

Fundamentals of Information Studies

Understanding Information and Its Environment
Second Edition

JUNE LESTER
WALLACE C. KOEHLER, JR.

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*This work is dedicated to our children
and to our grandchildren,
those with us and all yet to come.*

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Foreword

How do we make sense of information? From cave drawings and the Rosetta Stone to HTML and the Wayback Machine, people today see the study of information as a worthwhile enterprise. But information can seem to be a truly abstract concept easily confused with data, facts, and documents all mixed together in the maelstrom of knowledge creation. For many decades we looked to editors and publishers as the legitimizing forces who bestowed their stamp of approval on credible information, but now in the wide-open landscape of the Web, the quality of information is for the user to decide.

In the new edition of *Fundamentals of Information Studies*, June Lester and Wally Koehler take on the noble task of examining the theory and application of information concepts to clarify the history and current environment of information use, information applications, and information technology. The book's overt mission is to help students understand communication and information systems and how they have evolved and to provide a learning tool for introductory courses in information studies. Instead of plodding along in typical textbook fashion, the authors insert fascinating anecdotes and real-life examples to energize what could otherwise be merely a theoretical work. Theory in itself is important and not to be diminished, however, and to their credit, the authors build their chapters on a foundation of solid information science research. From the work of Otlet, Paisley, Buckland, and Briet, the book offers students concepts from the "names they should know" in the information field while still being an accessible text. At the same time the authors also provide an interesting read to all those who wish to understand a field that emerged in the twentieth century and continues in prominence in the twenty-first.

Those unfamiliar with the information field may not realize that there are many subdisciplines such as information seeking, information retrieval, knowledge management, and informatics among others that are subject to primary research at major universities around the world. This text is ecumenical in scope, bridging a number of professional fields including communication, computer science, library and information science, and information technology, and offering an international focus that commends it to those

who see information studies as global by nature. University programs in information science and information technology (outside of computer science and engineering schools) are a relatively recent phenomenon, and there is a dearth of texts that unify the various concepts of information as well as information and communication technology (ICT). *Fundamentals of Information Studies* is an excellent starting point for students at the undergraduate and graduate levels, opening an intellectual door to the challenging and abiding questions that are integral to nascent fields of study such as information science whose applications change rapidly and continuously.

It is not just the theory and practice of information that gives value to this volume. The text introduces readers to the political side of information and the concomitant power relationships that exist in the access to information or the lack of it in everyday society. The analysis of power and information is a welcome addition to this updated version of the book, comprising a new chapter in the second edition. A chapter on the economic aspects of information and its distribution also provides a depth of thoughtful ideas related to a pluralistic and democratic society. The new edition has additional material on user behavior, a key aspect of the social informatics side of the informing sciences. Recognizing the human aspects of information and technology use is appropriate for a work that emanates from the library and information science field. Library professionals traditionally focus on the information needs of individuals, relevant information to meet those needs, and how people and organizations use information.

Lester and Koehler are seasoned faculty in the field of information studies with years of teaching experience and experience as administrators over decades of work within higher education. Their interests are broad and range from the arts and humanities to political science and information policy. Individually each author has held prestigious positions with information professional organizations and on editorial and directorial boards within the informing fields. It is only appropriate, then, that the book outlines the various professional roles that students who aspire to information professions can fill as they complete their studies on the university level. As a practical matter, this focus is important in professional schools where students see themselves on the path to a career that they will sustain over a lifetime, despite shifts and moves in various positions along the way.

I am impressed with the care and thoughtfulness with which the authors have approached the subject matter of all things related to information. They are courageous to take on material that potentially changes at every news conference announcing a new operating system or new e-gadget or i-device. In a world where “screenagers” live on the screen and are facile with online social networking, googling, and interactive digital video, a book that steps back to

survey the information environment and its broad implications for society is welcome for those who wish to work with students and encourage them to be intelligent consumers and producers of information. The chapter on ethics is particularly useful in its offering of deep questions that touch the values that gird a society where organizations depend on quality information in order to function. It is not easy for those outside of the field of philosophy to write about ethics without appearing to be moralistic. The approach taken by Lester and Koehler works well by demonstrating that professionals in information environments across the board attempt to adhere to codes of ethics based on the moral norms expected of them by society. As the text concludes looking toward information futures with allusions to popular and classic films about artificial intelligence, the authors suggest that understanding information and technologies may actually help us examine big ideas such as what makes us human and the responsibilities we must assume because of our humanity and those we can delegate to machines.

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Preface

Information has become so central to our daily lives that we now live in an “information environment,” a habitat that surrounds us as surely and completely as the ecosystem in which we live. This habitat expands constantly to encompass new sources of information and new information activities.

In writing *Fundamentals of Information Studies: Understanding Information and Its Environment, Second Edition*, we sought to combine theory and everyday examples to provide a broad-based introduction to the field.

We define information broadly as anything that changes the knowledge state of the receiver. Our focus here is on human information activity. We use the term “information environment” to connote not only information and information activity but also the social, political, economic, and cultural milieu. It is, in our view, impossible to separate information from the context in which it occurs.

Although *Fundamentals of Information Studies* focuses primarily on the contemporary information environment, we also strive to connect current information institutions to their historical roots and with their cultural, political, and economic settings. *Fundamentals of Information Studies* also examines what we consider key concepts and issues in information policy.

Throughout this book, we have tried to identify and trace general themes that the reader can track over time. The most prominent theme is the impact of the development of technology on access to and use of information and the changes that this development causes in the structure and operation of society. One question that pervades the entire book is whether the information issues and challenges we currently face are really new or just different manifestations of issues and concerns that have been with us since the beginning of recorded communication. Although we suggest answers, in the end, the reader is left to decide.

We believe that our duty as authors is to help the reader identify significant questions and to suggest ways in which the reader can ponder those questions. Thus, we are not trying necessarily to provide answers to the issues raised, but rather to help the reader to think about the questions and to look for answers on an ongoing basis. This is, of course, the primary purpose of education.

The ideas and concepts within the book have been shaped by experience and interaction with students and faculty colleagues and through our participation in the information profession over a long period of time. One of us has been teaching an introductory course in this area at the graduate level for over thirty years and the other has worked and taught in the area of politics and policy for almost that long.

Fundamentals of Information Studies is designed primarily for use as a textbook in introductory courses in undergraduate and graduate information studies programs. It also could be assigned as background or collateral reading for more narrowly focused undergraduate or graduate courses. We hope that nonstudents seeking background on the information society or wishing to gain perspective on this rapidly changing subject will also find that the work clarifies their understanding of how information affects us daily.

NEW IN THIS EDITION

One of the advantages of writing more than one edition of a book is that one can take into account the criticisms and comments of reviewers. Book reviews provide a valuable service to readers looking to select works of interest. They also offer valuable guidance to authors by helping to point out lacunae and other gaps in their material. We thank our reviewers for their guidance.

We have chosen to provide additional material in this second edition based upon two reviews of our first edition that we believe provide valuable insights. Based on a review by Elena Macevičiūtė (2004), we have added chapter 3, “Information Needs and Information Seeking Behavior,” which offers a broad exploration of user behavior. Douglas Raber (2004) pointed out that the first edition, while not explicitly a Foucauldian analysis of the art, science, and practice of informing, fails to address the nexus between power and information. Raber is correct. Because we were writing an introduction of informing, we purposefully did not provide that level of analysis. On reflection, we have decided to offer an analysis of power and information in a new chapter 10. Other changes in this edition include expansions of several chapters and updates and revisions throughout. We wish to express our appreciation to those who have granted permission to use their materials.

We have also added two new features to each chapter:

- A “Learning Guide” that introduces important terms and issues and prepares the reader for the topic at hand. Instructors and students can use these guides to assess whether key concepts have been comprehended and retained.

- An “Information Idea” that draws attention to an interesting application or to supplemental material that enriches the chapter’s content.

ORGANIZATION

- Chapter 1, “The Impact of Information in Society,” provides an overview of information in our daily lives and in society as a whole.
- Chapter 2, “Fundamental Concepts of Information,” defines information in several ways and considers characteristics of information, making a distinction between “information” and the “information record.”
- Chapter 3, “Information Needs and Information Seeking Behavior,” explores users’ motivations for seeking information.
- Chapter 4, “History of Information Technology,” traces the development of information technology and the social implications of major changes.
- Chapter 5, “Current Information Technology,” introduces contemporary uses of information technology within the contexts of creating, transmitting, storing, retrieving, and preserving information and the information record.
- Chapter 6, “Societal Institutions for Creation, Distribution, and Management of Information,” begins with a brief history and describes modern institutions that develop, produce, transmit, distribute, manage, and provide access to information records.
- Chapter 7, “The Information Professions,” discusses four broad categories of information work (creation, transmission, management, and storage) across three traditions (oral, print, and electronic).
- Chapter 8, “The Impact of Information Cultures and Societies,” focuses first on how one identifies an “information society” and then explores the impact of information and information technology in oral, print, and electronic environments.
- Chapter 9, “Economics of Information,” defines key economics terms and explicates the role of the government in the economics of information.
- Chapter 10, “Information, Power, and Society,” highlights the relationship between information and power and the various ways in which the two concepts interact.
- Chapter 11, “The Regulation and Politics of Information,” examines the idea of information regulation and introduces a sample of the governmental, intergovernmental, and nongovernmental agencies that are either regulatory or policy-making bodies.
- Chapter 12, “The Areas and Issues of Information Policy,” focuses on two key areas of current concern: copyright and privacy. It also inspects

policies related to generation and production, dissemination and access, and distribution of information.

- Chapter 13, “Information Ethics,” gives examples of several professional codes of ethics and discusses current key issues in information ethics: privacy, intellectual freedom, equitable access, and intellectual property.
- Chapter 14, “Information Future(s),” concludes with speculation on where further development in the information society may lead.

We conclude each chapter with summary thoughts and with “Questions for Consideration.” These questions are intended to stimulate thinking about the issues and concepts that have been introduced. While they might be assigned for discussion by a class or by small groups of students, they could also be assigned as individual essay questions to help develop students’ critical thinking skills. In addition to the references given at the end of each chapter, most chapters include a list of additional sources that might be useful in pursuing the topic. When appropriate and available, Web sources are included. The appendixes include a glossary and a list of acronyms.

Since the information environment changes so rapidly, *Fundamentals of Information Studies* should be supplemented with sources that can provide the latest developments on the issues and concerns addressed. A companion Web site is provided for this purpose; see the copyright page for details. We also recommend that educators and students use a combination of the current professional literature, a national newspaper, and Web sites that give attention to the topics covered, many of which are listed in either the references or additional sources.

Through our years of experience, we have learned that one of the most difficult challenges in our field is finding a framework in which to place all of the information activities that occur and in which to make sense of the constant changes. The information environment often seems much like a kaleidoscope—the minute we think we have a fix on the patterns, everything seems to turn and change again. We hope to assist our readers in making sense of the information environment and to provide a background from which more specialized and detailed investigation can take place. If the pieces of the information puzzle make more sense after reading this book—and if there are still interesting questions that have not been answered—we will judge our efforts to have been successful.

References

- Macevičiūtė, Elena. 2004. “June Lester and Wallace C. Koehler. *Fundamentals of Information Studies: Understanding Information and Its Environment*. New York: Neal-Schuman Publishers, Inc., 2003.” *Information*

Research 9, 2. (Accessed December 2006.) Available at: <http://informationr.net/ir/reviews/revs124.html>.

Raber, Douglas. 2004. "Fundamentals of Information Studies: Understanding Information and Its Environment." *Library Quarterly* 74, no. 4: 486–88.