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An easy way to help your students **learn, collaborate, and grow.**



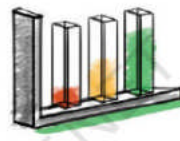
Diagnose Early

Educators assess the real-time proficiency of each student to inform teaching decisions. Students always know what they need to work on.



Facilitate Engagement

Educators can quickly organize learning activities, manage student collaboration, and customize their course. Students can collaborate and have meaningful discussions on concepts they are learning.



Measure Outcomes

With visual reports, it's easy for both educators and students to gauge problem areas and act on what's most important.

Instructor Benefits

- Assign activities and add your own materials
- Guide students through what's important in the interactive e-textbook by easily assigning specific content
- Set up and monitor collaborative learning groups
- Assess learner engagement
- Gain immediate insights to help inform teaching

Student Benefits

- Instantly know what you need to work on
- Create a personal study plan
- Assess progress along the way
- Participate in class discussions
- Remember what you have learned because you have made deeper connections to the content

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WILEY

Operations Management

An Integrated Approach

6th

EDITION

R. DAN REID • NADA R. SANDERS

WILEY

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This book was set in Minion Pro 10.5/12 by Laserwords and printed and bound by Quad Graphics-Versailles. The cover was printed by Quad Graphics-Versailles

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Library of Congress Cataloging-in-Publication Data

BRV: 978-1-118-95261-0

EVAL: 978-1-118-95260-3

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

Preface

Today, companies are competing in a very different environment than they were only a few years ago. Rapid changes such as global competition, e-business, the Internet, and advances in technology have required businesses to adapt their standard practices. Operations management (OM) is the critical function through which companies can succeed in this competitive landscape.

Operations management concepts are not confined to one department. Rather, they are far-reaching, affecting every functional aspect of the organization. Whether studying accounting, finance, human resources, information technology, management, marketing, or purchasing, students need to understand the critical impact operations management has on any business.

We each have more than 25 years of teaching experience and understand the challenges inherent in teaching and taking the introductory OM course. The vast majority of students taking this course are not majoring in operations management. Rather, classes are typically composed of students from various business disciplines or students who are undecided about their major and have little knowledge of operations management. The challenge is not only to teach the foundation of the field, but also to help students understand the impact operations management has on the business as a whole and the close relationship of operations management with other business functions.

We were motivated to write this book to help students understand operations management and to make it easier for faculty to teach the introductory operations management course. We continue to have three major goals for this book.

Goals of the Book

1. Provide a Solid Foundation of Operations Management

Our book provides a solid foundation of OM concepts and techniques, but also covers the latest on emerging topics such as e-business, supply chain management, enterprise resource planning (ERP), and information technology. We give equal time to strategic and tactical decisions and provide coverage of both service and manufacturing organizations. We look closely at some of the unique challenges faced by service operations.

2. Provide an Integrated Approach to Operations Management

While several excellent textbooks provide appropriate foundation coverage, we believe that few provide sufficient motivation for students. We are aware that a major teaching challenge in OM is that students aren't motivated to study OM because they don't understand its relevance to their majors. We think the course textbook can greatly support the professor in this area; therefore, a chief goal of this book is to integrate coverage of why and how OM is integral to all organizations. Interfunctional coordination and decision making have become the norm in today's business environment. Throughout each chapter we discuss information flow between business functions and the role of each function in the organization.

The text also illustrates the linkages and integration between the various OM topics. Our end-of-chapter feature entitled "Within OM: How It All Fits Together" describes how the chapter topic is related to other OM decisions. It addresses the issue that OM topics are linked and interdependent, not independent of one another.

As supply chain management (SCM) has taken on an increasingly important role, the end-of-chapter section titled "The Supply Chain Link" explains the relationships between the specific chapter topic covered and supply chain

"The Supply Chain Link" explains the relationships between the specific chapter topic covered and supply chain management.

3. Help Students to Understand the Concepts

This course remains challenging for students to take and professors to teach. Students often have no prior exposure to operations concepts and little real business experience. They have a broad spectrum of quantitative sophistication and often find the math in the course extremely challenging. Therefore, a chief goal of the text and supplement package is to help students with these concepts. We begin each chapter with an example from everyday life, often a consumer or personal example, to help students intuitively understand what the chapter will be about. Then we explain each concept clearly and carefully, with *enough* depth for non-majors. Sustainability in operations is highlighted at the end of each chapter.

The new edition is focused on helping students by offering problem-solving hints and tips as part of the solution to most examples and solved problems throughout the entire text. Two unique supplements support student comprehension. A "Quantitative Survival Guide," available as an optional supplement packaged with the text, provides "help with the math" for all chapters. *WileyPLUS Learning Space* (available on-line via a password in an optional package with the book) provides plenty of homework practice, feedback for students, an e-book, and much more. In addition, algorithmic homework problems have been designed for each chapter in order to provide unlimited practice opportunity.

Organization and Content of the Book

We have arranged the topics in the book in progressive order from strategic to tactical. Early in the book we cover operations topics that require a strategic perspective and a cultural change within the organization, such as supply chain management, total quality management, and just-in-time systems. Progressively we move to more tactical issues, such as work management, inventory management, and scheduling concerns. We recognize that most faculty will select the chapters relevant to their needs. To make it easier for students and faculty, each chapter can stand alone. Any specific knowledge needed for a chapter is summarized at the beginning of each chapter, with specific topic and page references for easy review.

Balanced Coverage of Quantitative and Qualitative Topics

We have tried to find a balance between the quantitative and qualitative treatment and coverage of OM topics. To meet students' needs, this text presents the application of OM concepts through the extensive use of practical and relevant business examples. We eliminated from the printed book coverage of topics less frequently covered at the introductory level. However, complete supplementary chapters on spreadsheet modeling, optimization, master production scheduling, rough-cut capacity planning, and waiting line models are available on the book's Web site (www.wiley.com/college/reid).

Integrated Technology Perspective

Advances in e-commerce and the Internet are transforming the business environment, and we integrate these concepts in every chapter. We discuss a range of topics from enterprise resource planning (ERP) and electronic data interchange (EDI) to quality issues of buying goods on-line.

Changes to this Edition

We made a number of changes to this edition in order to make the text as current, user-friendly, and relevant as possible. In particular we have updated company examples, technology, big data analytics, and added some supply chain management issues.

Company Examples:

Since our last edition we have observed many changes in organizations that we had used as examples. Some companies have gone out of business while others, such as Amazon.com and Dell Computer Corporation, have changed their strategies. In order to offer the most current text we have made updates in company examples across all chapters.

Technology:

One of the biggest changes we are witnessing relates to changes in technology. We have updated discussions with regard to the latest technologies that impact operations management. This includes discussions of 3D Printing, new

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regard to the latest technologies that impact operations management. This includes discussions of 3D printing, new generation robotics and automation, and advancements in radio frequency identification (RFID) in [Chapter 3](#).

Big Data Analytics:

Big data analytics is having a tremendous impact on digitizing operations. We have incorporated the latest on big data analytics in [Chapters 1](#) and [3](#). In [Chapter 8](#) we have added an entire section on predictive analytics and forecasting.

Supply Chain Management Issues:

Since our last edition the proposed new shipping facility in Mexico has been canceled, while the Panama Canal is currently being widened. We discuss the ramifications on materials being shipped from Asia to the United States in [Chapter 4](#).

In addition, several chapters have been reorganized to facilitate a better flow. During the past five editions, we have added many new topics. This sixth edition better integrates those topics into the chapters. We continue to emphasize inter-functional coordination and decision making, and have updated a number of features as shown below.

Before You Begin.

In order to help students when solving quantitative problems, the feature called “Before You Begin,” placed immediately prior to the solution of most in-chapter example problems and end-of-chapter solved problems. Emphasizing our focus on strong pedagogy, this feature provides problem-solving tips and hints that the student should consider before proceeding to solve the problem.

Supply Chain Link.

To emphasize the increasingly important role of supply chain management, there is a section on supply chain management and expanded coverage of supply chain and services in every chapter.

Sustainability Link.

In order to address the latest challenges facing business, we have included “The Sustainability Link” feature. This feature discusses how the subject of the chapter directly ties to today’s sustainability concerns and challenges, providing specific business examples that illustrate the issues.

Problem Solving.

While our goal is to provide balanced coverage of quantitative and qualitative topics, the new edition further emphasizes and integrates problem solving to help students experience the course more successfully. We provide algorithmic homework problems for every chapter of the text (via *WileyPLUS Learning Space*) for unlimited practice opportunities, include problem-solving help in the book (“Before You Begin”) and on-line via *WileyPLUS Learning Space*, and provide step-by-step solved problems in the book and on-line. We also provide “help with math” as needed via *WileyPLUS Learning Space*. We believe that these changes to the new edition greatly enhance student learning.

Features of the Book

We have developed our pedagogical features to implement and reinforce the goals discussed previously and address the many challenges in this course.

Pedagogy that Provides an Integrated Approach

Chapter Opening Vignettes and Within OM: How It All Fits Together

To help students intuitively understand the topic, each chapter begins with a description of a personal problem that can be solved using the concepts discussed in the chapter. Our objective is to attract the attention of students by starting with a personal example to which they can relate. We demonstrate that OM is not just about operating a plant or a business, but that it is relevant in everything that we do. An end-of-chapter section titled “Within OM: How It All Fits Together” describes how the chapter topic is related to other OM decisions. It emphasizes the point that OM decisions are not made independently of one another, but that they are linked together and are dependent on one another.

Everyone has had experiences of poor quality when dealing with business organizations. These experiences might involve an airline that has lost a passenger's luggage, a dry cleaner that has left clothes wrinkled or stained, poor course offerings and scheduling at your college, a purchased product that is damaged or broken, or a pizza delivery service that is often late or delivers the wrong order. The experience of poor quality is exacerbated when employees of the company either are not empowered to correct quality inadequacies or do not seem willing to do so. We have all encountered service employees who do not seem to care. The consequences of such an attitude are lost customers and opportunities for competitors to take advantage of the market need.

Successful companies understand the powerful impact customer-defined quality can have on business. For this reason, many competitive firms continually increase their quality standards. For example, Ford Motor Company's focus on qual-

Links to Practice

Other OM texts have many boxes and sidebars, which make it difficult for students to understand what they need to know. Furthermore, the many examples frequently interrupt the flow of the text and make a chapter difficult to read and assimilate. We recognize the importance of including "real-world" examples, but believe they should be integrated into the stream of the text instead of interrupting the text. Therefore, we have developed embedded boxes titled "Links to Practice", which provide brief examples from actual companies in every chapter. Embedded by both content and design into the general text discussion, each provides a concise and relevant example without interrupting the flow of the text.

quality problems. Open discussion is promoted, and criticism is not allowed. Although the functioning of quality circles is friendly and casual, it is serious business. Quality circles are not more "ish sessions." Rather, they do important work for the company and have been very successful in many firms.

LINKS TO PRACTICE
THE WALT DISNEY COMPANY
www.disney.com



The importance of exceptional quality is demonstrated by The Walt Disney Company in the operation of its theme parks. The focus of the parks is customer satisfaction. This is accomplished through meticulous attention to every detail, with particular focus on the role of employees in service delivery. Employees are viewed as the most important organizational resource, and great

Current textbooks typically do not use business examples to which students can relate. The typical examples provided are from large corporations such as General Motors, IBM, or Xerox. Primarily using these types of examples creates the impression for students that this is a field that is either beyond their reach or irrelevant to their needs. We have found that students understand the concepts better when these concepts are also presented in a context that is smaller in scale. The examples chosen range from large multinational organizations to small local businesses.

OM across the Organization and Cross-Functional Icons

Unique to this book is an end-of-chapter summary titled "OM across the Organization" that highlights the relationship between OM and key business functions, such as accounting, finance, human resources, information technology, management, marketing, and purchasing. This section is designed to help students understand the close relationship of operations management with other business functions and appreciate the critical impact OM has on other business functions. In addition, a cross-functional icon is used throughout the text to highlight sections in the text where the relationships between OM and other key business functions are discussed.

role or the marketing department is not working closely with customers. TQM requires the close cooperation of different functions in order to be successful. In this section we look at the involvement of these other functions in TQM.

- **Marketing** plays a critical role in the TQM process by providing key inputs that make TQM a success. Recall that the goal of TQM is to satisfy customer needs by producing the exact product that customers want. Marketing's role is to understand the changing needs and wants of customers by working closely with them. This requires a solid identification of target markets and an understanding of whom the product is intended for. Sometimes, apparently small differences in product features can result in large differences in customer appeal. Marketing needs to accurately pass customer information along to operations, and operations needs to include marketing in any planned product changes.
- **Finance** is another major participant in the TQM process because of the great cost consequences of poor quality. General definitions of quality need to be translated into specific dollar terms. This serves as a baseline for monitoring the financial impact of quality efforts and can be a great motivator. Recall the four costs of quality discussed earlier. The first two costs, prevention and appraisal, are preventive costs that are intended to prevent later

Cases

Each chapter ends with four cases that reinforce the issues and topics discussed in the chapter. The first two cases are within the text, while the other two are on-line cases. The cases can provide the basis for group discussion or can be assigned as individual exercises for students. Many cases conclude with a list of questions for students to answer. In addition, each chapter offers a unique interactive learning exercise titled "Internet Challenge" where students are provided with a short case and given specific Internet assignments.

Interactive Cases

There are two Web-based cases for this edition. The first case features an Internet site for a simulated cruise company that has hired a student intern to help solve operations problems. The second case features an Internet site for a simulated consulting company that works in the medical industry that has hired a student to help solve operations problems. In both cases, the students are given assignments that require them to use information provided at the book Web site to develop solutions. These exercises offer students hands-on experience in the areas of supply chain management, statistical quality control, forecasting, just-in-time, aggregate planning, inventory management, scheduling, and project management, and help tie all the topics in the book together in a service environment.

Interactive Case: Virtual Company www.wiley.com/college/heid

On-line Case: Cruise International, Inc.

Assignment: *First Quality Management (TQM) at Cruising International, Inc.* For this assignment, you will work again with Meghan Willoughby, Chief Purser aboard the *Princess Pearl*. You know the assignment has something to do with quality, but you aren't quite sure what. You meet Meghan aboard the ship. She greets you and says, "Let me tell you a bit about what you'll be doing for us. We've been working on quality measures for several years, and now must focus on quality even more as our industry becomes more competitive. We need to make sure that our guests receive quality service from beginning to end. We need your help in bringing ideas together on how to measure quality in a service organization." This assignment will enhance your knowledge of the material in Chapter 5 of your textbook while preparing you for your future assignments.

To access the Web site:

- Go to www.wiley.com/college/heid
- Click Student Companion Site
- Click Virtual Company/Cruise International, Inc.
- Click Consulting Assignments
- Click Service Package and Processes at CHI

Pedagogy to Help Students Master the Course

Learning Objectives

At the beginning of each chapter, students are provided with a short statement of what they need to either know or review from previous chapters, referring students to specific topic information. This enables students to review previous material necessary to understand the topic being covered.

Learning Objectives

After studying this chapter you should be able to:

- 1 Explain the meaning of total quality management (TQM).

Before You Go On

Sections strategically placed within every chapter summarize key material the student should know before continuing. Often the material in chapters can be overwhelming. We felt that breaking up the chapter with a brief summary of key material is highly beneficial in aiding learning and comprehension.

BEFORE YOU GO ON

Today's concept of quality, called total quality management (TQM), focuses on building quality into the process, as opposed to simply inspecting for poor quality after production. TQM is customer driven and encompasses the entire company. Before you go on, you should know the four categories of quality costs. These are prevention and appraisal costs, which are costs that are incurred to prevent poor quality, and internal and external failure costs, which are costs that the company hopes to prevent. You should understand the evolution of TQM and the notable individuals who have shaped our knowledge of quality. Last, you should know the seven concepts of the TQM philosophy: customer focus, continuous improvement, employee empowerment, use of quality tools, product design, process management, and managing supplier quality.

Key Terms and Definitions

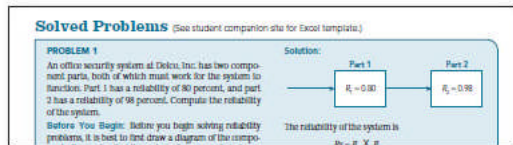
Key terms and concepts are highlighted in boldface when they are first explained in the text, are defined in the margin next to their discussion in the text, and are listed at the end of the chapter with page references.

Before You Begin

Most example problems within the chapters, and end-of-chapter solved problems, have a feature called “Before You Begin”. The feature provides students with problem-solving tips and hints they need to consider before solving the problem. The purpose is to help students with their problem-solving ability.

Solved Problems

Numerous solved problems are provided, complete with step-by-step explanations to ensure students understand the process and why the problem is solved in a particular way. Where appropriate, we provide a series of steps for problem solving and offer problem-solving tips.



Teaching and Learning Resources

Our supporting material has been designed to make learning OM easier for students and teaching OM easier for faculty.

Book Companion Site www.wiley.com/college/reid

An extensive Web site has been developed in support of *Operations Management*. The site is available at www.wiley.com/college/reid, and offers a range of information for instructors and students.

For Instructors

- **Instructor's Manual:** Includes a suggested course outline, teaching tips and strategies, war stories, answers to all end-of-chapter material, brief description of the additional resources referenced in the Interactive Learning box, additional in-class exercises, and tips on integrating the theory of constraints.
- **Solutions Manual:** A complete set of detailed solutions is provided for all problems.
- **Virtual Company Cases Instructor's Materials:** Include accompanying Instructor's Manual with answers to exercises and Excel solutions.
- **Test Bank:** A comprehensive Test Bank comprised of approximately 1700 questions that consist of multiple choice, true-false, essay questions, and open-ended problems for each chapter. The Test Bank is also available in a computerized version that allows instructors to customize their exams.
- **PowerPoint Lecture Slides:** PowerPoint Slides are available for use in class. Full-color slides highlight key figures from the text as well as many additional lecture outlines, concepts, and diagrams. Together, these provide a versatile opportunity to add high-quality visual support to lectures.
- **Operations Management Video Series:** The video package, including Wiley's own Student OM Videos, offers video selections that tie directly to the theme of operations management and bring to life many of the examples used in the text. Videos can be viewed within *WileyPLUS Learning Space*.

For Students

- **Supplemental Chapters:** The supplement chapters include Supplement A: Spreadsheet Modeling: An Introduction; Supplement B: Introduction to Optimization; Supplement C: Waiting Line Models; Supplement 4: Master Scheduling and Rough-Cut Capacity Planning.
- **Excel Spreadsheets:** Templates are provided so that students can model and solve problems presented in the textbook. A spreadsheet icon appears next to those examples and problems in the textbook that have an accompanying Excel template available on the student Web site. Step-by-step directions are provided. Directions prompt students as they work through each spreadsheet. Expected outcomes and questions are also given.

WileyPLUS Learning Space

What is *WileyPLUS Learning Space*? It is a place where students can learn, collaborate, and grow. Through a personalized experience, students create their own study guide while they interact with course content and work on learning activities.

WileyPLUS Learning Space combines adaptive learning functionality with a dynamic new e-textbook for your course—giving you tools to quickly organize learning activities, manage student collaboration, and customize your course so that you have full control over content as well as the amount of interactivity between students.

You can:

- Assign activities and add your own materials
- Guide students through what is important in the e-textbook by easily assigning specific content
- Set up and monitor collaborative learning groups
- Assess student engagement
- Benefit from a sophisticated set of reporting and diagnostic tools that give greater insight into class activity

Learn more at www.wileypluslearningspace.com. If you have questions, please contact your Wiley representative.

Acknowledgments

Operations Management Sixth Edition, benefits from insights provided by a dedicated group of operations management educators from around the globe who carefully read and critiqued draft chapters of this and previous editions. We are pleased to express our appreciation to the following colleagues for their contributions

Charles Foley, *Columbus State Community College*; Nicholas C. Georgantzias, *Fordham University Business Schools*; Gregory A. Graman, *Michigan Technological University*; Roger Dean Iles, *The University of Memphis*; Tony R. Johns, *Clarion University of Pennsylvania*; Anita Lee-Post, *University of Kentucky*; Douglas Schneiderheinze, *Lewis and Clark Community College*.

Yossi Aviv, *Washington University in St. Louis*; Kevin Caskey, *SUNY New Paltz*; Scott T. Crino, *United States Military Academy*; Phillip C. Fry, *Boise State University*; Thomas F. Gattiker, *Boise State University*; Christian Grandzol, *Bloomsburg University*; Samuel Hazen, *Tarleton State University*; James He, *Fairfield University*; John Jensen, *University of Southern Maine*; Mark Kesh, *University of Texas at El Paso*; Anita Lee-Post, *University of Kentucky*; Winston T. Lin, *SUNY Buffalo*; Jaideep Motwani, *Grand Valley State University*; Fariborz Y. Partovi, *Drexel University*; Tamara Reid, *Seattle University*; Dmitriy Shaltayev, *Christopher Newport University*; Marilyn Smith, *Winthrop University*; Robert J. Vokurka, *Texas A&M University–Corpus Christi*; Pamaela J. Zebst, *Sam Houston State University*.

Dennis Agboh, *Morgan State University*; Karen Eboch, *Bowling Green State University*; Greg Graman, *Michigan Technological University*; GG Hegde, *University of Pittsburgh*; Seung-Lae Kim, *Drexel University*; John Kros, *East Carolina University*; Anita Lee-Post, *University of Kentucky*; David Little, *High Point University*; Robert Vokurka, *Texas A&M University*; John Wang, *Montclair State University*.

Ajay Aggarwal, *Millsaps College*; Nezh Altay, *University of Richmond*; Suad Alway, *Chicago State University*; Robert Amundsen, *New York Institute of Technology*; Gordon Bagot, *California State University, Los Angeles*; Cliff Barber, *California Polytechnic State University, San Luis Obispo*; Hooshang Beheshti, *Radford University*; Prashanth Bharadwaj, *Indiana University of Pennsylvania*; Joe Biggs, *California Polytechnic State University*; Debra Bishop, *Drake University*; Vincent Calluzzo, *Iona College*; James Campbell, *University of Missouri–St. Louis*; Kevin Caskey, *SUNY New Paltz*; Sohail Chaudhry, *Villanova University*; Chin-Sheng Chen, *Florida International University*; Kathy Dhanda, *University of Portland*; Barb Downey, *University of Missouri–Columbia*; Joe Felan, *University of Arkansas at Little Rock*; Wade Ferguson, *Western Kentucky University*; Teresa Friel, *Butler University*; Daniel Heiser, *DePaul University*; Lewis Hofmann, *The College of New Jersey*; Lisa Houts, *California State University, Fullerton*; Tony Inman, *Louisiana Tech University*; Richard Insinga, *SUNY Oneonta*; Tim Ireland, *Oklahoma State University*; Mehdi Kaighobadi, *Florida Atlantic University*; Hale Kaynak, *The University of Texas–Pan American*; William Coty Keller, *St. Josephs College*; Robert Kenmore, *Keller Graduate School of Management*; Jennifer Kohn, *Montclair State University*; Dennis Krumwiede, *Idaho State University*; Kevin Lewis, *University of Wyoming*; Ardeshir Lohrasbi, *University of Illinois at Springfield*; Chris McDermott, *Rensselaer Polytechnic Institute*; John Miller, *Mercer University*; Ajay Mishra, *SUNY Binghamton*; Ken Murphy, *Florida International University*; Abraham Nahm, *University of Wisconsin–Eau Claire*; Len Nass, *New Jersey City University*; Joao Neves, *The College of New Jersey*; Susan Norman, *Northern Arizona University*; Muhammad Obeidat, *Southern Polytechnic State University*; Barbara Osyk, *The University of Akron*; Taeho Park, *San Jose State University*; Eddy Patuwo, *Kent State University*.

State University; Carl Poch, Northern Illinois University; Leonard Presby, William Paterson University; Will Price, University of the Pacific; Randy Rosenberger, Juniata College; George Schneller, Baruch College-CUNY; LW Schell, Nicholls States University; Kaushik Sengupta, Hofstra University; William Sherrard, San Diego State University; Samia Siha, Kennesaw State University; Susan Slotnick, Cleveland State University; Ramesh Soni, Indiana University of Pennsylvania; Ted Stafford, University of Alabama in Huntsville; Peter Sutanto, Prairie View A&M University; Fataneh Taghaboni-Dutta, University of Michigan-Flint; Nabil Tamimi, University of Scranton; John Visich, Bryant College; Tom Wilder, California State University, Chico; Peter Zhang, Georgia State University; Faye X. Zhu, Rowan University.

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Special Thanks

We would also like to personally thank and acknowledge the work of our supplements authors, who worked diligently to create a variety of support materials for both instructors and students.

We would also like to express our appreciation to Mark Sullivan, AIA, NCARB, of Mark Sullivan Architects, and Susan O'Hara, RN, MPH, of O'Hara HealthCare Consultants, who generously contributed a simulation showing the before and after designs of an ambulatory surgery unit. A working example of the Extend simulation they used to optimize the design of the renovated facility is available on the Web site.

We would like to offer special acknowledgment to the publishing team at Wiley for their creativity, talent, and hard work. Their great personalities and team spirit have made working on the book a pleasure. Special thanks go to Lisé Johnson, Executive Editor; Jennifer Manias, Sponsoring Editor; and Suzie Pfister, Senior Production Editor, for all their efforts. We could not have done it without you.

Other Wiley staff who contributed to the text and media include: Allison Morris, Product Design Manager; Tom Nery, Senior Designer; Billy Ray, Senior Photo Editor; and Amanda Dallas, Market Solutions Assistant.