



Television Production

***Disciplines
and Techniques***

Sixth Edition

***Thomas D. Burrows
Lynne S. Gross
Donald N. Wood***



TELEVISION PRODUCTION

Disciplines and Techniques

THOMAS D. BURROWS

California State University, Northridge

LYNNE S. GROSS

California State University, Fullerton

DONALD N. WOOD

California State University, Northridge

**WCB Brown &
Benchmark**
P U B L I S H E R S
Madison, Wisconsin • Dubuque, Iowa

Book Team

Editor *Stan Stoga*
Developmental Editor *Kassi Radomski*
Production Editor *Debra DeBord*
Designer *Lu Ann Schrandt*
Art Editor *Brenda A. Erzen*
Visuals/Design Freelance Specialist *Mary L. Christianson*
Marketing Manager *Pamela S. Cooper*
Production Manager *Beth Kundert*

WCB Brown & Benchmark

A Division of Wm. C. Brown Communications, Inc.

Executive Vice President/General Manager *Thomas E. Doran*
Vice President/Editor in Chief *Edgar J. Laube*
Vice President/Marketing and Sales Systems *Eric Ziegler*
Vice President/Production *Vickie Putman*
National Sales Manager *Bob McLaughlin*



Wm. C. Brown Communications, Inc.

President and Chief Executive Officer *G. Franklin Lewis*
Senior Vice President, Operations *James H. Higby*
Corporate Senior Vice President and President of Manufacturing *Roger Meyer*
Corporate Senior Vice President and Chief Financial Officer *Robert Chesterman*

Cover photographs: top © S. Gazin/The Image Works; center © John Maher/The Stock Market;
bottom © Mug Shots/The Stock Market

Copyedited by Cynthia Cechota

Interior design by Karen Mason

Copyright © 1978, 1982, 1986, 1989, 1992, 1995 by Wm. C. Brown Communications, Inc.
All rights reserved

A Times Mirror Company

Library of Congress Catalog Card Number: 94-71284

ISBN 0-697-20131-7

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.

Printed in the United States of America by Wm. C. Brown Communications, Inc.,
2460 Kerper Boulevard, Dubuque, IA 52001

10 9 8 7 6 5 4 3 2 1

**To our many students
who have helped
make teaching
the most rewarding
of all professions.**

About the Authors

Thomas D. Burrows (Tom Burrows) now holds the title of *Professor Emeritus* in the Radio, TV and Film Department at California State University, Northridge. Retirement from full-time teaching has provided him the opportunity to pursue a number of activities relating both to his academic background and to his work as a professional broadcaster. In addition to ongoing teaching and advisory activities, Professor Burrows is a member of the Educational Programs and Services Committee of the Academy of Television Arts and Sciences. This committee oversees national student awards and internship programs in addition to a yearly television production seminar for broadcast professors. During his earlier career as a producer and director in commercial and public broadcasting, he received the Christopher, Emmy, and Peabody awards. He holds an M.A. degree from the School of Journalism at the University of Southern California.

Lynne Schafer Gross has taught television production at a number of United States colleges, including California State University–Fullerton, Pepperdine University, UCLA, Loyola Marymount University, and Long Beach City College. She has also taught production internationally at Queensland University of Technology in Brisbane, Australia; Georgetown University in Guyana, South America; Swaziland Broadcasting Corporation in Africa; and IPTAR in Kuala Lumpur, Malaysia. Her professional experience includes serving as director of programming for Valley Cable TV and producing a number of local and regional television series. She is presently chairperson of the Broadcast Education Association and has served as a board member and committee chair for the Academy of Television Arts and Sciences. She has published ten other books and numerous journal articles.

Donald N. Wood, professor of radio-TV-film, has been teaching at California State University, Northridge, since 1970. He also has taught at San Diego State University, The University of Michigan, and Westminster College (Pennsylvania). His professional background has been largely in educational broadcasting. He was program coordinator for National Educational Television, area coordinator for the Midwest Program on Airborne Television Instruction, and director of ETV for the Hawaii State Department of Education, during which time he was executive producer for more than eight hundred television productions. Dr. Wood is the author of *Mass Media and the Individual* and the textbook *Designing the Effective Message* and is coauthor of *Educational Telecommunications*. His B.A. is from Earlham College in Indiana; his M.A. and Ph.D. degrees are from The University of Michigan.

Preface

The first edition of this text was written some twenty years ago. Since that time much has changed in the field of television. In chapter 1 we have presented a short chronology of recent technical developments as a way of introducing the component systems and related terminologies that are in use at the present time.

Any person who has had access to the best of professional equipment over the past several decades cannot help but be very impressed with all that can be achieved today through the use of the new switchers, editing equipment, and computer generated graphic units. What is also somewhat startling is that the *rate of change* from year to year is definitely accelerating.

But, while the *techniques* of television may be changing, the *disciplines* that serve as the underlying strength of any operation remain much the same. The basic concepts of advance preparation, the constant checking of detail, and the necessity for teamwork assume a position of even more importance as technology becomes more complex. We are speaking here of a number of attitudes and behaviors involving responsibility, self-control, initiative, and respect for the work of others. These disciplines are in many ways the most important part of any university level production course. It is the authors' firm belief that these disciplines can be learned only within the structure of production exercises that involve full class participation and the rotation of students within the various crew positions.

This edition of the book has undergone some major changes to reflect what is happening in the industry. As already mentioned, a new section has been added to the first chapter to give students a history of production. The chapter has also been largely rewritten to take into account all forms of electronic media and the job possibilities they present.

The technical parts of both the audio and camera chapters have been simplified somewhat because of developments that have made this equipment easier to operate and control. The chapter on pictorial elements has been largely rewritten and moved forward from where it was placed in the last edition because of the expanding role of computer graphics and their connection to the switcher. The videotape chapter has been significantly revised to take into account the new smaller formats. Likewise, the chapter on editing has been changed to include the concept of nonlinear editing, although the linear editing systems that most schools still use are the main focus of the chapter.

A chapter on producing has been added so that graduating students can be more versed in what has become a crucial item in television production—budgeting and cost control. The two directing chapters have been largely reorganized and now incorporate much of the material that was in chapters dealing with acting and the production crew in the previous edition. Some of the production crew information is also included in the first chapter so that students

can start the course knowing what their duties will be. The final chapter, on field production, has been reorganized so it serves both as a review of the rest of the book and as an introduction to single camera production.

Some of the production projects given in the appendix have been changed, and the rate card material given in the appendix of previous editions now appears, in updated form, in the producing chapter. Both the glossary and bibliography have been largely rewritten.

As in previous editions we have presented equipment that in our view serves as an example of the technologies that students are working with in their institutions or will be working with as they first enter the job market. Some equipment used for illustration will be close to state of the art, but in other cases we have deliberately shown some older, proven units because they are typical of the technology in general use.

The *training exercises* that in previous editions were at the conclusion of each chapter will now be found only in the *Instructor's Manual*, along with suggested exam questions and other related information for each chapter.

It is our wish to again provide a text that serves as an efficient teaching and learning vehicle for introductory and secondary courses in television production. As always we welcome suggestions and corrections from our colleagues through our respective universities or the publisher.

We have had the advice and assistance of many colleagues and students in putting this text together. While we cannot single out everybody, we would specifically like to thank those who reviewed the previous edition. Their comments provided us with ideas for this sixth edition text. They are David Cardwell, Xavier University; Joseph Chuk, Kutztown University; and George Quenzel, Emerson College.

Contents

Preface xi

1 INTRODUCTION TO TV PRODUCTION 1

- 1.1 Disciplines and Techniques 3
- 1.2 Development of a Professional Attitude 5
- 1.3 The Expanding Scope of Video Production 7
- 1.4 Production Approaches 9
- 1.5 A Quick Survey of Working Areas, Equipment, and Crew Positions 10
- 1.6 Technical Aspects of TV Production 15
- 1.7 Background to Today's Technology 15
- 1.8 Technology and Teamwork 19

2 THE AUDIO SYSTEM: SIGNAL FLOW AND TECHNICAL CONTROL 21

- 2.1 Technical and Creative Functions of Audio 22
- 2.2 The Seven Basic Control Functions 22
- 2.3 Sources of TV Audio 36

3 FUNDAMENTALS OF AUDIO PRODUCTION 41

- 3.1 The Role of Frequencies 42
- 3.2 The Microphone: Function and Construction 42
- 3.3 Microphone Usage Categories 46
- 3.4 Using the Microphone 50
- 3.5 Adding Other Sources 56
- 3.6 Production Communication 57
- 3.7 Vocal Command Procedure 59
- 3.8 Audio Setup Procedures 60

4 TV LIGHTING: EQUIPMENT AND TECHNIQUES 63

- 4.1 Types of Light: Incident and Reflected 64
- 4.2 Lighting Objectives: Basic Illumination 64
- 4.3 Lighting Objectives: Creative Purposes 68
- 4.4 Types of Lighting Instruments 71
- 4.5 Fundamental Lighting Concepts 77
- 4.6 Studio Lighting Procedures 87

5 CAMERA STRUCTURE AND LENS DESIGN 101

- 5.1 Video Signal Flow and Control Functions 102
- 5.2 The Color Video System 106
- 5.3 Lens Characteristics 114
- 5.4 The Zoom Lens 120
- 5.5 Controls for Camera Adjustments 124

6 CAMERA FUNCTION AND OPERATION 129

- 6.1 Camera Operation and Control 130
- 6.2 Camera Perspectives 136
- 6.3 Picture Composition 140
- 6.4 Operating Techniques 145

7 PICTORIAL ELEMENTS: SETS AND GRAPHICS 151

- 7.1 Pictorial Design Functions 152
- 7.2 Pictorial Design Factors 154
- 7.3 Computer Generated Graphics 157
- 7.4 Other Graphics 169
- 7.5 Graphic Aesthetics 171
- 7.6 Set Design 173
- 7.7 Staging Requirements and Considerations 174
- 7.8 Using Sets and Scenic Elements 176

8

OPERATION OF THE SPECIAL EFFECTS GENERATING SWITCHER 187

- 8.1 The Principle of the Switcher 190
- 8.2 Fades, Dissolves, and Superimpositions 192
- 8.3 Operation of the Special Effects Generator 195
- 8.4 Additional Special Effects and Digital Applications 203
- 8.5 Video Production Commands 207

9

THE FUNCTION AND OPERATION OF THE VIDEO RECORDER 211

- 9.1 Principles of Video Recording 214
- 9.2 The Electromagnetic Basis of Video Recording 215
- 9.3 Videotape Track Functions 223
- 9.4 Video Recorder Operations and Controls 225
- 9.5 Successful Performance and Maintenance 233

10

VIDEO EDITING: EQUIPMENT AND TECHNIQUES 235

- 10.1 Editing as a Factor in Television Production 236
- 10.2 Editing Control Systems and Related Equipment 239
- 10.3 On-Line and Off-Line Editing 248
- 10.4 Linear Videotape Editing Procedures 248
- 10.5 A Developing Concept of How Editing Is to Be Used 258

11

PRODUCING 261

- 11.1 The Role of the Producer 262
- 11.2 Scripts 263
- 11.3 Budgets 273
- 11.4 Personnel 279
- 11.5 Production Paperwork 281
- 11.6 Schedules 283

12

DIRECTING DUTIES 287

- 12.1 Overview of the Director's Duties 288
- 12.2 Overview of the Associate Director's Duties 296
- 12.3 Overview of the Floor Director's Duties 300
- 12.4 Working with Talent 304
- 12.5 Working with the Crew 314

13

DIRECTING TECHNIQUES 319

- 13.1 Design Elements 320
- 13.2 Camera and Cutting Principles 323
- 13.3 Production Project: The Discussion Program 331

14

FIELD PRODUCTION 339

- 14.1 Introduction 340
- 14.2 Audio 342
- 14.3 Lighting 345
- 14.4 Cameras 350
- 14.5 Pictorial Elements 353
- 14.6 Videotape Recorders 355
- 14.7 Editing 357
- 14.8 Producing 360
- 14.9 Directing 366

APPENDICES

- A Electromagnetic Waves 375
- B The Overtone Series 381
- C Hand and Arm Signals 385
- D Production Projects 389

Glossary 407
Bibliography 427
Index 429



CHAPTER

1

Introduction to TV Production

The electronic mass media are the primary forms of communication in America today. Those working in the field of TV production are part of an industry that has a great deal of authority and responsibility. There has been a mixed reaction to the fact that most people now receive the majority of their information, education, and entertainment from broadcast television, radio, cable, and motion pictures. A commonly accepted figure states that the average graduating high school student has spent 18,000 hours watching television and only 15,000 hours in the classroom.

With the advent of satellite transmission and the merging of a number of other communication organizations, the influence of these media upon our lives can only increase. Some educators have expressed a concern over statistics that show a steady decline in all cognitive skills and have blamed this on the influence of television. Others see the electronic media as an important adjunct to the field of education.

Whatever the case, most of those who work to organize and deliver the media message must themselves be very adept at traditional verbal and scientific abilities. A better than average reading and writing test score often serves as the gateway to success in media related areas such as *critical analysis, research, and business training*. Each of these can be an important prerequisite for long-range employment in the communication field.

To the outsider, and probably some of the newer entry level workers, television production seems to be an endlessly fascinating combination of glamour and excitement. While it is true that status and income levels are often impressive and the intensity found in many production situations can make the pulse race (see figure 1-1), the

attractiveness of television as a career is rather more sophisticated.

Most video professionals feel a definite sense of pride in being able to function as a part of a team that creates a product, generally valued by our society. Whether one works on a news program or works to produce an industrial training tape, there are a number of things about being a part of this communications team that strongly appeal to intelligent, well-motivated people. Because the effort requires many different and exacting skills, the process of working together and accomplishing this worthwhile and very visible end product makes for a strong sense of continuing inner satisfaction as well as a good deal of mutual respect among colleagues. (See figure 1-2.)

FIGURE 1-1

Fast breaking stories can create a number of last minute, on-the-air changes in the five o'clock newscast. Those changes are possible because the director has calmly talked through the basic structure of the program with key operating personnel in a session that goes right up to airtime. Note clock.

Photo courtesy of
KABC-TV



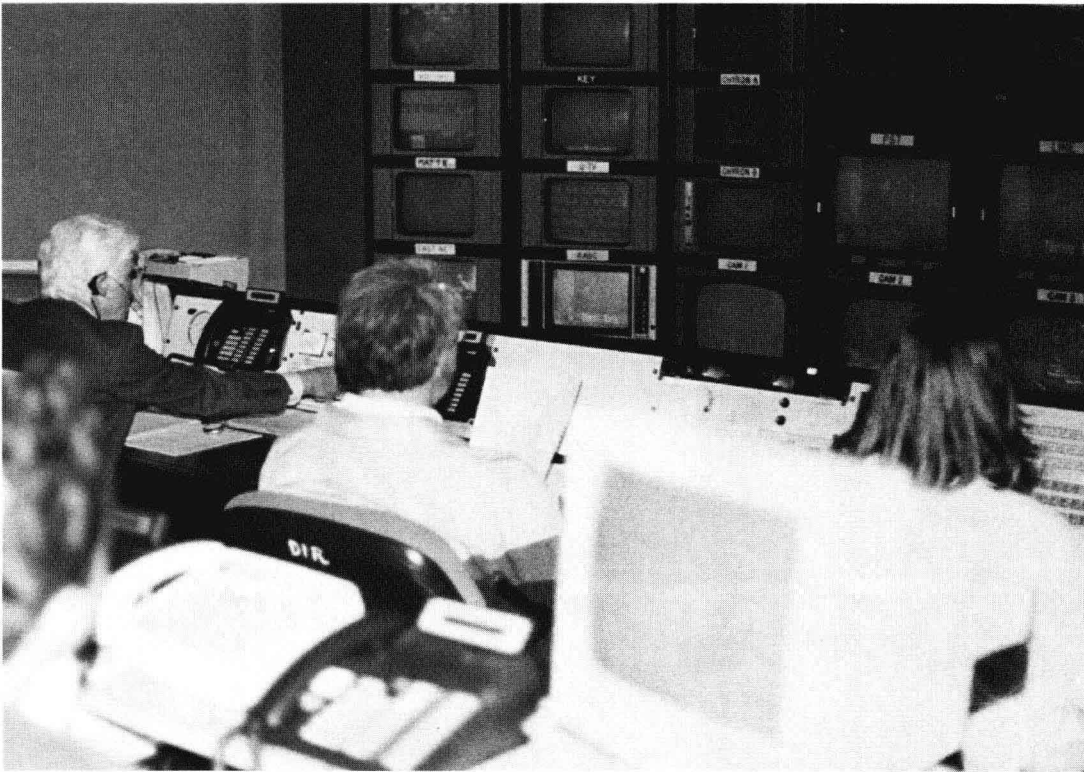


FIGURE 1-2

Prior planning pays off when the production team can coordinate an hour of studio anchored news with live location pick-ups and the split second insertion of videotaped inserts. This group took over from the crew of the previous hour which returned again to do the six o'clock program.

Photo courtesy of KABC-TV

1.1 DISCIPLINES AND TECHNIQUES

In the study of electronically based media production it is important that students develop an understanding of the ways in which the creative process is linked to the technology of the media. Such an understanding can really only be gained through “hands-on” experience in operating such components as switchers, cameras, audio consoles, and lighting control systems that are essential to the production sequence. As is evident by the title of this text, it is the opinion of the authors that there are two related but differing aspects to the operation of studio and field equipment.

First there are the basic *techniques* of knowing how and when to move levers,

push buttons, and turn knobs so that a component can do what it is intended to do. The operator must follow the designated *logic* of the control system or the machine does not operate. The second aspect of equipment control is at a much more personal level of activity. This is the matter of *discipline*—the way in which skill and attitude are brought together in what is usually considered a creative effort. For the professional this more subtle level of operation may be the end product of a lifetime of work.

To further define these two terms, let's take the example of one camera operator who uses off-air time to double-check all aspects of focus for upcoming shots, allowing for possible unexpected variables in camera-to-subject distance. Another operator does

only a cursory check at several positions of the zoom lens and figures to make last-second adjustments if changes occur. Both individuals may know the specific *techniques* needed to operate their cameras equally well. But only one will be prepared for the unforeseen but all too common surprises of an ongoing production.

For a professional director, the *discipline* exhibited by the well-prepared camera operator is an enormously important quality. It is what makes “live” and “live-to-tape” sports, news, and music television possible. It exists when one is motivated to combine operational skill with a sense of responsibility. This text takes a number of opportunities to extend the

idea of self-discipline into the related concept of *teamwork* and the skills that are necessary for one to function as a part of a production team. (See figure 1-3.)

The authors have sought to stress the importance of both the *technical* and *organizational* aspects of television while preparing the material presented here. They are well aware that for many individuals college level production courses are their first opportunity to gain an understanding about the way the production process operates. The text has been designed so that the instructor can provide a somewhat realistic introduction to both studio and field operations by means of a number of scripted exercises and production examples.

FIGURE 1-3

The calm authority of news anchors Harold Green and Ann Martin is only possible with the support of many highly skilled people behind the camera. At KABC-TV nearly 200 people work to produce five and one half hours of news per day.

Photo courtesy of
KABC-TV



The law of averages would indicate that while many students will follow a career in production-based positions, others will gravitate to office jobs such as operations, programming, sales, or management. Whatever the case, nothing has been wasted. Management decisions constantly revolve around what is done in the studio and how efficiently it is done. People in all facets of the industry, from unit managers and scriptwriters to advertising executives and general managers, will do a better job if they have a good understanding of the production techniques presented here.

Today the need for a good background in studio and field operations also directly relates to the important process of getting that first job. The competition for internships and entry level jobs at cable companies and independent production houses is such that it is almost mandatory to have some experience in directing, producing, and writing along with many of the operating skills of lighting, audio, editing, and graphics.¹

As a television production student, you have entered into a long process of *individual development* that must continue throughout your career. You must be concerned with the *techniques* of knowing precisely how to use all of the equipment as well as developing your own sense of production *discipline* so that others will be able to depend on you with confidence. In fact, one of the most revealing tests of your production capabilities is to answer this simple question: Do other people really want you on their production team?

1.2 DEVELOPMENT OF A PROFESSIONAL ATTITUDE

When people work together in what sociologists call *task-oriented groups*, ongoing



FIGURE 1-4

These students are discussing professional methods and attitudes with Erica Hanson, a producer with Fox Entertainment News.

success is very much a matter of what other people—especially those in charge of getting things done—think of you. In these circumstances we are judged by a set of values that are usually summed up under the term *professional attitude*. (See figure 1-4.) How do others view your manner of approaching those tasks that fall within your area of responsibility?

Dependability is probably the most basic virtue in a time-oriented industry like telecommunications. Do you make a conscious effort to be on time, and to be in the sort of physical and mental condition that enables you to give your best effort? Do you handle your equipment with proper care to avoid costly maintenance work? Do you make an attempt to communicate your suggestions as well as your uncertainties to those in charge? Do you show respect for the work of others and for their operational needs during the production sequence? Finally, and of great importance, have you learned to discipline yourself to remain calm and focused upon your tasks, especially when difficulties begin to occur?

The answers to these and similar questions are what determine how we rank with our peers. It may be hard to

1. Gross, Lynne S. *The Internship Experience*. 2nd ed. Prospect Heights, IL: Waveland Press, 1993.

believe in the early college years, but for many students their important career contacts will go back to the people in their classes—especially in their production courses. In terms of future employment it is not so much *who* you know, as it is the status of the people who *think well of you*. It therefore behooves all students, beginning on the first day of class, to quietly but confidently start doing those things that go into creating the impression of being one who is articulate, reliable, and skilled. Yes, there are those big talkers who for a while can make an impression without much to back it up, but the realities of production eventually are their undoing.

Attitudes and Self Image

In this process of interpersonal relationships it is important to keep in mind that the opinions that others have about us in many ways relate to what we think of ourselves. There has been much discussion recently about how young people need *self esteem*. The reality that is often ignored in this is that people do not simply *get* self esteem—they *earn* it. On a production crew you earn the good opinion of others by consistently doing the sort of job that brings approval and, along with it, that very important sense of self-satisfaction. People know, and the word gets out. Good work does not just happen. It comes from thinking through the things that one must be prepared for in order to function in any given position.

Do you really understand the signal flow through the audio board or are you planning on figuring it out during the setup period? Where are the tight places in the script when a lot of things happen at once? Do the others working with you understand their responsibilities or should you double-check them on equipment and procedures? Minutes spent in

preparation can save a tenfold wasting of precious time during final production.

Competition and Team Functioning

An interesting process of interaction becomes evident as groups of four and five persons begin to work together on a project. Such teams quickly find it difficult to function properly if everyone tries to have an equal say on all matters. There must be one designated person who has responsibility for final decisions after making sure there has been a good exchange of ideas on the content and approach to the project. The successful leader maintains his or her position not only by presenting a good plan of action, but also by adopting other team members' ideas, especially in their areas of assigned responsibility. Teams usually function best when everyone has a chance to exhibit his or her skills and leadership abilities. This delicate combination of cooperation and competition usually produces very positive results. (See figure 1-5.)

The authors have seen this process of "equal opportunity in action" occur in countless classes. The course starts out with a new mix of students. Some are old friends and some are just getting to know each other. There are usually a few who would like to think of themselves as "the talented people." In early production work the truth or myth of their superiority is proven by results. During a normal process of organization and competition, some new people begin to emerge both as leaders and/or as persons with other special talents that are very important to a project. No one has really been "put down," but some have had a chance to learn some very important lessons about hard work and accomplishment. Those with sufficient *ego energy drive* make adjustments and in later classes work to regain the good opinion of their peers. The need for status and respect motivates us all.



FIGURE 1-5

For this student crew, field production day was the culmination of a month of planning that included subject research, scriptwriting, and location surveys.

1.3 THE EXPANDING SCOPE OF VIDEO PRODUCTION

In his 1991 book, *Three Blind Mice*,² author Ken Auletta tells the fascinating story of how some aggressive and imaginative people in the cable business captured a considerable amount of the traditional network audience. They did it by providing low cost programming that appealed to smaller, select audience groups. Called **niche programming**, it included a number of “talk” shows featuring some rather bizarre people, channels airing commercial-free movies for a fee, top musical hits accompanied by visual images, and news twenty-four hours a day. It wasn’t all pretty, but the networks were caught napping and lost many of their viewers.

2. Auletta, Ken. *Three Blind Mice*. New York: Random House, 1991.

This sequence of events accelerated the already changing shape of video production in this country. In the “good old days” the networks produced many of their own programs or had them tailor-made by a very select group of production companies. With the new opportunities on cable, a whole new group of production companies began to turn out numerous attractive, low budget shows.

Employment Patterns

While many prime time network and cable shows are still produced in large, fully equipped video studios often located on movie lots, an increasing number of programs are done in much smaller **production houses**, with or without union sanction. They employ many recently graduated students working at entry level wages. The reality is that all too often one must trade experience for money during the early years of a media career.

Another negative trend is the employment of most workers on a **daily hire** basis. These workers are not on staff and, even though they may work regularly three or four days a week, they are not eligible for health or other benefits. The result of this **freelance** employment is that many people now make their living working simultaneously in cable, corporate, and broadcast production. The production techniques and equipment are very much at the same level. Except for the larger broadcasting stations and networks, crew members are often called upon to perform a wide range of engineering tasks such as audio, lighting, camera, and graphics. Those wishing to do directing and producing are selected from these crew positions.

For those about to graduate, all of this may seem to be a bit on the down side. The good news is that in many areas of employment, things are expanding at a

FIGURE 1-6

Many former broadcasting students have turned internships into fulfilling careers at medical institutions.

Photo by permission of Northridge Hospital



very healthy rate. Most of those who can survive the difficult early years will find themselves in responsible positions with a fairly secure future. One can take heart in the knowledge that those early career problems being faced by students today are not very different from what entry-level people have faced over the past four decades. The problem of an oversupply of young people wanting to get into TV production continues to exist.

One of the burgeoning areas is *corporate video*. Large and small companies produce a variety of material such as orientation tapes for new employees, training tapes to teach people specific jobs, promotion tapes for new products, and video "newsletters" to keep employees up-to-date. Sometimes these companies have people on staff using company equipment to produce the material; other times they hire freelancers or people who have formed small production houses. In both cases, jobs are created for people with television production skills.

Educational institutions also employ people in media related jobs. Today many universities use **Instructional Television**

Fixed Service (ITFS) to transmit courses over specially designated channels. At many universities this service is a part of a media center that also trains instructors in the use of video in their own classrooms.

Interactive video, made possible by the instant access possibilities of the **CD-ROM** and other digital technologies, is seen as having an important impact on television and is creating many new jobs for those seeking careers in telecommunications.

During the 1980s the FCC approved the use of commercial *low power television* (LPTV) by educational institutions and other organizations. With its transmission distance of only 15 to 20 miles and the difficulty of competing with an ever increasing number of cable channels, its ultimate success remains in question, but it provides excellent entry level jobs.

One of the largest fields is *government media*. Local, state, and federal agencies are involved in a myriad of telecommunications projects. The federal government is probably the world's largest television and film producer. Military applications, including the Armed Forces Radio and Television Services, account for worldwide operations—as does the United States Information Agency (USIA) and its worldwide satellite operation, Worldnet.

Possibly the most rapidly expanding area is in the field of *medical and health services*. More than 80 percent of the 7,000 hospitals in the country use television and related media for patient education, in-service training (staff development), and/or public and community relations. (See figure 1-6.)

Another active field is that of *religious production*. The production level seen on many of the broadcasts of some of the evangelical groups rivals many network programs. At least five such church bodies operate their own satellite networks.

One of the more intriguing applications of the video and computer technologies is **desktop video**. A number of manufacturers