(1), pp. 39—50.
- Musciano, C., and Kennedy, B. (1996). HTML: The Definitive Guide. Cambridge, MA: O'Reilly.

- Mytinger, R. E. (1968). Innovation in Local Health Services: A Study of the Adoption of New Programs by Local Health Departments with Particular Reference to New Practices, Washington, D.C.: U.S. Department of Health Education and Welfare.
- Network Solutions (1997). Network Solutions announces millionth domain registrant: Milestone in history of Internet highlights evolutionary changes. [<http://nce.com/mil.html>].
- Network Wizards (1998). Internet Domain Survey, [<http://www.nw.com/zone/WWW/top.html>]
- Newhagen, J. and Rafaeli, S. (1996). Why communication researchers should study the Internet: A dialogue. Journal of Communication, 46(1), Winter, 1996.
- Nielsen Media Research (1997, December). Electronic commerce on the rise according to CommerceNet /Nielsen Media Research Survey. [<http://www.commerce.net/news/press/121197.html>].
- Novak, T.P. and D.L. Hoffman (1997). New metrics for the new media: Toward the development of Web measurement standards. World Wide Web Journal, Winter, 2(1), 213-246.
- Ostland, L. E. (1973). Interpersonal communication following McGovern's Eagleton decision. Public Opinion Quarterly, 37, 601—610.
- Palmgreen, P. (1984). Uses and gratifications: A theoretical perspective. Communication Yearbook, 8, 20—55.
- Raftner, M. V. (1997). Two cable operators merge net divisions, taking on @Home. WebWeek, December 12 [<http://www.webweek.com/1997/12/15/news/19971215-cable.html>].
- Robinson, J. (1972). Toward defining the functions of television. Television and social behavior; reports and papers. A technical report to the Surgeon General's Scientific Advisory Committee on Television and Social Behavior. Edited by John P. Murray, Eli A. Rubinstein, and George A. Comstock. Rockville, Md: National Institute of Health.
- Rogers, E. (1986). Communication technology: The new media in society. New York: The Free Press.
- Rogers, E. (1995). Diffusion of Innovations, Fourth Edition, New York: Free Press.

- Rubin, A. (1983). Television and gratifications: The interaction of viewing patterns and motivations. Journal of Broadcasting, 25, 1—15.
- Rubin, A. & Rubin, R. (1982). Older persons' TV viewing patterns and motivations. Communications Research, 9, 287—313.
- Rubin, A. & Windahl, S. (1982). Mass media uses and dependency: A social systems approach to uses and gratifications. Paper presented at the meeting of the International Communication Association, Boston.
- Ryan, B. & Gross, N. (1943). The diffusion of hybrid seed corn in two Iowa communities. Rural Sociology, 13, 273—285.
- Santoni, A. (1998). Pentium's reign cut short. Info World, 20(6), p. 1.
- Schmitz, J., & Fulk, J. (1991). Organization colleagues, media richness, and electronic mail: A test of the social influence model of technology use. Communication Research, 18(4), 487—523.
- Semich, J. W. (1995). The World Wide Web: Internet boomtown. Datamation, 41, 37-41.
- Siegel, J., Dubrovsky, V., Kiesler, S., & McGuire, T. (1986). Group processes in computer-mediated communication. Organizational Behavior and Human Decision Processes, 37, 157—187.
- Siegmann, K. (1997). Is the Internet about to crash? The Site, February 7 [http://www.thesite.com/0297w2/work/work395_020797.html].
- Steinfatt, T. M., Gantz, W., Seibold, D., & Miller, L. D. (1973). News diffusion of the George Wallace shooting: The apparent lack of interpersonal communication as an artifact of delayed measurement. The Quarterly Journal of Speech, 59, 401—412.
- Sterling, C.H. & Kittross, J.M. (1978). Stay Tuned: A Concise History of American Broadcasting. Belmont, CA: Wadsworth.
- Tan, A. (1986). Mass Communication Theories and Research, New York: Macmillan.
- Tarde, G. (1903). The Laws of Imitation, translated by E. Parsons, New York: Holt.
- Teisberg, E. (1992). McCaw Cellular Communications, Inc. in 1990. Harvard Business Review, 53, 127—133.

- Van de Ven, A. (1986). Central problems in the management of innovation. Management Science, 32(5), 590—607.
- Varhol, P. (1998). Getting better feedback on beta test software. Computer Design, 37(1), p. 106.
- Wagner, T. (1997). The Sound of Science. John McChesney, host, [<http://www.hotwired.com/synapse/hotseat/97/38/transcript2a.html>].
- Windahl, A. (1981). Uses and gratifications at the crossroads. In G.C. Wilhoit & H de Bock, editors, Mass Communication Review Yearbook, Beverly Hills: Sage.
- Wired News Daily (1998). Heckalottanames.com [<http://www.wired.com/news>].
- Wong, C. (1997). Web Client Programming with Perl. Sebastapol, CA: O'Reilly.
- Yankelovich, D. (1981). Stepping out of Maslow's escalator. New Rules: Searching for Self-Fulfillment in a World Turned Upside Down, New York: Random House, pp. 234—243.
- Young, T. (1998). MIT List of Radio Stations on the Internet. [<http://wmbr.mit.edu/stations>].

VITA

Robert Gwynne was born in Los Angeles, California on June 13, 1938. He attended elementary school in Grants Pass, Oregon and graduated from West Linn High School in West Linn, Oregon in 1956. He attended Portland State University off and on from 1957 until 1964, working for the U.S. Forest Service and as a jazz drummer while not attending school. In 1964 he graduated with a Bachelor of Arts Degree in English from Portland State University. He taught English and was the librarian at Pacific High School in Port Orford, Oregon from 1964 until 1966. He then continued his education at Portland State University, receiving a Master of Arts Degree in English in 1968. He taught at Mercer Island Senior High School in Mercer Island, Washington from 1969 until 1981 when he moved to Knoxville, Tennessee with his wife, Dr. Rosalind Gwynne, who was appointed to a faculty position at the University of Tennessee. While teaching at Mercer Island, he was active in the Seattle area as a jazz musician, playing contra-bass or drums. In addition to recording playing with many world-class musicians, for 7 years his Sunday afternoon jazz show was heard throughout the Pacific Northwest on KRAB in Seattle. Also, while teaching at Mercer Island High School, he acted as advisor to the school's FM radio station. Other activities included artistic photography for record covers and art shows.

He started to work on an undergraduate degree in Music at the University of Tennessee, Knoxville, in 1982, but was recruited to teach communications, English, photography, and music as an Assistant Professor at Knoxville College, a historically black college located in Knoxville, Tennessee. He entered the doctoral program at the University of Tennessee in 1989 while still teaching at Knoxville College. In

1991 he left Knoxville College and worked at Oak Ridge National Laboratories designing a prototype computer interface to be used in conjunction with the destruction of chemical weapons. In 1992 he became a graduate assistant, teaching Speech Communication at the University of Tennessee, Knoxville. In 1994 he became an adjunct professor in the Speech Department and also taught public speaking at Roane State Community College in various counties of East Tennessee. In August of 1998, he received his Doctor of Philosophy degree in Communications with an emphasis in Broadcasting.

He is currently employed as an adjunct professor at the University of Tennessee, Knoxville.