

Jack Lyle Douglas McLeod

COMMUNICATION,
MEDIA AND CHANGE

Communication, Nedia and Change

Jack Lyle

Boston University



Mayfield Publishing Company, Mountain View, California London Toronto CORNA THE CORNA



CORA LIRELLIA. opyright © 199° Mayrield Publis All rights reserved. No portion of this book may be reproduced in any form or by any means without written permission of the publisher.

Library of Congress Cataloging-in-Publication Data

Lyle, Jack.

Communication, media, and change / by Jack Lyle, Douglas B.

McLeod.

Includes bibliographical references (p. and index.

ISBN 1-87484-935-7

1. Communication—Technological innovations. 2. Mass media-

Technological innovations. I. McLeod, Douglas B. (Douglas

Birmingham), 1958-

II. Title.

P96.T42L95 1992

302.2—dc20

92-19127

Manufactured in the United States of America 10 9 8 7 6 5 4 3 2

Mayfield Publishing Company 1240 Villa Street Mountain View, California 94041

Sponsoring editor, C. Lansing Hays; production editor, Lynn Rabin Bauer; manuscript editor, Candace Holts; text and cover designer, Paula Goldstein; associate designer, Jean Mailander; cover art, Dominique Saurraute/The Image Bank © 1992; illustrator, Marilyn Kreiger; manufacturing manager, Martha Branch. The text was set in 10/12 Galliard by G&S Typesetters, Inc., and printed on 50# Finch Opaque by Malloy Lithographing.

Preface

This book was written from our conviction that the rapid and often radical changes taking place in the communications field constitute an important area of study and career opportunity for today's students. This conviction was strengthened during the four years we taught a course called Alternative Systems of Communication at Boston University. Students came to this course highly motivated by expectations of learning about exciting new technologies but with little knowledge or understanding of the institutional contexts in which these technologies are used.

Like many other such institutions, Boston University's College of Communication is divided into traditional departments of journalism, broadcasting and film and mass communication (which encompasses advertising, public relations and communication theory). The curriculum forced each student to major in one media area. As a result their courses were organized to prepare them to be print journalists, radio or television staffers, film producers or advertising or public relations account executives.

We wanted to prepare students for a future in which new technologies remove such institutional and career boundaries. Knowing that there are limits to what the new technologies can accomplish, we wanted our students to develop an appropriate balance between pragmatism and visionary expectations. We realized that it was the visionary expectations that attracted the students to the field. The challenge we faced was to acquaint them with the practical limits imposed by the past and the present while capitalizing on their interest in the new.

This book is our attempt to meet that challenge. Our strategy is to start with an overview of the functional needs for communication by individuals, groups and societies: news, persuasion, education and entertainment. The students' own enthusiastic communication activities provide a variety of avenues for exploring these needs. Next we look at the major technologies that have made the Communication Revolution possible: semiconductors, satellites, optical fiber, personal computers and high definition television. We discuss how these new technologies can be used across all of the institutions and media of the communications sector.

vi Preface

Having suggested how these technologies may revolutionize our communications world, we turn to some of the facts of life within that world. Students must understand that technology is a tool used by institutions that operate within the constraints of a complex structure of systems. Any tool must overcome the barriers of resistance inherent in the status quo, factors we loosely group under the headings of policy, systems and money.

After providing this background, we turn our attention to the potential of new technologies within the context of the communications functions listed in the Introduction. This survey allows the student to examine changes within and across media, as well as to speculate on how existing media may be forced to change in response to new competition.

Our conclusion brings us full circle: We attempt to get readers to look beyond existing communications services and institutions and speculate on the future. In our progress through the circle, we have had these three objectives:

- 1. To help foster an ability among readers to anticipate change rather than to be satisfied with adapting to a status quo that is in fact transitory.
- To stimulate readers to think about how they can use new technologies and alternative applications to build a fairer, more efficient and smarter world of communications.
- To help other teachers impart an understanding of a subject as fragile and quickly changing as communications systems.

An inherent problem in discussing a subject as dynamic as communications technologies is that details change daily. Recognizing that much of our specific information will be outdated before the book is published, we have stressed general principles. In our own classes we used weekly current-events assignments as the springboard for discussion that expanded and updated lectures and reading assignments. These assignments reinforced students in acquiring the habit of reading the trade publications, such as Advertising Age, Broadcasting, Variety, PC World, MacWorld and Network World, as well as watching for news of professional interest in the daily press.

Revolution is a strong word, as are age and era. Nevertheless, we have repeatedly used all three throughout the book. Researchers and analysts may think our use presumptuous (as if it were possible to recognize the passing from one era to another as being the result of revolution), but we feel that the potential of the new communications technologies justifies strong language. Future historians will be the ultimate judges of the extent to which we entered a new era during the latter decades of the 20th century. They will have the perspective to evaluate the success or failure of any such revolution.

We have used attention-grabbing terminology for a pragmatic reason: to stimulate our students to strive for the richer, more equitable society that new communications technologies can provide *if* they use these technologies with skill and imagination that transcends the barriers of the status quo. Ithiel de Sola Pool referred to them as "Technologies of Freedom"; it is we who must seek, use and protect the freedom.

Preface vii

ACKNOWLEDGMENTS

We would like to express our appreciation to those who provided assistance as we wrote this book. The comments of those who reviewed the manuscript, Stephen R. Acker, Ohio State University; Andrew Arno, University of Hawaii at Manoa; Arthur Asa Berger, San Francisco State University; Carl Bybee, University of Oregon; Charles Clift, Ohio University; Herbert S. Dordick, Temple University; Susan Tyler Eastman, Indiana University at Bloomington; Hamid Mowlana, The American University; and JoAnn Valente, University of Florida at Gainesville, were extremely helpful in giving the book its final shape.

For a year and a half, our friend Philippe Delarue, now back in Paris, worked as our research assistant. By doing the detective work of tracking innumerable facts and citations, he helped us enrich the text as well as speed up the writing process.

Our greatest debt, however, is to the students who studied new developments in media and communications technologies with us in BF521 classes at Boston University. Their reactions provided real-life testing of draft chapters used as text materials. Their in-class reports and term papers helped us keep up-to-date on developments. Most important, their interest and enthusiasm kept us going.

Communication, Media and Change

FREE COPY FREE COPY FREE COPY FREE COPY

Contents

Preface v

INTRODUCTION Technological Evolution and Revolution in the Mass Media 1
Getting Ready for Change 1
A New Century, a New Age 2
Unclear Frontiers, Expanding Freedoms 2
Information: A Commodity with Value 2
Making Profits from Innovative Telecommunication 3
The Media: Comprising a Commodity Market 3
Personal Aspects of the Communication Revolution 5
The Functional Basis of Mass Media 5
Changing Functions: The Case of Radio 6
Victims of the Communication Revolution 7
Digital Codes: Changing the Relationship Between Information and Signal 7
◆ Box: Why Move from Analog to Digital Codes? 8
Changes in Software and Hardware 8
The Common Person and the Common Code 9
Revolutions Sometimes Fizzle 9
Breaking Out of Institutional Traps 10

X Contents

DA	DT	
M	KI	ı

Technologies of the Communication Revolution 13
CHAPTER 1 The Semiconductor Family: Building Blocks of the Revolution 15
Intelligence, Personal Satisfaction, Money and Power 15
Speeding Up the Communication Process 16
The Drudgery of Intelligence: Storing and Sorting 16
Capacity, Speed and Flexibility: The Basis of the Revolution 17
The Electromagnetic Spectrum 17
The Switch as a Bottleneck 19
AT&T's Search for More Efficient Switches 20
The Semiconductor Family 20
Transistors: A Basis for Amplification 20
From Edison's Light Bulb, Another Idea 21
Semiconductors and Mobility 21
Integrated Circuits: Combinations of Semiconductors 22
Digital Language and Boolean Algebra 23
Boolean Algebra and Semiconductors: Creation of the Microchip 23
Miniaturization 25
The Ever-Increasing Speed of Switching 25
Digital Technology in an Analog World 26
The Translation Sequence Required for Mixing Technologies 26
Handicaps for Digital Operation in a Non-Digital Environment 26
The Growing Push for Digitalization 27
CHAPTER 2 Satellites: Transmitters in the Sky 29
Communication for a Global Community 29
◆ Box: The Geosynchronous Orbit 30
The Geosynchronous Orbit: From Science Fiction to Reality 30
A Complex Operating System 31
The Components of a Satellite System 32
Power, Attenuation, Signal Coverage and Dish Size 32
Changing the Concept of Distance and Time 34
Restructuring Rate Schedules 35
Exploding Capacity and Spreading Time 35
Enabling Nations to Leapfrog in Development 36
How Media Leapfrog 36

Contents xi

Satellite Reception in Individual Homes 36
♦ Box: INTELSAT 37
Direct Broadcast Satellites 37
Very Small Aperture Terminal Applications 38
Crowding the Geosynchronous Orbit 38
Pushing Farther Out in the Electromagnetic Spectrum 40
Disadvantages of Telecommunications Satellites 40
New Competition: Optical Fiber 41
CHAPTER 3 Optical Fiber: A New Tie That Binds 43
Putting Light into Our Networks 43
Advantages of Glass Fiber Over Copper Wire 44
Optical Fiber as a Competitor for Satellites 44
Reflecting Light Through Glass Wire 45
Digital Codes: Making Better Use of Light's Bandwidth 45
The Role of Lasers in Optical Fiber Systems 46
Digital Codes and Signal Interference 47
Optical Fiber Versus Satellite Transmission 48
Hurdles for Conversion to Fiber 48
Competition Is the Driving Force 48
Which Comes First: Bandwidth or Demand? 49
Business and Technological Advancement 50
Changing Dynamics in the Local Loop 50
Why Not Optical Fiber Video? 51
The Telephone–Cable–Television Fiber Connection 51
Continuing Advances in Optical Fiber Technology 52
CHAPTER 4 The Personal Computer: Putting Things Together 54
The Computer: New Technology but an Old Idea 55
Changing Our Perspective from Computing to Communication 55
◆ Box: A Bug That Gained Immortality 56
The Development of Computer Software 57
Apple: A New Concept 57
The Next Step: Turning Personal Computers into Communication Devices 58
The Concept of Multimedia 59
A Collaborative Effort 59
Multimedia Standardization—A Goal for the Future 60
Evolutionary yet Revolutionary 60

xii Contents

The Evolution of the Revolution 61
Personal Computer Multimedia Terminals 61
Wide-Area Multimedia Networks 61
Technology Is Ready, but Policy Is Not 62
ISDN and Intelligence in the Network 63
Adjusting Rates for Fluctuating Bandwidth Demand 63
Dedicated Links That Don't Get Switched 64
Software to Run It All 64
Software That Takes Initiative 65
Software to Store the World 65
Storage: Multimedia Libraries 65
APTER 5 HDTV: A Bigger, Better Video Window 67
Saturation Means Market Stagnation 67
Box: Recording Motion in Pictures 68
Blurred Images from Archaic Screens 69
Enlarging the Picture and Junking the CRT 69
Hurdles in the Path of a New Standard 70
The Lost Dream of a Single International Standard 71
◆ Box: Broadcasting Standards 71
The Agony of Changing U.S. Standards 72
Where Is the Demand for a New Standard? 72
The HDTV Dilemma for Broadcasters 73
A Better Picture Requires More Information 73
◆ Box: Channels and Bandwidth 74
Putting the Squeeze on Channel Bandwidth 74
Semiconductors to the Rescue: Signal Compression 75
 Box: Signal Compression 75
The Optical Fiber–Digital Signal Connection 76
Expanded Participation in the HDTV Decision 76

PART II

Factors That Shape the Communications Marketplace 79

CHAPTER 6 The Constraints of Policy 81

Setting the Limits 81

Constitutional Starting Points 82

Communication's Special Role in Democratic Societies 82

The National Mosaic of Local Governments 83

Contents xiii

Federal Oversight for Interstate Commerce 83
Intellectual Property Should Be Fairly Shared 84
Conditions Change but Principles Persist 84
Press and Policy 85
Broadcasting and Policy 85
Common Carriers and Policy 86
Technologies Change Faster Than Policies 87
Cable 88
MMDS and DBS 88
The Rising Demand for Spectrum Service 88
Sharing Content Across Media Boundaries 89
Limits Intended to Preserve Freedom 89
From Open Markets to Monopolies 90
Restricting Freedoms to Preserve the Open Market 90
◆ Box: Restrictions on Group and Cross-Media Ownership 91
Free Press, and Free Speech? 91
♦ Box: Examples of Restrictions on Broadcast and Cable Content 92
A Free and Open Marketplace? 92
The Social Influence of Technology 93
Shaping—and Distorting—the Revolutionary Technologies 93
he Challenge of Multimedia Formats 94
'he International Dimension of Policy 94
The Role of Multinational Operators 95
At Stake: Billions of Dollars 95
PTER 7 Technologies, Infrastructures,
Systems and Standards 98
Technologies Require Operating Systems 98
Basic Functions, Different Capabilities 99
Press Systems 100
Broadcasting Systems 101
Common-Carrier Systems 102
Changing Technologies Within Domains 102
Misfits and Hybrids 103
Using Technology Requires Organization—and Organizations 103
The Newspaper: A Case Study 103
Newspapers Face a Double Crisis 105
Functional Competition, Displacement and Accommodation 105

xiv Contents

Technological Progress Can Outrun the Market 105
Forces of Institutional Change 106
Infrastructure Change by Policy Fiat 107
Organizational Push and Pull in Systems 109
The Arbitrary Nature of Standards 110
An Inescapable Aspect of Technology 111
Forms of Standards 112
Changing Standards: Inertia and Resistance 112
Economic Dimensions of Standards 113
The Phantom Component of Infrastructure 113
Flag Waving and Global Systems 114
CHAPTER 8 The Matter of Money 117
The Age-Old Question: How Much Will It Cost? 117
What Will the Market Bear? 118
Internal Subsidization and Deep Pockets 118
The Common-Carrier Model: Pay for Service 119
Changing the Rules of Common-Carrier Rates 119
The Press and Broadcast Models: Advertising Subsidy 120
Who's the Boss? 120
The Public Gets a Bargain 121
The Size of the Advertising Subsidy 121
Attrition Through Advertising Allocations 123
Radio: A Case of Functional Displacement 123
Fat Cats No More: The Oligarchy Networks 124
The Movies: A Good Product Wherever It's Sold 124
An Unchanged Function with Shifting Finances 125
From Integration to Chaos 125
Losing Control of Costs 126
Cinema: Cinderella in Reverse 126
The Paradox at the Cinema Office 127
Outrunning the Competition 128
What About That \$5-Billion Box Office? 129
Conflicting Interests 129
Viewers Will Pay for Television 129
Providing Advertisers with Alternatives 130
Cable's New Jackpot: Pay-per-View 130

Contents XV

Cable's Double Whammy 131
The Cost of Creative Content 131
How Do We Pay the Bill? 132
The Subsidy That Won't Go Away 132
Once More, How Much Will It Cost? 133
Getting There 134

PART III

The Changing World of Communication 137

CHAPTER 9 From All the News That's Fit to Print to All the News We Want 139

Gatekeepers, Watchdogs and Agenda Setters 139

Box: The Fourth and Fifth Estates 140

Symptoms of Dissatisfaction 140

The Function Is Survival 141

Deciding for Ourselves What News Is "Fit" 142

Social and Economic Conditions Shape Our Institutions 142

"Manifest Destiny" Expands the News Horizons 142

Pressures for Objectivity 143

Objective Reporting: The Journalistic Standard 143

The Public Shift from Print to Broadcast News 144

Broadcasting and Public Trust 144

An Interest More Apparent Than Real 145

The Push of Advertising 146

Objectivity: In the Eye of the Beholder 146

Fraying the Fabric of Public Consensus 147

Shifting Functions Among the News Media 147

Changes in the Newspaper 148

Changes in Video News 151

The Future: Getting Our Own News 156

CHAPTER 10 Selling Ideas, Candidates and Products 160

How Do We Win Buyers and Influence People? 160

A Relatively Recent Specialization 161

Persuasion and Social Order 162

Marketing, Advertising and Public Relations 162

Parallel but Distinct Marketplaces 163

Parallels and Divergences Between the Two Markets 163

xvi Contents

	◆ Box: If You Pay the Piper, Can You Really Call the Tune? 164
	Persuasion Strategies Reflect the Times 165
	Sic Transit E Pluribus Unum? 165
	Rethinking Cost per Thousand 166
	♦ Box: Cost per Thousand 166
	Why Buy Audiences You Don't Need? 167
	A Trickier Proposition for Politicians 167
	Cable Creates New Options for Advertisers 168
	Taking Advantage of Impulse Response to Persuasion 168
	Providing Feedback Loops 169
	Online Computer Shopping and the Telco Future 169
	Telcos Are Knocking at the Shopping Gates 170
	The Growing Field of Direct Marketing 170
	Moving the Catalogs to Multimedia 171
	♦ Box: Multimedia Shopping 171
	You Can't Kick the Tires 172
	Interacting with Solicitors and Candidates 172
	◆ Box: Polls and Persuasion 173
	Lists, Lists and More Lists 173
	◆ Box: Getting to Know You—More Than You Know 174
	Changing the Trade-Off 175
	A Mass Media Tailspin? 175
	Getting the Public's Attention 176
	Changes Everywhere 176
	Fragmenting or Already Fragmented? 177
	Gains Are Commensurate With Risk 177
H/	APTER 11 The New Renaissance and the
	Liberation of Learning 179
	New Literacy for the Information Age 180
	Public Education: A Pragmatic Concern 180
	Status Quo Roadblocks 181
	From Horace Mann's Log to Multimedia Exchange of Knowledge 181
	Changing the Relations Among Students, Teachers and Knowledge 182
	Re-examining Functional Goals 182
	The Clients and Sponsors of the Educational System 183
	◆ Box: Limits on Educational Innovation 184
	From a Trickle to a Flood of Knowledge 184

Contents xvii

The Storehouses of Knowledge: Bursting at the Seams 185
Literacy, Media Literacy and Computer Literacy 185
The Changing Formats of Knowledge 186
Switching Concepts from Volumes to Bits 186
Learning to Share Information 187
The Importance and Variety of Libraries 187
Adding Dimensions to Information Storage 188
Keeping Track 188
Dewey Decimal Gives Way to Library of Congress 189
The Critical Role of Indexing 189
Overload, Overuse and Theft 190
Pressing the Limits of Storage 190
Introducing the Digital Archive 191
Redefining and Redesigning Libraries 191
More Good News 192
Searching for Other Kinds of Information 192
Helping the Computer to Help Us 192
What's Possible, and What's Practical? 193
 Box: Parallelism and Hypermedia: The Future of Information Storage and Retrieval 194
Standards, Standards and More Standards 196
The Necessity of Electronic Publishing 196
As Always, The Money Problem 197
Exchanging Freedom of Action for Financial Assistance 197
How Will We Protect and Reward Intellectual Products? 198
Problems of Information Fragmentation 199
Neither an Easy nor a Rapid Reconstruction 199
APTER 12 Entertainment Unlimited 202
Entertainment Reflects Growth of Leisure Time 202
Electricity to Light and Lighten Our Lives 203
Lightening Our Lives 203
Expanding Choice and Use 204
Non-Television Pressures for HDTV 204
Digital Conversion: Aesthetic and Economic Costs 205
Functional Costs, Not Aesthetics, Drive the Market 205
Aesthetics, Artistic License and Market Pressures 206

xviii Contents

Digital Trade-offs 206 Embracing the Digital Future 207 Digital Formats, Optical Fiber, Video and Telcos 207 Movies as the Driving Force for Fiber 208 Movie Archives at Our Fingertips 208 Location Alters Impact 209 Digital and HDTV Cinema Exhibition 209 A Matter of Money 210 Video and Television 210 A Restructured Television Industry? 211 212 New Networks to Challenge the Old The Unraveling of the Networks 212 Redefining the Shape of Networks An End for Broadcast Television? 213 The Question of Penetration The Question of Money The Dilemma of Being in Between The Extended Cycle of Television Economics 215 Finding Material for All Those Channels 216 More Choice, More Diversity? Games and Special Services What About Music? The Uniqueness of AM and FM Radio 218 New Technology, Old Question The Multinational Dimension

Preparing for a Multinational Multimedia Future 219

CONCLUSION Bringing the Revolution Home:

A Survey of the Communication Landscape of the Future 222

A Framework for Predicting Effect 223

Forecasting Technology 225

The Digital Headend: Nearing Cyberspace 225

Reality Redefined by Digital Media 226

A New Reality Will Require New Rules 227

The Elimination of Scarcity: Digital Transport 228

Personal Computer or Television? Or Both? Or Much More? 229

Microchips 229

Display Systems 230