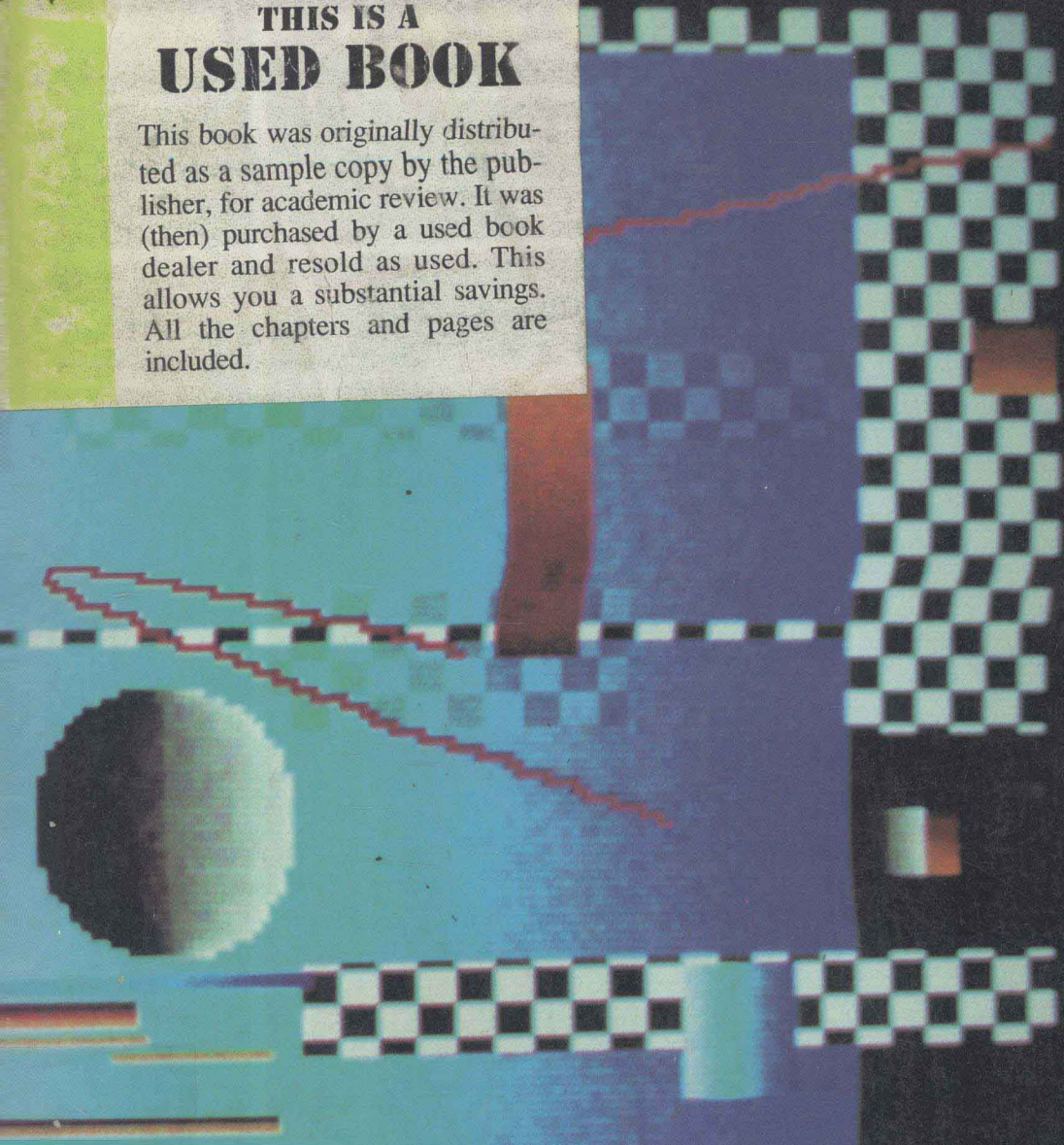
COMPUTER APPLICATIONS IN THE SOCIAL SCIENCES



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Edward Brent is Professor of Sociology at the University of Missouri—Columbia and President of The Idea Works, Inc., an information technology company specializing in expert systems for the design of research. Dr. Brent received his Ph.D. in Sociology from the University of Minnesota in 1976. He has published over forty articles, three books, and several computer programs. He is coeditor of *New Technology in Sociology: Practical Applications in Research and Work* (Transaction Publishers, 1989), and coauthor of *Expert Systems in the Social Sciences,* to be published by Sage Publications. His programs for the design of research include *EX-SAMPLE* (which he coauthored) and *Statistical Navigator.* He is currently coeditor for sociology of *Social Science Computer Review* and served as software and book review editor for *Computers and the Social Sciences.* He is the 1989–1990 President of the American Sociological Association Microcomputer Section. His research interests include applications of expert systems to the design and conduct of social research, and the impact of computers on scholarly research.

Ronald E. Anderson completed his Ph.D. at Stanford University and now is an Associate Professor at the University of Minnesota in the Department of Sociology. He primarily teaches courses on research methods and computing. Professor Anderson is coeditor of *Social Science Microcomputer Review* and is a software series editor for *CONDUIT.* Author of *World of Computing* (Houghton Mifflin, 1988), he has also authored over fifty articles on computers and education, and about twenty instructional software packages. Professor Anderson is the elected Chairperson of ACM/SIGCAS (Association for Computing Machinery's Special Interest Group on Computers and Society), a professional group with 1,300 members. He was also founding chair of the Microcomputing Section of the American Sociological Association. His most recent project has involved the design and implementation of a policy simulation for prison sentencing guidelines development, which several states are currently using.

PREFACE

This book is intended for anyone curious about how computer resources enhance the practice of social research. Comprehensive treatments of many different computer applications make this book an extensive resource for practicing social scientists. Chapters for those who are new to the subject make the book a painless yet effective route to learning about using computers in social research. To accommodate readers with diverse backgrounds, we define technical terms when they are first mentioned and then list them in the glossary.

The only prerequisite for reading and using *Computer Applications in the Social Sciences* is that the reader be slightly familiar with the approaches and methods of social science research.

While we anticipate that the predominant use of this book will be as a reference or self-study resource, it will also serve as a text for college courses. It is designed for use as a supplementary text in undergraduate courses on research methods and as the principal text in courses on computer applications in the social sciences. Such courses are now taught at all levels, from community colleges to Ph.D. programs.

The social sciences overlap with many other disciplines, including library science, public administration, planning, architecture, applied statistics, home economics, and so forth. The mutual interests of the social sciences with these disciplines become especially apparent from the vantage of computing.

Practicing specialists in numerous fields will find that such chapters as "Writing and Rewriting" and "Graphing" are as applicable to educational researchers, librarians, and counselors as they are to sociologists and economists. Although this book can be used in the classroom, it will be equally at home in libraries, research institutes, government agencies, and other professional offices.

Computer Applications in the Social Sciences is for anyone who does social research or aspires to do so. If you are such a person, you will find something of interest in this sourcebook. If you are quite illiterate about computer matters, Part One will give you the jargon you need to get more deeply involved. If you are experienced with computers but have not kept up with available software, especially microcomputer programs, Part Two will help you because it surveys the software tools of particular interest to social researchers. No matter what level of computer sophistication you bring with you as a reader, you will find something useful in Part Three, which describes the application of computers to the specific tasks of social research. The last section of this book, Part Four, offers the reader a broad perspective on the role of computers in social research. This section, like Part Three, is useful for those lacking computer expertise, but it is also recommended reading for computer specialists because it serves as an agenda for the next few years, specifically an agenda for harnessing computer power for the social sciences.

Only a few years ago this preface would have argued that social scientists should take time to learn about computers and how to use them. The emergence of relatively inexpensive, all-purpose microcomputers with substantial disk storage has rendered such an argument trivial because now it is nearly impossible to find a social scientist who does not admit to the need for more computer learning, even if only to understand the negative potential of computers. The last chapter concludes with a balanced perspective on the social impact of computers by reviewing the major issues in the context of the future.

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AN INTRODUCTION TO COMPUTERS

CHAPTER 1

INTRODUCTION: COMPUTER LITERACY AND THE SOCIAL SCIENCES

During the past 25 years many new computer capabilities have transformed the practice of social and behavioral research. Computers continue to be drawn into every facet of social research, including such unlikely tasks as textual analysis and field note-taking, which were totally untouched by computers only a few years ago.

This transformation of the social sciences dramatically accelerated when we entered the 1980s. It was not until the early 1980s that the price and performance of the average microcomputer had evolved to the point when typical social scientists began to contemplate acquiring desktop computers. Such an idea was more obtrusive for some than for others, but whatever the emotional reaction, no one claimed immunity from the need to learn more about computers. The only major disagreement was over what people specifically needed to know in order to avoid obsolescence from the rapidly advancing technology of computing.

In order to decide how much learning is needed by the average social scientist to harness the power of the new microcomputer technology, many social researchers began looking for a sourcebook to help locate and evaluate the principal ways computers can be used. It is this need to which we address this book. Other books have been written on computers in the social sciences, but they tend to merely explain how specific software is used.

Computers Applications in the Social Sciences provides a systematic examination of current and potential computer applications to social science research. It identifies important computer applications, provides direction, defines issues, and describes appropriate standards for different applications. New areas where the computer may come to play an important role are also

identified. The chapters in their entirety set an agenda for the continuing development of computer applications in the social sciences.

COMPUTER LITERACY

One of the major debates in education today concerns how to prepare students for a society that is increasingly computerized. Seidel, Anderson, and Hunter (1982) discuss many arguments for universal education of students in the computer skills which will presumably increase their chances of effective functioning in an "information age." While these arguments tend to be generally accepted within educational circles, considerable disagreement can be found over which computer-related skills and insights are sufficiently important to justify replacing any existing subjects in the curriculum. The one point of consensus shared by all proponents in these controversies is that computer literacy refers to the computer-related learning which everyone needs. For example, history professor John V. Lombardi, in his book entitled *Computer Literacy* (1983), states, "computer literacy means the ability to recognize problems for which the computer may be a useful part of the solution." Lombardi, like most other authors of computer literacy texts, claims that everyone needs such ability.

One emergent notion we adopt to clarify the real need for computer literacy is the premise that computer education needs are role-specific. For example, the computer literacy requirements for electrical engineers are greater than those for camp counselors.

COMPUTER LITERACY AND THE SOCIAL SCIENTIST

Given that computer literacy is specific to particular social or occupational roles, what are the computer literacy needs for social scientists?

Every social scientist needs the skills, understanding, and attitudes to:

1 Evaluate the appropriateness (including the feasibility) of specific applications of computers

2 Select and use computer programs as needed

3 Find and read technical information in order to make wise *consumer* decisions for home or work

4 Evaluate the validity of computer-produced output

5 Communicate with computer programmers and other computer specialists as needed

6 Be aware of the long-term social consequences of the computer for individuals and societies

Each of these requirements can be translated into specific learning objectives and used as guidelines for learning activities and programs. A critical question for each area is this: What are the specific underlying skills and knowledge required? Each area will be discussed in turn.