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教育部高校工商管理类教学指导委员会双语教学推荐教材

工商管理经典教材·核心课系列
BUSINESS ADMINISTRATION CLASSICS

商务统计学

英文版·第6版

戴维·莱文 (David M. Levine)
蒂莫西·克雷比尔 (Timothy C. Krehbiel) 著
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BUSINESS STATISTICS
A FIRST COURSE

..... Sixth Edition



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总 序

随着我国加入 WTO，越来越多的国内企业参与到国际竞争中来，用国际上通用的语言思考、工作、交流的能力也越来越受到重视。这样一种能力也成为我国各类人才参与竞争的一种有效工具。国家教育机构、各类院校以及一些主要的教材出版单位一直在思考，如何顺应这一发展潮流，推动各层次人员通过学习来获取这种能力。双语教学就是这种背景下的一种尝试。

双语教学在我国主要指汉语和国际通用的英语教学。事实上，双语教学在我国教育界已经不是一个陌生的词汇了，以双语教学为主的科研课题也已列入国家“十五”规划的重点课题。但从另一方面来看，双语教学从其诞生的那天起就被包围在人们的赞成与反对声中。如今，依然是有人赞成有人反对，但不论是赞成居多还是反对占上，双语教学的规模 and 影响都在原有的基础上不断扩大，且呈大发展之势。一些率先进行双语教学的院校在实践中积累了经验，不断加以改进；一些待进入者也在模仿中学习，并静待时机成熟时加入这一行列。由于我国长期缺乏讲第二语言（包括英语）的环境，开展双语教学面临特殊的困难，因此，选用合适的教材就成为双语教学成功与否的一个重要问题。我们认为，双语教学从一开始就应该使用原版的各类学科的教材，而不是由本土教师自编的教材，从而可以避免中国式英语问题，保证语言的原汁原味。各院校除应执行国家颁布的教学大纲和课程标准外，还应根据双语教学的特点和需要，适当调整教学课时的设置，合理选择优秀的、合适的双语教材。

顺应这样一种大的教育发展趋势，中国人民大学出版社同众多国际知名的大出版公司，如麦格劳-希尔出版公司、培生教育出版公司等合作，面向大学本科生层次，遴选了一批国外最优秀的管理类原版教材，涉及专业基础课，人力资源管理、市场营销及国际化管理等专业方向课，并广泛听取有着丰富的双语一线教学经验的教师的建议和意见，对原版教材进行了适当的改编，删减了一些不适合我国国情和不适合教学的内容；另一方面，根据教育部对双语教学教材篇幅合理、定价低的要求，我们更是努力区别于目前市场上形形色色的各类英文版、英文影印版的大部头，将目标受众锁定在大学本科生层次。本套教材尤其突出了以下一些特点：

- 保持英文原版教材的特色。本套双语教材根据国内教学实际需要，对原书进行了一定的改编，主要是删减了一些不适合教学以及不符合我国国情的内容，但在体系结构和内容特色方面都保持了原版教材的风貌。专家们的认真改编和审定，使本套教材既保持了学术上的完整性，又贴近中国实际；既方便教师教学，又方便学生理解和掌握。

● 突出管理类专业教材的实用性。本套教材既强调学术的基础性，又兼顾应用的广泛性；既侧重让学生掌握基本的理论知识、专业术语和专业表达方式，又考虑到教材和管理实践的紧密结合，有助于学生形成专业的思维能力，培养实际的管理技能。

● 体系经过精心组织。本套教材在体系架构上充分考虑到当前我国在本科教育阶段推广双语教学的进度安排，首先针对那些课程内容国际化程度较高的学科进行双语教材开发，在其专业模块内精心选择各专业教材。这种安排既有利于我国教师摸索双语教学的经验，使得双语教学贴近现实教学的需要；也有利于我们收集关于双语教学教材的建议，更好地推出后续的双语教材及教辅材料。

● 篇幅合理，价格相对较低。为适应国内双语教学内容和课时上的实际需要，本套教材进行了一定的删减和改编，使总体篇幅更为合理；而采取低定价，则充分考虑到了学生实际的购买能力，从而使本套教材得以真正走近广大读者。

● 提供强大的教学支持。依托国际大出版公司的力量，本套教材为教师提供了配套的教辅材料，如教师手册、PowerPoint讲义、试题库等，并配有内容极为丰富的网络资源，从而使教学更为便利。

本套教材是在双语教学教材出版方面的一种尝试。我们在选书、改编及出版的过程中得到了国内许多高校的专家、教师的支持和指导，在此深表谢意。同时，为使我们后续推出的教材更适于教学，我们也真诚地期待广大读者提出宝贵的意见和建议。需要说明的是，尽管我们在改编的过程中已加以注意，但由于各教材的作者所处的政治、经济和文化背景不同，书中内容仍可能有不妥之处，望读者在阅读时注意比较和甄别。

徐二明

中国人民大学商学院

Preface

Educational Philosophy

Seeking ways to continuously improve the teaching of business statistics is the core value that guides our works. We actively participate in Decision Sciences Institute (DSI), American Statistical Association (ASA), and Making Statistics More Effective in Schools and Business (MSMESB) conferences. We use the Guidelines for Assessment and Instruction (GAISE) reports as well as our reflections on teaching business statistics to a diverse student body at several large universities. These experiences have helped us identify the following key principles:

- 1. Show students the relevance of statistics** Students need a frame of reference when learning statistics, especially when statistics is not their major. That frame of reference for business students should be the functional areas of business, such as accounting, finance, information systems, management, and marketing. Each statistics topic needs to be presented in an applied context related to at least one of these functional areas. The focus in teaching each topic should be on its application in business, the interpretation of results, the evaluation of the assumptions, and the discussion of what should be done if the assumptions are violated.
- 2. Familiarize students with the statistical applications used in the business world** Integrating these programs into all aspects of an introductory statistics course allows the course to focus on interpretation of results instead of computations. Introductory business statistics courses should recognize that programs with statistical functions are commonly found on a business decision maker's desktop computer, therefore making the *interpretation* of results more important than the tedious hand calculations required to produce them.
- 3. Provide clear instructions to students for using statistical applications** Books should explain clearly how to use programs such as Excel and Minitab with the study of statistics, without having those instructions dominate the book or distract from the learning of statistical concepts.
- 4. Give students ample practice in understanding how to apply statistics to business** Both classroom examples and homework exercises should involve actual or realistic data as much as possible. Students should work with data sets, both small and large, and be encouraged to look beyond the statistical analysis of data to the interpretation of results in a managerial context.

New to This Edition: Enhanced Statistical Coverage

This 6th edition of *Business Statistics: A First Course* builds on previous editions with these new and enhanced features:

- The use of the DCOVA (**D**efine, **C**ollect, **O**rganize, **V**isualize, and **A**nalyze) framework as an integrated approach for applying statistics to help solve business problems.
- Many new applied examples and exercises, with data from *The Wall Street Journal*, *USA Today*, and other sources.
- “Managing Ashland MultiComm Services,” a new integrated case that appears at the ends of chapters throughout the book (replacing the *Springville Herald* case).
- “Digital Cases,” interactive PDF files that create a new series of cases that appear at the ends of chapters throughout the book (replacing the Web Cases).
- An expanded discussion of using Excel and Minitab to summarize and explore multidimensional data.
- Revised and updated “Think About This” essays (formerly entitled “From the Author’s Desktop”) that provide greater insight into what has just been learned and raise important issues about the application of statistical knowledge.
- Additional in-chapter Excel and Minitab results.

New to This Edition: Expanded Excel and Minitab Guides

In this 6th edition of *Business Statistics: A First Course*, the instructions for using Excel and Minitab have been revised, reorganized, and enhanced in new end-of-chapter guides and back-of-the-book appendices. These sections support students by:

- Providing a readiness checklist and orientation that guide students through the process of getting ready to use Excel or Minitab (see Chapter 1 and the Chapter 1 Excel and Minitab Guides).
- Incorporating Excel Guide workbooks that serve as models and templates for using Excel for statistical problem solving. These free and reusable workbooks, annotated examples of which appear throughout the chapters of this book, can be used by students in their other courses or in their jobs.
- Allowing students to use Excel with or without PHStat2 and with or without the Analysis ToolPak (an Excel component that is not available in Mac Excel 2008).
- Expanding the scope of Minitab Guide instructions.
- Reviewing common operations, such as opening, saving, and printing results (see Chapter 1 Excel and Minitab Guides).
- Explaining the different types of files available online that support this book and how to download those files (Appendix C *).
- Providing a separate appendix that discusses software configuration issues, including how to check for Excel and Minitab updates and how to configure Excel for use with PHStat2 or the Analysis ToolPak (Appendix D).
- An appendix that discusses formatting and other intermediate-level Excel operations (Appendix F).
- Answering frequently asked questions about Excel, PHStat2, the Pearson statistical add-in for Microsoft Windows-based Excel versions, and Minitab (the new Appendix G).
- In Appendix Section C.4, offering a complete list of all downloadable files for this book. (See “Student Resources” for more details about the files and programs that can be downloaded.)

Chapter-by-Chapter Changes in the 6th Edition

The 6th edition features Excel and Minitab Guides at the end of each chapter that replace the software appendices of the previous edition. Organized by in-chapter subsections for easy cross-reference, these new guides contain an expanded discussion of how to apply Excel and Minitab to the statistical methods discussed in a chapter. The Excel Guides present instructions for using Excel without employing an add-in (*In-Depth Excel*); instructions for using PHStat2, the add-in that allows students to focus on the results that Excel creates; and, when appropriate, instructions for using the Analysis ToolPak, the Microsoft Office add-in that is included in most versions of Excel. The Minitab Guides have been greatly expanded to better match the scope of the material covered by the Excel Guides.

The 6th edition also contains a number of other global changes. End-of-chapter Digital Cases that use interactive PDF documents update and replace the Web Cases. A new integrated case, “Managing Ashland MultiComm Services,” replaces the “Managing the *Springville Herald*” case in Chapters 2, 3, 5, 6, 7, and 9 through 13. End-of-chapter summaries and roadmaps have been enhanced in selected chapters. And Appendices B through D and F and G have been revised and reorganized to provide enhanced help for students seeking answers to questions about using the software and online resources for this book. Highlights of the changes to the individual chapters are as follows:

Chapter 1 Sections 1.1 and 1.2 have been rewritten to focus on the increasing role of statistics in business. The 5th edition’s Section 1.5 has been moved to Chapter 2. Section 1.4 has been rewritten and retitled “How to Use This Book” and now includes the “Checklist for Getting Started” (with Excel or Minitab). There are new undergraduate and graduate surveys.

Chapter 2 This chapter has been completely reorganized. Section 1.5 of the previous edition, “Data Collection,” has been moved to this chapter. This chapter opens by introducing the **DCOVA** approach (for **Define, Collect, Organize, Visualize, and Analyze**) for solving business problems. The material on tables and charts has been reorganized so that the sections on organizing data into tables is presented first, in Sections 2.2 and 2.3, followed by sections on visualizing data in graphs in Sections 2.4–2.7. There is a new section on organizing multidimensional data (Section 2.7) and new Excel and

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Minitab Guide sections that discuss multidimensional data. There are also new examples throughout the chapter, and the chapter uses a new data set that contains a sample of 184 bond mutual funds.

Chapter 3 The section “Numerical Measures for a Population” has been moved after the section on quartiles and boxplots. For many examples, this chapter uses the new bond mutual funds data set that is introduced in Chapter 1.

Chapter 4 The chapter example has been updated. There are new problems throughout the chapter. The “Think About This” essay about Bayes’ theorem has been condensed and updated. Counting rules have been added. In combinations and permutations, x is used instead of X to be consistent with binomial notation in Chapter 5.

Chapter 5 This chapter has revised notation for the binomial and Poisson distributions. It uses lower-case x and includes the parameter after an $|$ sign in the equation. To reduce the size of the book, the tables of the binomial and Poisson distributions (Tables E.6 and E.7) have been placed online. There are new problems throughout the chapter.

Chapter 6 This chapter has an updated Using Statistics scenario. The “Think About This” essay on the importance of the normal distribution has been revised.

Chapter 7 A new “Think About This” essay replaces and expands on the pros and cons of web-based surveys, using a famous historical example.

Chapter 8 This chapter includes problems on sigma known in Section 8.1.

Chapter 9 This chapter includes problems on sigma known in Section 9.1.

Chapter 10 This chapter has a new example on the paired t -test on textbook prices.

Chapter 11 This chapter has new problems throughout the chapter.

Chapter 12 The chapter now includes the section “Measuring Autocorrelation: The Durbin-Watson Statistic.” The “Think About This” essay has been revised. There are new problems throughout the chapter.

Chapter 13 This chapter has various new problems.

Chapter 14 This chapter has been edited for conciseness without any loss of concepts or clarity. This chapter has been published as an online topic that is available for download from this book’s download page.*

Hallmark Features

We have continued many of the traditions of past editions and have highlighted some of these features below.

Using Statistics Business Scenarios—Each chapter begins with a Using Statistics example that shows how statistics is used in the functional areas of business—accounting, finance, information systems, management, and marketing. Each scenario is used throughout the chapter to provide an applied context for the concepts. The chapter concludes with a Using Statistics Revisited section that reinforces the statistical methods and applications discussed in each chapter.

Emphasis on Data Analysis and Interpretation of Software Results—We believe that the use of computer software is an integral part of learning statistics. Our focus emphasizes analyzing data by interpreting results while reducing emphasis on doing computations. For example, in the coverage of tables and charts in Chapter 2, the focus is on the interpretation of various charts and on when to use each chart. In our coverage of hypothesis testing in Chapters 9 through 11, and regression and multiple regression in Chapters 12 and 13, extensive computer results have been included so that the p -value approach can be emphasized.

Pedagogical Aids—An active writing style is used, with boxed numbered equations, set-off examples to provide reinforcement for learning concepts, problems divided into “Learning the Basics” and “Applying the Concepts,” key equations, and key terms.

Answers—Many answers to the even-numbered exercises are included at the end of the book.

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Flexibility Using Excel—For almost every statistical method discussed, this book presents more than one way of using Excel. Students can use *In-Depth Excel* instructions to directly work with worksheet solution details *or* they can use either the *PHStat2* instructions *or* the *Analysis ToolPak* instructions to automate the creation of those worksheet solutions.

Digital Cases—Digital Cases appear at the end of all chapters except Chapters 5 and 14. Most Digital Cases extend a Using Statistics business scenario by posing additional questions and raising issues about the scenario. Students examine interactive documents to sift through claims and assorted information in order to discover the data most relevant to a scenario. Students then determine whether the conclusions and claims are supported by the data. In doing so, students discover and learn how to identify common misuses of statistical information. (Instructional tips for using the Digital Cases and solutions to the Digital Cases are included in the Instructor's Solutions Manual.)

Case Studies and Team Projects—Detailed case studies are included in numerous chapters. A “Managing Ashland MultiComm Services” continuing case, a team project related to bond funds, and undergraduate and graduate student surveys are included at the end of most chapters, and these serve to integrate learning across the chapters.

Visual Explorations—The Excel add-in workbook allows students to interactively explore important statistical concepts in descriptive statistics, the normal distribution, sampling distributions, and regression analysis. For example, in descriptive statistics, students observe the effect of changes in the data on the mean, median, quartiles, and standard deviation. With the normal distribution, students see the effect of changes in the mean and standard deviation on the areas under the normal curve. In sampling distributions, students use simulation to explore the effect of sample size on a sampling distribution. In regression analysis, students have the opportunity to fit a line and observe how changes in the slope and intercept affect the goodness of fit.

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Business Statistics

A First Course

SIXTH EDITION

1

Introduction

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- 1.1 Reading, Writing, and Statistics?**
- 1.2 Statistics: Fundamental for Business**
How Statistics Has Become So Important
- 1.3 Data and Variables**
Types of Variables
- 1.4 Basic Vocabulary of Statistics**
- 1.5 Statistical Applications for Desktop Computing**
- 1.6 How to Use This Book**
Checklist for Getting Started

USING STATISTICS @ GT&M Holdings Revisited

CHAPTER 1 EXCEL GUIDE

- EG1.1 Getting Started with Excel**
- EG1.2 Entering Data and Variable Type**
- EG1.3 Opening and Saving Workbooks**
- EG1.4 Creating and Copying Worksheets**
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- EG1.9 Using Appendices D and F**

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- MG1.5 Printing Parts of a Project**
- MG1.6 Worksheet Entries and References**
- MG1.7 Using Appendices D and F**

Learning Objectives

In this chapter, you learn:

- What statistics is
- How statistics is fundamental to business
- The basic concepts and vocabulary of statistics
- How to use Microsoft Excel and/or Minitab with this book

