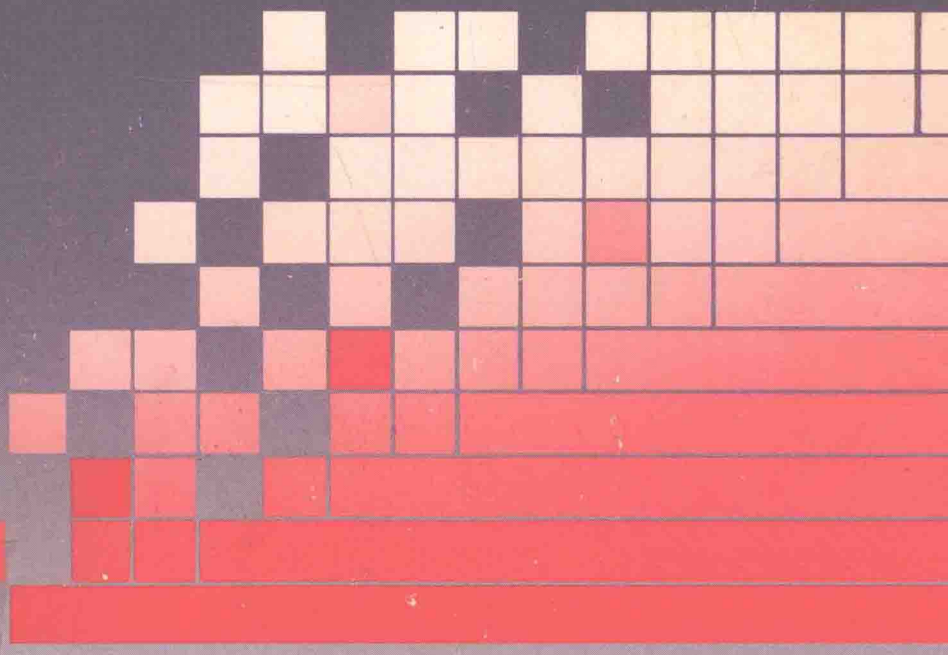


COMPUTERS AND SOCIAL CHANGE

INFORMATION, PROPERTY,
AND POWER



JUDITH A. PERROLLE

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WADSWORTH PUBLISHING COMPANY

Belmont, California

A Division of Wadsworth, Inc.

Sociology Editor: Sheryl Fullerton
Production Editors: Leland Moss and Debbie McDaniel
Assistant Editor: Elizabeth Clayton
Managing Designers: MaryEllen Podgorski and Julia Scannell
Designer: Vargas/Williams/Design
Print Buyer: Barbara Britton
Copy Editor: Sylvia Stein
Compositor: Kachina
Cover: Vargas/Williams/Design
Illustrator: Susan Breitbard

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Printed in the United States of America **30**

2 3 4 5 6 7 8 9 10—91 90 89 88

ISBN 0-534-07464-2

Library of Congress Cataloging-in-Publication Data

Perrolle, Judith A.

Computers and social change.

Bibliography: p.

Includes index

1. Computers—Social aspects. I. Title.

QA76.9.C66P47 1987 303.4'834 86-18979

ISBN 0-534-07464-2

COMPUTERS
AND
SOCIAL
CHANGE

*for Jeanette
and her generation*

they seize the instruments of harmony; they throw away
The spear, the bow, the gun . . .

—William Blake

PREFACE

Most texts about the computer and society introduce students to programming or to the way computers work. This book does something different. It provides a framework for understanding the social context and consequences of information technology, including the role of information in human history. Because the computer is a general-purpose tool for communication and control, it affects how people interact with one another, significantly changing what we know and how we behave. By altering the ways we create and use information, computers are contributing to changes in the ways property and power are distributed in society. The effects of computers on individual health and psychology, changing social relationships and workplaces, the protection of electronic information, the preservation of privacy, and the political and military uses of information technology have all become controversial public issues.

This book was “field tested” in university classes attended by a mix of liberal arts, computer science, engineering, and business students. Through their participation in Northeastern University’s Cooperative Education Program, most of my students have been actively involved in the computer revolution, and their contributions helped shape what is intended as a text for future classes. Although I assume that the reader is already somewhat familiar with computers (the majority of students entering American colleges in 1985 had already written a computer program), computer terminology has been kept to a minimum. Technical terms that appear without explanation are included in a glossary. Because student backgrounds in the liberal arts are more diverse, introductory-level social science material has been included. Less experienced students have found this material a helpful introduction to the study of society; those with previous coursework have found that it links the humanistic and technological dimensions of their education.

To social scientists, the computer is both a technological product of a society’s shared way of life and a source of social change. C. Wright Mills describes the perspective from which many sociologists approach the world as the ability to imagine “the intersection of biography and history” and the ability to see “private troubles” as “public issues.” The social significance of the computer lies not only in the personal experiences of the people who interact with it as part of their individual biographies, but also as part of broad historical changes in societies. Problems such as “com-

puter phobia" or "computer illiteracy" are more than the private troubles of some individuals; they are part of public issues of economic transformation and cultural change.

My own biography intersects with the history of computers at several points. In the 1950s I was an enthusiastic young observer of Sputnik and the first UNIVAC computers. Somewhere in my parents' attic is a cardboard "teaching machine" planned for a junior high school science fair project. As a humanities and electrical engineering student at MIT, I was introduced to the challenge of artificial intelligence and to the ethical role of professionals in social change by two excellent professors, Marvin Minsky and Noam Chomsky. In the late 1960s and early 1970s I worked in the computer software industry, first in Boston's Route 128 area and later in Asia, where I was faced with cultural and political issues that dwarfed the technical problems of transferring computers to developing countries. Returning to graduate school in sociology, I have since studied and taught about technology and social change. What began for me as an uncritical enthusiasm for computers became a set of "private troubles" coping with the human factors in computing and eventually a professional specialization.

Computer technology is sometimes viewed as a phenomenon to be promoted or opposed. A positive or optimistic approach to the benefits of computers is contrasted with the "other side"—a negative or pessimistic view. However, this perspective is often fatalistic, based on the belief that social change just "happens" to people and that nothing can be done about it. In this view, the only choice is whether the inevitable future is "good" or "bad." However, the purpose of the social sciences is not to judge the goodness or badness of phenomena but to describe them in ways that add to our understanding of the world and our ability to predict and influence change. Social science can also provide a basis for democratic policy, by clarifying the consequences of technological choices.

When the computer is viewed as part of large-scale social change, some of its effects may seem beyond our influence. Yet people's choices do make a difference. Studying the social impact of the computer can have practical consequences for our decisions about how computers will be used. As individuals, computer specialists and other professionals are often in a position to choose the direction of technological development. For example, a programmer coding a piece of medical records software may make a minor modification to improve accuracy and reduce human misery. An office manager may choose between two data display screens and save employees from eyestrain. Organized groups of people can affect larger public issues. Parents, through their local PTA and school board, may have a direct say about computer use in their children's schools. Voters, through their elected representatives, can influence local, state, and national legislation. Business and employee organizations can negotiate issues of computers in the workplace.

Considering the current popular enthusiasm for computers, much of this book may seem critical. Yet, if we allow our enthusiasm for technology to obscure our judgment of its consequences, we will restrict our capacity to

make informed choices about the use of that technology. If we look only at social benefits, we will fail to assess social costs.

THE PLAN OF THE BOOK

The book is organized into four parts. The first examines the social context of information technology, providing a conceptual framework for understanding the computer as an information-processing tool capable of producing enormous changes in human life far beyond the immediate purposes for which it was designed. Chapter 1 introduces the basic concepts of information, society, and technology. A theoretical background to the study of social change is provided in Chapter 2. In Chapter 3, the role of information, property, and power in human history furnishes a perspective from which to assess the significance of the new information age.

The second part of the book considers immediate effects of computers by examining the subject of ergonomics—the human/technology interface. The individual's experience with computers is the subject of Chapter 4. The physiology of computer use is presented as a discussion of ergonomic research aimed at improving both health and productivity. Design criteria for computer equipment and systems that improve human well-being are considered, with a focus on aids for the handicapped. The topic of the psychology of the human/computer interaction is organized around the issue of self-esteem and includes computer phobia, the fascinations and hazards of hacking, sex differences in computer use, and the question of what “user-friendly” actually means in terms of human satisfaction. In Chapter 5, a review of recent research on social interaction among computer users connects the individual's experiences to broader public issues of family change, education, and new forms of recreation.

The third part of the book analyzes the computer transformation of work. Chapter 6 presents the computer's impact on work as part of a major industrial transformation of the economy accompanied by job dislocations as well as enhanced productivity. Chapter 7 considers microlevel issues of computers in the workplace, with emphasis on changing conditions of work in blue-collar, clerical, and professional occupations.

The fourth section of the book deals with the computer's effects on information, property, and power in democratic institutions. In Chapter 8, legal consequences of information as a form of property are examined. The transformation of legal institutions involves changes in copyright and patent protection for computer software and data bases. It also affects law enforcement and the definition of white-collar crime. The tension among legal guarantees of individual privacy, public “right to know,” and emerging property rights in information are analyzed in terms of information's role in social control. Chapter 9 looks at the role of computers in society's decision-making processes. Ethical and professional issues are examined in a discussion of computer use in business, government, and military decisions.

ACKNOWLEDGMENTS

As participant observers in workplaces undergoing rapid technological change, my students informed and educated me. I gratefully acknowledge their contribution to this work, though any errors of interpretation and synthesis are my own. I thank them for their patience with experimental electronic manuscript drafts and with ideas in progress. Special thanks to Mike Gunderloy, Margery Rossi, William Swanson, and Cathy Swindlehurst for help with the tedious chores of proofreading and typing.

I am indebted to many colleagues for comments and criticisms at all stages of the work. Conversations with Joseph Weizenbaum clarified the moral and ethical framework of the project. The late Lila Leibowitz contributed to the anthropological perspective in Part One. For Part Two I am grateful for Sherry Turkle's psychological insights. Journal and conference panel reviewers' suggestions improved the theoretical argument about computers and capitalism, especially as it was applied to the transformation of work in Part Three. Members of the Harvard/MIT faculty study group on technology and civil liberties provided useful advice for Chapter 8; material prepared by the Computer Professionals for Social Responsibility was invaluable for completing Chapter 9. I am also indebted to the following reviewers for their valuable suggestions: Professors Harold Borko, U.C.L.A.; Gary Marx, M.I.T.; Bernard Phillips, Boston University; Charles Van Loan, Cornell University; John Williamson, Boston College; and Vance Wisenbaker, Eastern Kentucky University.

The people at Wadsworth Publishing have been enormously helpful, from the initial encouragement of John Moroney through the capable editorship of Sheryl Fullerton. The fact that I have never met face-to-face with Leland Moss or the other members of the production staff confirms my belief that cooperative projects with geographically dispersed participants can be an effective way to organize work in the information age.

Finally, to Gwendolyn Bikis, whose assistance with research, rough draft editing, word processing, and proofreading kept the manuscript going through hectic schedules and numerous revision, thanks are insufficient. She was a partner in producing the book and will be a partner in sharing the royalties.

Judith A. Perrolle
Boston, Massachusetts
August, 1986

CONTENTS

Preface xvii

PART ONE THE SOCIAL CONTEXT OF INFORMATION TECHNOLOGY 1

CHAPTER 1 INFORMATION, SOCIETY, AND TECHNOLOGY 3

- The Nature of Information 3
 - Data, Information, and Knowledge 4
 - Cultural Information 7
 - The Scientific Study of Information 10
 - The Data Explosion and the Information Lag 13
- Society 17
 - System Characteristics 17
 - Social Interaction 18
 - Social Structure 19
 - Institutions 21
- Technology 22
 - The Computer as a Tool 22
 - Techniques 24
 - Design 25
 - Technology and Reification 26

CHAPTER 2 SOCIAL CHANGE 29

- Conceptual Models of Social Change 29
 - Theories and Paradigms 30
 - Boundaries, Dynamics, and the Origins of Change 32
 - A Model of Information and Tools in Social Change 34
- Theories of Social Change 39
 - The Classical Insights: Smith, Malthus, and Darwin 40

The Internal Dynamics of Capitalism: Marx, Durkheim, and Weber	42
The Individual Component: Freud and the Classical Theorists	45
Contemporary Perspectives on Computers and Social Change	46

CHAPTER 3 INFORMATION, PROPERTY, AND POWER IN HISTORY 51

Evolution and Revolution	51
Tools, Information, and Human Evolution	52
The Agricultural Revolution: New Techniques and Social Structures	55
The Industrial Revolution	58
The Great Transformation	58
The Transformation of Property	60
The Transformation of Labor	62
The Rationalization of Culture	63
Information and the Rise of Capitalism	65
Computers and Capitalism	66
The Industrial Origins of the Modern Digital Computer	67
A New Division of Labor	67
The Social Consequences	69
Further Reading for Part One	70

PART TWO ERGONOMICS: THE HUMAN/TECHNOLOGY INTERFACE 73

CHAPTER 4 MICROERGONOMICS: PHYSIOLOGY AND PSYCHOLOGY 75

Technology and Human Needs	75
A Functionalist Model of Human Needs	76
Capitalism and Human Needs	77
The Physiology of the Human/Computer Interaction	78
Physical Stress	78
Vision	80

VDT Radiation	82
Computers for the Handicapped	85
The Psychology of Human/Computer Interaction	87
The Psychology of Stress	88
Response Time	88
Conversations with a Computer	91
Children's Ideas and Adult Attitudes	92
Sex and the Compulsive Programmer	94
The Reflexive User	99

CHAPTER 5 MACROERGONOMICS: THE CONSEQUENCES FOR RELATIONSHIPS, PROCESSES, AND STRUCTURES 101

Social Interaction Among Computer Users	102
Loss of Face-to-Face Contact	102
Computer-Aided Conversation and the Problem of Trust	104
Social Integration in Electronic Networks	107
Computer-Aided Socialization	109
Home Computers and Family Change	110
Computers and the Changing Schools	114
The Changing Functions of Leisure	119
Video Games as Socializing Agents	124
Further Reading for Part Two	127

PART THREE THE COMPUTER TRANSFORMATION OF WORK 129

CHAPTER 6 THE INFORMATION ECONOMY: FROM MANUFACTURING TO KNOWLEDGE PRODUCTION 131

The Structure of Work	131
The Labor Force	132
Occupation	132
Industry	133
"High-Tech" Industry	134
Industrial Change in the Information Society	135
Publishing	136

The Production of Visual Information	140
The Microelectronics Industry	143
The Computer Industry	145
Occupational Change in the Information Society	148
The Meaning of Work	150
Efficiency and Productivity	151
Two Views of Human Skills	153
The Deskillng Debate	155

CHAPTER 7 THE ANALYTICAL ENGINE: WORK IN THE INFORMATION SOCIETY 159

Redesigning Work	160
Telecommuting in the Global Factory: A New Distribution of Labor	160
The Industrialization of Mental Work	163
Blue-Collar Robots: Automating the Labor Aristocracy	164
Office Automation: Job Enhancement or Information Factories?	166
Rationalizing Technical, Professional, and Managerial Work	167
The Transformation of Technical Skill: Rationalization and Mechanization in Software Production	168
Expert Systems in the Professions	170
The Social Consequences	172
Alienation and Automation	173
Stratification and Social Change	175
Further Reading for Part Three	180

PART FOUR INFORMATION, PROPERTY, AND POWER IN DEMOCRATIC INSTITUTIONS 181

CHAPTER 8 PROPERTY, PRIVACY, AND SOCIAL CONTROL: COMPUTERS AND THE LAW 183

Information as Property: The Legal Transformation	184
Information and Change in Legal Institutions	184

	The Changing Status of White-Collar Crime	188
	Protecting Information Products	190
	Computers and Social Control: The Privacy Debate	196
	Privacy and Social Control	196
	Who Knows What About You?	197
	Surveillance and Law Enforcement	200
CHAPTER 9	INFORMATION AS POWER: COMPUTERS AND SOCIAL DECISIONS	205
	Information and the Public Interest	206
	The Tragedy of the Common	206
	Access to Cultural Records	207
	Regulation and Deregulation	210
	International Protections for Information	211
	Computers and Decision Making	214
	Management Decision Making	215
	Computers in Government	218
	The Military Influence on Computer Development	221
	Computer Models and Policy-Making	223
	The Social Future of Information	229
	Distance, Time, and Social Interactions	229
	Property and Privacy	230
	Ethics and Politics	230
	Artificial Intelligence and Human Decisions	231
	Communications and Social Movements	233
	Individuals, Computers, and Social Change	234
	Further Reading for Part Four	236
REFERENCES		237
GLOSSARY		266
INDEX		281

LIST OF FIGURES

Figure 1	Relational Data Base: An Example of Hierarchically Organized Information	6
Figure 2	The Changing Production and Consumption of Media	14
Figure 3	The Relationship Between Theories and “Reality”	31
Figure 4	Stability and Change in a Very Simple System	34
Figure 5	Information and Tools Modify the Relationships Between the Social System and the Physical Environment	35
Figure 6	Maslow’s Model of Human Needs	77
Figure 7	Ergonomic Workstation Parameters	79
Figure 8	The Electromagnetic Radiation Spectrum	83
Figure 9	Effect of Job Design on Strain	89
Figure 10	Computerized Taxicab Printout	95
Figure 11	Example of a Public Message	109
Figure 12	The Evolution of Computer Graphics	121
Figure 13	Four-Sector Aggregation of the U.S. Work Force, 1860–1980	136
Figure 14	Growth of the Personal Computer Market	147
Figure 15	The Software Industry	149
Figure 16	U.S. Multifactor Productivity	154
Figure 17	Projections of the Limits to Growth Model	227

LIST OF TABLES

Table 1	Necessary Functions for All Social Systems	48
Table 2	Evolution and Revolution in Information Technology	59
Table 3	Acceptable Response Times	91
Table 4	A Time and Constraint Model of Leisure	121
Table 5	United Nations International Standard Occupational Classifications	133
Table 6	United Nations International Standard Industrial Classification of All Occupations	134
Table 7	The Information Society	138
Table 8	Workplace Commitment Strategy	156
Table 9	The Possibilities for Computerized Work	161
Table 10	Successful Expert Systems, by Occupational Area, 1984	171

LIST OF BOXES

Box 1	The Social Consequences of a Tool	38
Box 2	The New World Information and Communication Order	209
Box 3	The Strategic Computing Initiative: Conclusions of the Fletcher Panel	224
Box 4	Professional Ethical Standards	232

PART
ONE

THE
SOCIAL
CONTEXT
OF
INFORMATION
TECHNOLOGY

1 / Information, Society, and Technology

2 / Social Change

3 / Information, Property, and Power in History