

Lynne Schafer Gross  
Sixth Edition

# TELECOMMUNICATIONS

An Introduction to Electronic Media

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**To my husband, Paul**

# **PREFACE**

## **Purpose**

Telecommunications is one of the most potent forces in the world today. It influences society as a whole, and it influences every one of us as an individual. As each year passes, telecommunications grows in scope. The early pioneers of radio would never recognize today's vast array of electronic media—broadcast television, cable TV, direct broadcast satellite, multimedia, videocassettes, the Internet—just to name a few. Neither would they recognize the structure that has evolved in such areas as regulation, advertising, and audience measurement. They would marvel that their early concepts of equipment have led to such developments as audiotape recorders, cameras, videotape recorders, digital effects generators, editors, computer graphics, and satellites. If they could see the quantity and variety of programming available today, they might not recognize that it all began with amateurs listening for radio signals on their “primitive” crystal sets.

All indications are that telecommunications will continue to change at a rapid pace. As it does, it will further affect society. All people, whether they be individuals working in the telecommunications field or individual members of society, have a right to become involved with media and have an obligation to understand why people need to interact with the media. Some knowledge of the background and structure of the industry is an essential basis for this understanding.

A major goal of this book is to provide just that kind of knowledge so that intelligent decisions about the role of telecommunications can be made both by those who are practitioners in the field and those who are members of the general society.

## **Organization of the Book**

This is the sixth edition of this book, the first appearing in 1983, the second in 1986, the third in 1989, the fourth in 1992, the fifth in 1995. This edition has been reorganized and greatly revised to take into account the many changes that have occurred in the media field in the last few years. The book is now in two parts, one dealing with forms and the other dealing with functions.

Within the forms section, the chapters on commercial radio and commercial TV are fairly similar to those in the fifth edition, except for updating of events that have happened recently. Cable TV has been given its own chapter, and the chapter that used to be called “Public Broadcasting” has been broadened to “Noncommercial Broadcasting” to include forms such as college radio and religious programming. A new chapter of “Other Forms of Telecommunications” covers computer services such as the Internet and World Wide Web, telephones including PCS and ISDN, satellite services such as VSAT and DBS, wireless

cable, SMATV, videocassettes, video discs, audio tapes and discs, and multimedia forms such as CD-ROMs and virtual reality. Corporate telecommunications, although discussed in previous editions, now has its own expanded chapter. The international chapter has been totally revised with a format that places it within the concept of forms of electronic media.

The functions section begins with a chapter that covers business practices and includes, among other things, much of what used to be in a separate chapter on programming practices. The chapter on programming is organized by genre with acknowledgement to the various merging genres on present-day radio and TV. Advertising is similar to what was in the last edition except for updating, but the “Audience Measurement” chapter is now called “Audience Feedback,” mainly to take into account the interactivity of various computer services. The two legal chapters have been merged into one, mainly a result of the present deregulation emphasis. A brand new chapter, however, on ethics and effects brings attention to the responsibilities placed on telecommunications practitioners, in part because there is less regulation than there used to be.

The book begins with a short prologue on the significance of telecommunications that points out the importance of media. It ends with a short epilogue on career opportunities in the field. Both of these are new features.

All the chapters should lead the reader to assess the strengths and weaknesses of the particular subject being discussed. Each chapter has a new section on “Issues and the Future.” This should prepare the readers for fast-changing events that they will read about in newspapers and magazines.

### **Special Features**

Each part of the book begins with an overall statement that relates the chapters to one another. Each chapter begins with a pertinent quote and a short introduction. At the end of each chapter a summary outlines major points but does so in an organizational manner slightly different from that given within the chapter. For example, if the chapter is ordered chronologically, the summary may be organized in a topical manner. This should help the reader form a gestalt of the material presented.

Further aids in understanding the material are the thought questions at the end of each chapter. These questions do not have “correct” answers, but rather are intended to lead the reader to form his or her own judgments. Discussions centering around these questions will indicate that varying opinions surround telecommunications issues.

Marginal notes appear in each chapter. These notes highlight the main subject being discussed in the adjacent paragraph or paragraphs. Taken together, these notes serve as review points for the reader. Throughout the text, important words are boldfaced. These, too, should aid learning and are defined in the glossary.

The chapters may be read in any sequence; some of the terms that are defined early in the book, however, may be unfamiliar to people who read later chapters first. The glossary can help overcome this problem. It includes important

technical terms that the reader may want to review from time to time, as well as terms that are not necessary to an understanding of the text but that may be of interest to the reader.

Chapter notes, which appear at the end of the book, are extensive and provide many sources for further study of particular subjects.

The photographs and charts that appear throughout the book supplement the textual information.

## **Supplementary Materials**

The supplementary materials available with this text include an instructor's manual, transparencies, videotapes, updates on the Internet, and test items.

### **Instructor's Manual**

The instructor's manual available with *Telecommunications* offers a sample course outline that can be adapted to semesters or quarters, as well as learning objectives, suggested lecture topics/activities, films and tapes, overheads, test questions, and a bibliography for each text chapter.

### **Transparencies and Videotapes**

Brown and Benchmark sales representatives can provide instructors with overhead transparency charts that they can incorporate within lectures. The representatives can also advise the instructors concerning selected free videotapes that they can obtain to enhance lectures.

### **Updates on the Internet**

Because telecommunications is such a fast changing field, the author will provide updated material for instructors who are using the text. These updates will be available by accessing Brown and Benchmark's home page. Sales representatives can provide additional information.

### **MicroTest III**

The questions in the test item file are available on MicroTest III, a powerful but easy-to-use test-generating program by Chariot Software Group. MicroTest is available for DOS, Windows, and Macintosh personal computers. With MicroTest, an instructor can easily select the questions from the test item file and print a test and answer key. The instructor can customize questions, headings, and instructions; can add or import his or her own questions; and can print the test in any choice of fonts the printer supports. Instructors can obtain a copy of MicroTest III by contacting their local Brown & Benchmark sales representative or by phoning Educational Resources at 800-338-5371.

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Lynne Schafer Gross



## PROLOGUE

# The Significance of Telecommunications

The electronic media are a major source of entertainment and information for most people. They act as a soothing relaxant, a warm companion, a regular babysitter, a friendly sage, a portage to a vicarious adventure, and a window to the outer world. Radio and TV answer simple questions such as whether or not to carry an umbrella, and they give us more complex information so we can better choose our country's leaders. They keep us up to date in times of disaster and keep us in touch with each other through periods of happiness, pain, and curiosity. Television has caused lunchrooms around the country to buzz with talk of the latest *Seinfeld* episode and the latest from the O.J. Simpson trial.

And yet the electronic media are far from perfect. Detractors complain about the sensationalism of news and talk shows. Parents bemoan the violence of such programs as *Mighty Morphin Power Rangers* and the wasted time that children (and adults) spend on video games and "surfing the net." The underlying commercialism of most electronic media systems brings about a "buy, buy, buy" mentality. Favorite shows are cancelled—seemingly for no reason. To some, the electronic media appear to be run by greedy moguls devoid of ethics and unconcerned about the influence their actions have on the citizenry as a whole.

A transmitter broadcasting radio waves, a TV set sitting in the corner of the living room, a microphone picking up sound, a fiber optic delivering a phone signal—none of these is good or bad. They are at the mercy of the people who use them, both those who are involved with them as a career and those who interact with them on a day-to-day personal basis.

Television is less a means of communication (the imparting or interchange of thoughts, opinions, and information by speech, writing, or signs) than it is a form of communion (act of sharing or holding in common; participation, association; fellowship).

Richard Schickel  
*The Urban Review*

## Relationships to Electronic Media

use

The degree to which individuals interrelate with electronic media is great. Americans own a large number of electronic communication devices (see figure P.1). They don't just own them; they use them. The average person listens to the radio three hours a day and watches TV four hours a day.<sup>1</sup> And that doesn't include the time spent playing video games, talking on the phone, scouring the Internet, or faxing documents.

attitude

For the most part people seem to like what they see and hear. A *TV Guide* survey found that almost half of the population would not give up television viewing for less than a million dollars and that only 12 percent of people feel guilty about the amount of TV they watch.<sup>2</sup> Year after year, people say TV is their major source of news.<sup>3</sup>

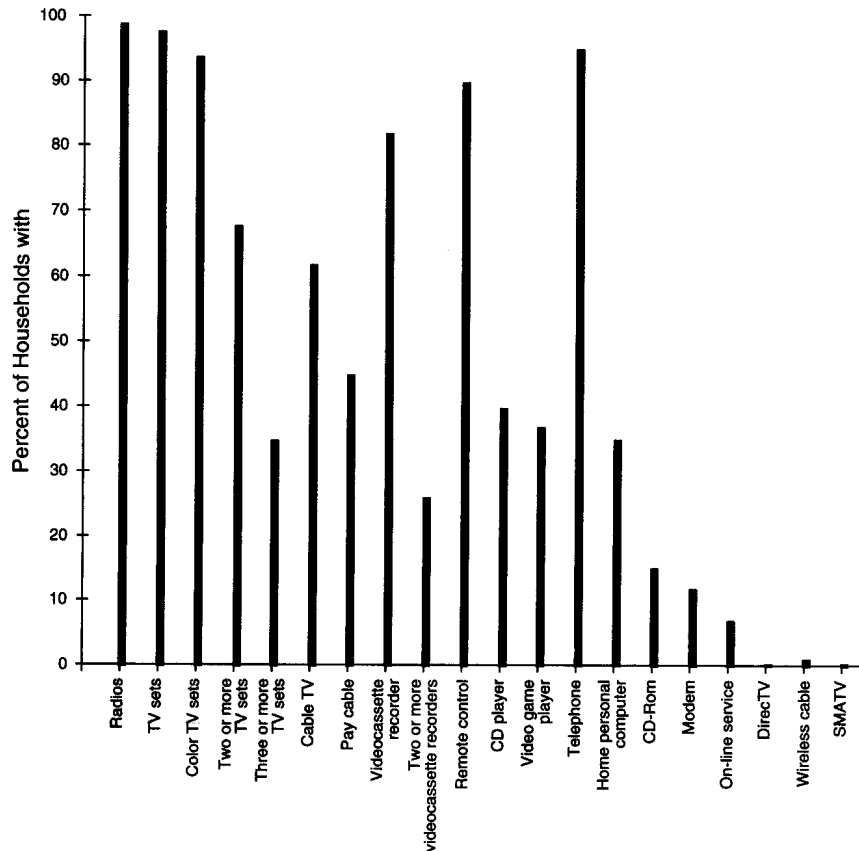
## A Matter of Terms

Telecommunications is a fast-paced business with major changes occurring almost daily. It is also young—a product of the twentieth century. Although the pervasive influence of telecommunications has occurred in a short space of time, its intensity compensates for its youth.

FIGURE P.1

Percent of households with various telecommunications devices and services.

(Sources: Joseph C. Anselmo, "Hughes Sees Payoff from DBS Gamble," *Aviation Week and Space Technology*, 1 May 1995, 58; Bureau of Census, *Statistical Abstracts of the United States*, 1994 (Washington, DC: Department of Commerce, 1994), 564–81; Rich Brown, "MMDS (Wireless Cable): A Capital Ideal," *Broadcasting and Cable*, 1 May 1995, 18; Cable Television Developments (Washington, DC: National Cable Television Association, 1995), 2 and 10; "CD to Read," *Newsweek*, 5 June 1995, 15; Thomas Rikig, "Keeping Track," *Wall Street Journal*, 9 September 1994, R-11; Thomas A. Stewart, "The Information Age in Charts," *Fortune*, 4 April 1994, 75–79; and "TVs Top Telephones, Say Studies," *Broadcasting and Cable*, 22 August 1994, 16)



The study of radio and television at the university level did not begin in a widespread manner until the 1960s. At that time, there were two media—radio and television, and together they were called **broadcasting**. Radio consisted of a fairly large number of local stations with specific formats. Television was dominated by three commercial networks—ABC, CBS, and NBC—and their **affiliated** stations. A few stations were **independent** and did not broadcast material from any of the big three networks, but they were definitely considered second class.

radio and TV

By the late 1960s, broadcasting was divided into two categories—commercial and public (originally called educational). These two coexisted fairly harmoniously because public broadcasting was small and not really a threat to its commercial kin. In fact, it often relieved commercial broadcasting of its more onerous public service requirements because the commercial broadcasters could point out that public broadcasting served that interest.

commercial and public

Then in the mid-1970s a number of other media came to the fore to challenge radio and TV, creating an alphabet soup that included **CATV** (cable TV), **VCRs** (**videocassette recorders**), **DBS** (**direct broadcast satellite**), **MMDS** (**multichannel multipoint distribution service**, sometimes referred to as **wireless cable**), **SMATV** (**satellite master antenna television**), **STV** (**subscription television**), and **LPTV** (**low-power television**). Also during the 1970s many companies began using television, particularly for training. This was referred to as **industrial TV**.

other media

The word *broadcasting* no longer seemed to apply because that word implied a wide dissemination of information through the airwaves. Many of these other media were sending information through wires, and cable TV was even going around touting its **narrowcasting** because its programs were intended for specific audience groups.

In the 1980s when the new media weren't so new anymore, they began being referred to as *developing technologies*, but some of them didn't develop very well. In fact, a number of them just plain died. Generally, the term **electronic media** was used to describe broadcasting and the newer competitive forces, but sometimes the word **telecommunications** was used to label the entire group, including industrial TV, which, by now, had changed its name to corporate TV because industrial sounded too grimy.

The whole concept of television as a form of mass communication began to change. Prior to the 1980s, most people in the country watched the same programming at the same relative time. The three networks competed fiercely, but, on the average, each garnered almost 30 percent of the available audience. They were mass communication systems sending out programming to be viewed by generally passive masses. Individuals could accept or reject the programs, but they could not “talk back” or interact. This differed from interpersonal point-to-point communications where a small group of people engaged in give and take on a subject through telephone conversations, letters, or face-to-face talking.

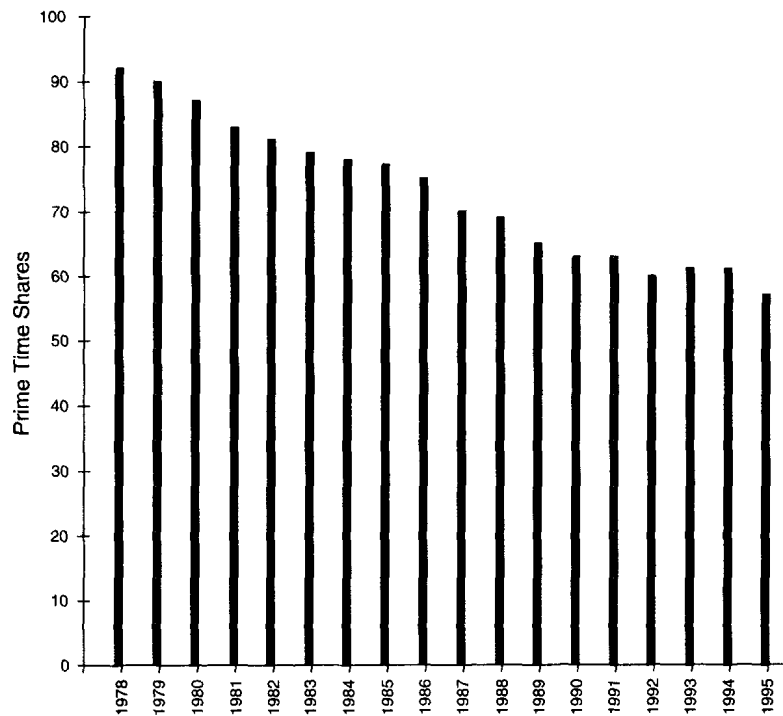
mass comm and point-to-point comm

With the introduction of a variety of delivery systems, TV became a more fractionalized medium that appealed to smaller groups of consumers. No longer did three network programming chiefs call the shots on what the people

FIGURE P.2

The prime-time share of audience of ABC, NBC, and CBS from 1978 through 1995.

(Sources: Cable Television Developments (Washington, DC: National Cable Television Association, 1995), 5; Elizabeth Jensen, "Still Kicking," Wall Street Journal, 9 September 1994, R-3; Steve McClellan, "Big Three Post Record Share Slide," Broadcasting and Cable, 10 April 1995, 8; and "Net Ratings Plunge to Record Low," Variety, 11 June 1990, 1)



would watch and when they would watch it. People could tape programs off the air to watch whenever they wanted. Instead of watching NBC, CBS, or ABC, they could watch one of the many cable channels, public broadcasting, one of the independent TV stations that by then had grown in stature, or one of the other alternative media forms. They could also watch programs on the newly formed Fox network. The **share** of audience that the "big three" networks attracted plummeted dramatically (see figure P.2).<sup>4</sup>

In the 1990s, the field of study broadened even more. Telephone companies started to enter areas that had traditionally been reserved for broadcasters and cablecasters. The once lowly phone also allied itself with the computer, spawning a whole new array of interactive services. An **information highway** started to emerge as interlinked computers were used to exchange **electronic mail** and other information stored in computer **data banks**.

The entry of the phone industry into electronic media, in a way, brought broadcasting full circle. Radio has its antecedents in the telephone because, at one point, the telephone was seen as a mass medium and the radio as an individual, private medium. In 1877, a song called "The Wondrous Telephone" contained the following lyrics: "You stay at home and listen to the lecture in the hall, Or hear the strains of music from a fashionable ball!"<sup>5</sup> The original idea for the telephone was that it would deliver words and music to large groups of people. With the development of radio, many people tried to invent ways to make the signals private so that two people could have their own confidential conversation.

the information  
highway

telephone and  
radio roles

Of course, over the years the two media switched roles—telephones being the private medium and radio becoming the mass medium. The two also went their separate ways academically and socially. Rarely were they studied in the same curriculum, and rarely did people trained for broadcasting obtain jobs in the telephone industry. The social, economic, and political issues affecting each were quite dissimilar.

Then along came the computer and the **modem**. The modem enabled data generated by the computer to be sent over phone wires to another computer. Some of the information being transmitted over this computer-telephone system was not private, but was intended for anyone in the population who wanted it or was willing to pay for it, including those in corporations. It included news, stock market quotes, sports, and other information traditionally provided by radio and TV, as well as newspapers and magazines. It also included new services such as electronic mail and at-home banking that had not previously been part of the electronic media structure.

computer  
influence

The word *telecommunications* was somewhat taken over by the telephone industry to encompass both the old telephone services and all the new data transmission and other services the computer enabled the telephone to undertake.

Now the telephone, computer, radio and TV broadcasting, cablecasting, DBS, VCRs, SMATV, MMDS, corporate video, and even newer technologies (**videodiscs, CD-ROM, virtual reality, multimedia**) seem to be merging to form new types of information and entertainment suppliers. The most common word used to encompass all of this is *telecommunications*, but the word or even the concept could change dramatically in the near future.

newer  
technologies

One result of all the changes is that the consumer is becoming more empowered. Armed with the TV set **remote control**, people can switch channels from the comfort of their easy chairs. At one time networks could rely on the fact that most of the people who tuned in at the beginning of the evening would stay with the same station because they did not feel like getting up to change the channel. Now with the remote control, some people watch two or more programs at once. Even more people switch to a new channel the minute commercials are on. This channel switching phenomenon has become known as **grazing or channel surfing**.

remote control

Many TV and radio programs support computer **bulletin boards** on the **Internet**, and fans and nonfans alike can comment on the shows to each other and to the program's creators. High-quality cameras have become so portable and inexpensive that individuals can produce program material that can be aired on many of the TV distribution systems. The passive masses are becoming interactive individuals.

consumer  
interaction

The words *telecommunications*, *electronic media*, and *broadcasting* are used somewhat interchangeably in this book, depending on the circumstances and the era being discussed. Media forms are also separated into discrete chapters so that their characteristics and development can be chronicled in an organized manner. In reality, however, a continuous blurring and blending is taking place.

## A Rationale for Study

If telecommunications is constantly changing and if all people know a great deal about the electronic media because they deal with them on a daily basis, why study this field?



careers

Some of the answers to this question are obvious. Anyone who is aiming toward a career in this area will profit from an intimate knowledge of the history and organization of the industry. Radio and television are highly competitive fields, and those armed with knowledge have a greater chance for career survival than those who are naive about the inner workings and interrelationships of networks, stations, cable TV facilities, advertisers, unions, program suppliers, telephone companies, the government, and a host of other organizations that affect the actions and programming of the industry. As the various forms of communications expand, new and exciting jobs are created. Knowledge of the past will help people predict the direction of their future jobs. Knowledge about the industry can also help its practitioners set their own personal values in regard to it so that they can help mold the industry into a form that they feel is effective in a positive way.

societal  
importance

On a broader scope, individuals owe it to themselves to understand the messages, tools, and communication facilities that belong to our society because they are so crucial in shaping our lives. Rare is the individual who has not been emotionally touched or repulsed by a scene on TV. Rare, too, is the individual who has never formed, reinforced, or changed an opinion on the basis of information seen or heard on one of the electronic media. A knowledge of the communications industry and its related areas can lead to a greater understanding of how this force can influence and affect both individual lives and the structure of society as a whole. It can also teach each individual the most effective methods for interacting with media and affecting their programs and services.

fascination

In addition, telecommunications is a fast-paced, fascinating industry worthy of study in its own right. It is associated with glamour and excitement (and power and greed), both on-screen and off. Although, in reality, the day-to-day workings of the industry can be as mundane as any other field, the fact that it is a popular art that includes the rich and famous makes it of special interest. The ramifications of the power that the electronic media exert over society is most deserving of study.

### **Thought Questions**

1. Why do you watch TV and listen to the radio?
2. Of all the telecommunications devices and services listed in figure P.1, which do you own? Which would you like to own?
3. Why are you interested in studying telecommunications?

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