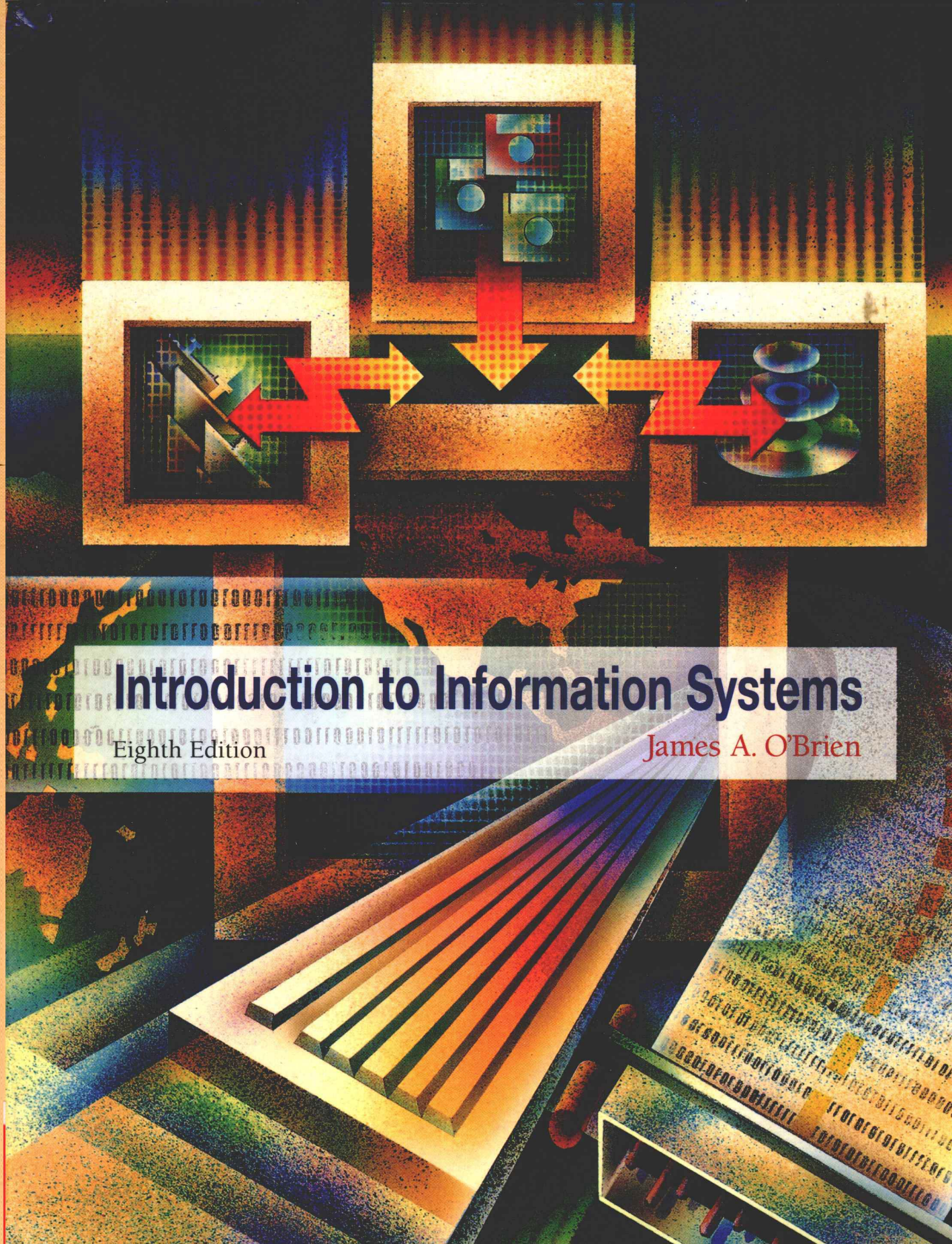

Introduction to Information Systems

Eighth Edition

James A. O'Brien

Introduction to Information Systems

Eighth Edition

James A. O'Brien
College of Business Administration
Northern Arizona University

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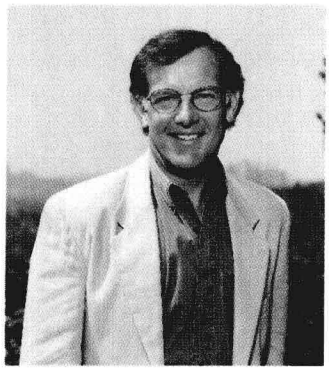
To all who read these words
May you love the Light within you
And in everyone you meet
And everything you experience

About the Author



James A. O'Brien is a professor of Computer Information Systems in the College of Business Administration at Northern Arizona University. He completed his undergraduate studies at the University of Hawaii and Gonzaga University and earned an M.S. and Ph.D. in Business Administration from the University of Oregon. He has been coordinator of the CIS area at Northern Arizona University, professor of Finance and Management Information Systems and chairman of the Department of Management at Eastern Washington University, and a visiting professor at the University of Alberta, the University of Hawaii, and Central Washington University.

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Preface

Introducing Information Systems to Business Students

This text is written as an introduction to information systems for business students. As tomorrow's managers, entrepreneurs, or business specialists, business students need to know how to use and manage information technology in today's networked enterprises and global markets. In this dynamic environment, they will rely on interconnected networks of information systems for end user collaboration, including communications and computing among end user work groups and teams, and enterprisewide computing, including communications and information processing for business operations, managerial decision making, and strategic advantage.

This is the business end user and networked enterprise perspective that the eighth edition brings to the study of information systems. Of course, as in the seventh edition, this edition:

- Loads the text with real world cases and problems about real people and companies in the business world.
- Organizes the text around a simple five level framework that emphasizes the IS knowledge a managerial end user needs to know.
- Distributes and integrates IS foundation theory throughout the text instead of concentrating it in several early chapters.
- Places a major emphasis on the strategic role of information systems in providing competitive advantage, as well as on the operational and decision support roles of information technology.

About the Text

This new eighth edition is a major revision that retains these important features, while significantly updating coverage of IS technology and its business and managerial applications. In addition, this edition includes a new chapter on the strategic use of IT for competitive advantage. Major revisions have been made to the organization of topics in many chapters, and new hands-on application exercises have been added to end-of-chapter materials. Finally, the eighth edition provides all new Real World Cases and Problems in every chapter.

This text is designed for use in undergraduate courses in Management Information Systems, which are required in many Business Administration or Management programs as part of the *common body of knowledge* required of all business majors. Thus, this text treats the subject area known as Information Systems (IS), Management Information Systems (MIS), or Computer Information Systems (CIS) as a major functional area of business that is as important to management education as are the areas of accounting, finance, operations management, marketing, and human resource management.

Like my other MIS texts, this text is designed to support the attainment of **information systems literacy** by students. That is, its objective is to build a basic understanding of the value and uses of information technology in information systems for business operations, managerial decision making, and strategic advantage. Although this text is not designed for courses in *computer literacy,* the four chapters of its *technology* module contain overviews of computer hardware, software, telecommunications, and database management that can be used as a refresher on such topics or to help remedy deficiencies in student computer literacy.

An Information Systems Framework

This text provides a teaching-learning resource that reduces the complexity of an introductory course in information systems by using a conceptual framework that organizes the knowledge needed by business students into five major areas:

- **Foundation Concepts.** Basic information systems concepts about the components and the operations, managerial, and strategic roles of information systems (Chapter 1). Other behavioral, managerial, and technical concepts are presented where appropriate in other chapters.
- **Technology.** Major concepts, developments, and managerial implications involved in computer hardware, software, database management, and telecommunications technologies (Chapters 2, 3, 4, and 5). Other technologies used in computer-based information systems are discussed where appropriate in selected chapters.
- **Applications.** How information technology is used in modern information systems to support end user collaboration, enterprise operations, managerial decision making, and strategic advantage (Chapters 6, 7, 8, and 9).
- **Development.** Developing information system solutions to business problems using a variety of approaches to application development and implementing change with IT (Chapter 10).
- **Management.** The challenges and methods of managing information systems technologies, activities, and resources, including information resource management, global IT management, and security and ethical challenges (discussed in many chapters, but emphasized in Chapters 11 and 12).

Real World Cases, Problems, and Exercises

This text makes extensive use of up-to-date "real world" case studies and problems. These are not fictional stories, but actual situations faced by business firms and other organizations as reported in current business and IS periodicals. This includes two real world case studies in each chapter that apply specifically to that chapter's contents, four real world problems provided at the end of every chapter, and a continuing case at the end of each module. In addition, each chapter contains several Application Exercises, including two hands-on spreadsheet or database software assignments in Chapters 2 through 11, and several Internet assignments in Chapter 4. The purpose of this variety of assignment options is to give instructors and students many opportunities to apply each chapter's material to real world situations, using managerial problem solving or end user development approaches.

Strategic, International, and Ethical Dimensions

This text contains substantial text material and cases reflecting the strategic, international, and ethical dimensions of information systems. This can be found not only in Chapter 9: *Information Systems for Strategic Advantage,* Chapter 11: *Enterprise and Global Management of Information Technology,* and Chapter 12: *Security and Ethical Challenges of Information Technology,* but in all other chapters of the text. This is especially evident in many real world cases and problems, such as Southwest Airlines, Satyam Computer Services, Catepillar, Inc., UPS, Federal Express, London Life, USAA Life, Bank of Montreal, Royal Bank of Canada, Columbia Sportswear, Dealer Net, Alaska Airlines, Eastman Kodak, Nestlé, Inc., Cisco Systems, Pacific Northwest National Laboratories, Database America, Yahoo Inc., and many, many others. These examples repeatedly demonstrate the strategic and ethical challenges of managing information technology for competitive advantage in global business markets and in the global information society in which we all live and work.

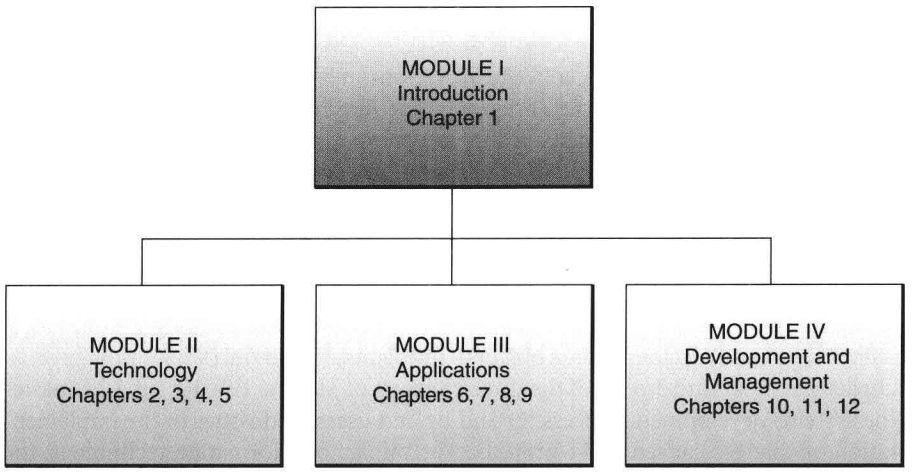

FIGURE 1
The modular organization of the text.

Modular Structure of the Text

The text is organized according to the five major areas of the framework for information systems knowledge mentioned earlier. Figure 1 illustrates how the text is organized into four modules. Also, each chapter is organized into two distinct sections. This is done to avoid proliferation of chapters, as well as to provide better conceptual organization of the text and each chapter. This organization increases instructor flexibility in assigning course material since it structures the text into modular levels (i.e., modules, chapters, and sections) while reducing the number of chapters that need to be covered.

Each chapter starts with a Chapter Outline and Learning Objectives and ends with a Summary, Key Terms and Concepts, a Review Quiz tied directly to the Key Terms and Concepts, Discussion Questions, Real World Problems, Application Exercises, Review Quiz Answers, and Selected References. Real World Cases are also provided at the end of each section and module of the book.

Module I: Introduction

The first chapter of this text is designed as an introductory core module of foundation concepts. Once instructors have covered Chapter 1, they can assign any other module depending on their pedagogical preferences. Chapter 1 introduces important topics and roles of information technology in business, a framework of information systems knowledge needed by business end users, the generic components and properties of information systems, and the major types of information systems.

Module II: Technology

Module II contains chapters on computer hardware (Chapter 2), software (Chapter 3), telecommunications (Chapter 4), and database management (Chapter 5). Its purpose is to give students an introduction to the technology used in modern computer-based information systems and its implications for end user management. This material is consolidated in an independent module since students may have already covered some of these topics in an earlier course. Thus, instructors can selectively use the chapters and sections of this module, depending on the preparation of their students. This is especially useful in the case of the important topics of business telecommunications and database management, to which many students have typically had only a brief exposure.

Module III: Applications

Module III contains four chapters that discuss the basic concepts and major applications of computer-based information systems. It emphasizes how information systems support end user productivity and the operations, managerial decision making, and competitive advantage of business firms and other organizations. Thus it includes coverage of concepts and applications in end user computing and collaboration and office automation (Chapter 6), business information systems and transaction processing (Chapter 7), management information, decision support, and executive information systems, and artificial intelligence and expert systems (Chapter 8), and information systems for strategic advantage (Chapter 9).

Module IV: Development and Management

It is important that prospective business end users learn that although information technology can help them solve business problems, it also poses major managerial challenges. That is the focus of the three chapters of Module IV. Chapter 10 explores the systems development process for and by end users, and issues in the implementation of changes caused by IT projects. The impact of information technology, the importance of information resource management, and the managerial implications of the global use of information technology are covered in Chapter 11. Chapter 12 explores the controls and safeguards needed to improve information system performance and security, as well as the ethical challenges posed by computer crime and other societal impacts of information technology.

Summary of Changes

Besides providing all new Real World Cases and Problems and Application Exercises, the eighth edition represents a major revision of chapter contents. Highlights of the changes made in the seventh edition material are found in the following eighth edition chapters:

Chapter 1: *Introduction to Information Systems in Business.*
Section I of this chapter is a major revision that emphasizes the importance of IT in business with an overview of the impact of IT on business developments such as globalization, reengineering, and competitive advantage. The model of IS components in Section II has been revised to stress the role of network resources, and the overview of the types and roles of information systems has been expanded.

Chapter 2: *Introduction to Computer Hardware.*
Updated and reorganized coverage of computer hardware, including moving more technical material to a *Technical Note* in Section I, and the elimination of Section III on the technical details of instruction execution and data representation.

Chapter 3: *Introduction to Computer Software.*
Updated and reorganized coverage of computer software, with application software moved to Section I, and system software moved to Section II.

Chapter 4: *Introduction to Business Telecommunications.*
A major revision and new topics such as open systems, client/server, the information superhighway, and business use of the Internet.

Chapter 5: *Introduction to Database Management.*
Updated and reorganized coverage of the role of database management in managing organizational and end user data resources in Section I, and technical topics in database management in Section II.

Chapter 6: *Information Systems for End User Computing and Collaboration.*
This revised chapter emphasizes the importance of end user computing and office automation applications, including new material on end user collaboration, work group computing, and hypertext and multimedia applications.

Chapter 7: *Information Systems for Business Operations.*
Section I is a revision of material on IS support of the functional areas of business. Section II contains revised material on EDI, EFT, and transaction processing systems.

Chapter 8: *Information Systems for Managerial Decision Support.*
Substantial new material has been added to Section I on online analytical processing (OLAP) and decision support and executive information systems. Section II features revised coverage of artificial intelligence and expert systems, and new material on case-based reasoning, neural networks, fuzzy logic, virtual reality, and intelligent agents.

Chapter 9: *Information Systems for Strategic Advantage.*
Section I of this new chapter contains new and revised coverage of competitive strategy concepts formerly in Chapter 6. Section II contains much new material on the strategic use of IT for business process reengineering, total quality management, agile competition, virtual corporations, and strategic use of the Internet.

Chapter 10: *Developing Business Solutions with Information Technology.*
Section I contains expanded coverage of end user development, and includes material on CASE formerly in Section III, which has been dropped. Section II contains new material on managing change caused by implementing new information technologies in an organization.

Chapter 11: *Enterprise and Global Management of Information Technology.*
Section I is a revision of managerial issues in IT including management involvement in IS governance, trends in IS organization, and the managerial and organizational impact of IT. Section II contains much new and revised material on global IT management, including cultural challenges, global company requirements, and global business/IT strategies.

Chapter 12: *Security and Ethical Challenges of Information Technology.*
Section I of this chapter contains new material on IS security and controls. Section II contains new material on computer crime and ethical controversies on the Internet, as well as revised coverage of ethical and societal IT issues.

Support Materials

The IRWIN Advantage and Effective Series are a collection of laboratory tutorials for the most popular microcomputer software packages available. There are numerous lab manuals available, so you can choose any combination to accommodate your individual class needs.

A revised **software casebook,** *Application Cases in MIS: Using Spreadsheet and Database Software,* second edition, by James N. Morgan of Northern Arizona University, is available to supplement the hands-on exercises in this edition. This

optional casebook contains an extensive number of hands-on cases, many of which include a suggested approach for solving each case with spreadsheet or database management software packages to develop solutions for realistic business problems.

An **Instructor's Resource Manual,** revised by Margaret Edmunds of Mount Allison University, is available to instructors upon adoption of the text. It contains instructional aids and suggestions, detailed annotated chapter outlines with instructional suggestions for use in lectures, answers to chapter questions, and problems and case study questions. A data/solutions disk is included for use with the spreadsheet and database exercises in the text as well as the IRM on disk.

There is a **presentation graphics disk** in PowerPoint that supplies color slide shows for each chapter to support classroom discussion.

A **Test Bank,** which contains over 3,000 true-false, multiple choice, and fill-in-the-blank questions, has been prepared by Margaret Edmunds of Mount Allison University. It is available as a separate test manual and in computerized form on floppy disk for use with the Irwin Test Generator Program.

The *Irwin IS Video Library* contains 12 videos, approximately 10–12 minutes long, on various IS concepts like multimedia, business process reengineering, and client/server computing. These videos, along with two new 1997 updates, are available to adopters of the text.

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Acknowledging the Real World of Business

The unique contribution of over 100 business firms and other computer-using organizations that are the subject of the real world cases, problems, exercises, and case studies in each chapter is also gratefully acknowledged. The real-life situations faced by these firms and organizations provide the readers of this text with a valuable demonstration of the benefits and limitations of using information technology to support business operations, managerial decision making, and strategic advantage.

James A. O'Brien

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