

■ PETER T. ITTIG, Feature Editor, College of Management, University of Massachusetts, Boston

Business schools have gradually adjusted their courses to accommodate the widespread availability of electronic spreadsheets. Some business schools have introduced an undergraduate core course on Excel applications, sometimes replacing a second semester of statistics. The use of the Excel spreadsheet in such a course offers unique opportunities and the potential to teach quantitative topics and optimization without the use of algebra. In the following guest article, David Heimann reviews three books that might be used as the text for such a course.

Quantitative Decision Modeling and Analysis Using Spreadsheets

by David I. Heimann, University of Massachusetts, Boston

Many tools and methodologies have developed over time for effective analysis in decision modeling and analysis. In recent years, a new approach has advanced: using spreadsheets as a foundation on which tools and analyses operate. From their origin nearly 20 years ago, spreadsheets have evolved into a powerful and pervasive software element. In response to this occurrence, researchers and developers have produced spreadsheet-based decision modeling and analysis tools.

For teaching decision modeling and analysis, the proliferation of spreadsheet-based analyses and tools can provide a more effective learning experience to a broader set of students, but with accompanying problems. On the positive side, all undergraduate students can learn material that once was restricted to upper-level and graduate students (for example, one does not have to understand the details of the Simplex Method to carry out linear programming). On the other hand, without knowing the details “under the cover of the machine,” how do students become aware of the nuances and traps such material contain, and how do they learn how to carry out effective analyses without knowing the underlying algorithms? This is the challenge faced by textbooks addressing the use of spreadsheets and spreadsheet-based tools to carry out decision modeling and analysis. We review three such textbooks: *Spreadsheet Modeling and Decision Analysis* (3rd ed.), by Cliff T. Ragsdale (Ragsdale); *Quantitative Business Modeling*, by Jack Meredith, Scott Shafer, and Efraim

Turban (Meredith); and *Applied Management Science: Modeling, Spreadsheet Analysis, and Communication for Decision Making* (2nd ed.), by John A. Lawrence, Jr. and Barry A. Pasternak (Lawrence).

All three textbooks cover similar ground, have similar basic features, emphasize a practical approach, and contain many realistic examples and exercises. Specifically, they include:

- Coverage of the four major topics of decision modeling and analysis: optimization, decision analysis, forecasting, and simulation, as well as other areas such as statistics, queuing theory, and project scheduling.
- Use of Excel spreadsheets for problem solving and modeling, both directly and with spreadsheet-based tools. The chapters contain many spreadsheet-based examples to demonstrate such use.
- Exercises for each chapter as well as case studies.
- CDs included with the text, containing slide presentations for each chapter, simulation and other add-in tools, and at times additional material and chapters. Instructor CDs include problem answers, soft copies of example spreadsheets, test banks, and supplementary materials.
- Web sites to support the text. The sites, usually one for students and one for instructors, contain similar material to the student and instructor CDs, respectively, as well as additional information and links to other Web-based material.

A personal note: The reviewer has taught courses using Ragsdale and is currently



David Heimann

is a professor in the Management Science and Information Systems Department of the College of Management at the University of Massachusetts Boston. His PhD is in computer science from Purdue

University. He has held positions in the U.S. Department of Transportation, Digital Equipment Corp., Fidelity Investments, MITRE Corp., and Converse, performing activities in reliability and availability modeling, simulation, database management systems, probabilistic modeling, software reliability and complexity analysis, and software process improvement. His publications have included several papers in the “Proceedings of the Annual Reliability and Maintainability Symposium” and a book-length article on system availability in “Advances in Computers.” In 1984 he received the Pyke Johnson Award for a paper of outstanding merit from the Transportation Research Board.

david.heimann@umb.edu

Peter T. Ittig, Feature Editor

College of Management
University of Massachusetts
Boston, MA 02125-3393
voice-mail: 617-287-7886
peter.ittig@umb.edu
http://www.faculty.umb.edu/peter_ittig/

teaching a course using Meredith. He is considering using Lawrence for a future course.

Spreadsheet Modeling and Decision Analysis (3rd ed.)

by **Cliff T. Ragsdale**

South-Western College Publishing

2001, 794 pages

<http://www.swcollege.com/Ragsdale>



RAGSDALE HAS 15 CHAPTERS covering optimization, regression analysis, simulation, queuing theory, project management scheduling, and decision analysis. The textbook has a heavy emphasis on optimi-

zation, with seven chapters addressing the topic.

Ragsdale has a very good mathematical depth in its presentation. It discusses the details of the various methodologies and provides descriptions not found in the other texts on various nuances and pitfalls (for example, degeneracy in optimization problems). In addition, it provides details on implementing the various methodologies in Excel, showing specific formulas and data for each cell in the spreadsheet in its examples. The chapters and slides are well organized; one can follow their sequence and provide a presentation that students can follow and understand.

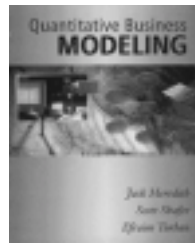
One can cover most of Ragsdale in a one-semester course (including most of the optimization chapters, forecasting, simulation, decision analysis, and queuing theory). As a two-semester course, most of Ragsdale would be covered in the first semester, with completion somewhere during the second semester. The remainder of the second semester would contain a class project, Web-based research into current practices in the field, or advanced topics from texts or journal articles.

Quantitative Business Modeling

by **Jack Meredith, Scott Shafer, & Efraim Turban**

South-Western College, 2002, 454 pages

Meredith has eight chapters covering data collection and analysis, regression and forecasting, optimization, decision analysis,



queuing theory, simulation, and project management scheduling. In the introduction, it presents a five-step modeling process as well as the influence diagrams, both of

which are used extensively throughout the rest of the book. The data collection and analysis chapter discusses basic statistics, which the other two books assume as prerequisites. The coverage of forecasting (other than regression) is very brief—just one section of one chapter.

Meredith appears to be aimed at a lower level audience than are the other two texts. It has a lesser breadth; it covers optimization in only one chapter and forecasting in only nine pages. It also devotes a full chapter early on to areas in basic probability and statistics.

The chapters are not as well organized in Meredith as in Ragsdale and Lawrence. The reviewer frequently found it necessary to skip chapter sections and return to them later. In addition, the slides required significant editing and rearranging for understandable course presentation. A number of students in the course that used Meredith obtained copies of Ragsdale on their own initiative and reported it helped them significantly.

With a bit of a time squeeze, one can present Meredith in a one-semester course. If one does not present the data collection and analysis chapter, assuming it as a prerequisite, and the project management scheduling chapter, it can be done without the time squeeze.

Applied Management Science: Modeling, Spreadsheet Analysis, and Communication for Decision Making (2nd ed.)

by **John A. Lawrence, Jr. & Barry A. Pasternak**

Wiley, 2002, 649 pages, plus 3 chapters on CD
<http://www.wiley.com/>

Lawrence has in its physical text 10 chapters covering optimization, project management scheduling, decision analysis, inventory models (which the other two books omit), queuing models, and simulation. In addition, it has three chapters on the included CD: quality management models (an important area not often con-



sidered in decision-science courses), Markov models, and nonlinear/goal/dynamic programming. The idea of including additional chapters on the CD is a good one. It allows the text to cover a lot more

ground without increasing the physical size and weight of the book itself, while allowing an instructor to focus on the physical-text chapters if desired.

Lawrence offers a level of depth greater than either of the other two books. For optimization, it presents the Simplex method, the fundamental algorithm for linear programming, as well as other algorithms for network and integer programming. It also presents algorithms for inventory models as well as detailed simulation models and algorithms and their underlying probabilistic foundations.

One can cover Lawrence in a one-semester course by including only the 10 chapters in the physical text (leaving the rest as optional activities for industrious students). For a two-semester course, one can also use Lawrence by covering all 13 chapters including those on the CD, as well as presenting some of the underlying models and algorithms contained in the CD supplements. Completion of the text would be sometime in the second semester. The remainder of the semester would cover a class project, Web-based research into current practices in the field, or advanced topics from texts or journal articles.

Summary

To summarize the three textbooks, Lawrence is strong as a text that provides an organized core that can be effectively presented to students, yet provides a broad and deep range of material allowing industrious or two-semester students to go well beyond that basic core. Ragsdale is strong as a text that provides an organized core that can be presented effectively to students, along with precise details to the students on implementing the material in Excel. Meredith allows the entire textbook to be presented as a one-semester course, though the instructor will need to reorganize some of the chapters and slide sets. Subject to the caveat that he has not yet used Lawrence, the reviewer prefers Lawrence, Ragsdale, and Meredith in that order. ■