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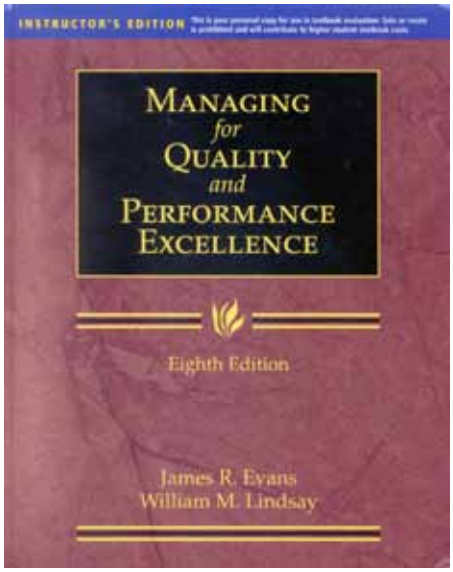
Book Review: *Managing for Quality and Performance Excellence*

by Amit Mitra, Auburn University

Managing for Quality and Performance Excellence (8th ed.), by James Evans and William Lindsay, is a proven and time-tested book aimed at the qualitative aspects of quality management. It uses a systematic approach throughout the text, and some unifying and pedagogical themes, which assist in the assimilation of the material, and is presented in a methodical and logical sequence. The authors are to be commended for taking a disciplined approach in presenting the material. Introductions to each chapter are typically presented using real-world scenarios. Without getting into technicalities, these themes provide the motivation to the student for the material that is to follow in the corresponding chapter. They demonstrate the need for mastery of the particular concepts/techniques addressed in the chapter, and broaden the student's mind to seek applications in non-traditional settings. This is not to say that the techniques should not be used in the 'normal' context in which they have currently been applied. Rather they infuse the student with ideas about how to grapple with problems from a systems perspective.

Each chapter begins with a "Quality Profile," a description of best practices of organizations that are leading the effort on quality. These have typically been selected from previous winners of the Malcolm Baldrige National Quality Award and thus lend credibility to the practice of quality management. Students emerge from reading each chapter with a feel for 'where to' and 'how to' apply the concepts, tools, and techniques. From an undergraduate student's perspective, this is quite beneficial. Chapters typically also have examples of "Quality in Practice," examples of published studies demonstrating, as before, applications of quality management principles. These are usually found at the end of the chapter and reinforce the usefulness and validity of the chapter contents. In addition to the above illustrations of applications in practice, there are usually also two or three case studies at the end of each chapter. These represent excellent examples of concept validation as they probe the student's understanding and their ability to seek out meaningful information from the available facts and figures. As is well known, problems in practice are often not well defined. The



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challenge for the student is to define the problem in a manner so that it can be addressed, define strategies for handling the problem, develop possible solutions, and test action plans. Hence, the question of measurement and verification of quality improvement, in the context of a defined metric(s), is important. The book provides a foundation for taking such a systematic approach.

Another integrating theme found in the text is the discussion on comparing and contrasting the application of Malcolm Baldrige National Quality Award criteria, ISO 9000, and the Six Sigma quality methodology. While all three focus on quality improvement, the approaches are not necessarily the same. The authors provide discussion of the situations under which each could be relevant. It is also refreshing to see applications from not only the traditional manufacturing field, but also numerous examples from the service industry, health care, education, and small business. This is a desirable feature of the text. An aggregation of the various citations of businesses and organizations used in the text is found in a summary listing. This assists the student in identifying, at a glance, the depth of the variety of organizations cited. To aid the student outside the classroom, additional materials for study/consultation are available through a website. Let me now discuss some chapter-related specifics.

Chapter 1, an introductory chapter, provides definitional terms, a discussion of the manner in which quality influences competitiveness, and some achievements of Baldrige winners. The Quality Profile that discusses "Quality Profiles in Modern China" is a relevant addition from past editions of the book. A good feature of Chapter 2, which is organized around the theme of total quality in organizations, is the material on quality in services, health care, education (including higher education), and small business. With a large segment of the economy focused in the above sectors, the application of quality management principles must extend from the traditional grassroots of manufacturing to these sectors. Moreover, the importance of healthcare cannot be overstressed. There are numerous areas where quality can be designed into and used in the processes that are encountered in that sector. Chapter 3 concludes Part I of the text that provides an overview of the systems approach to quality with a discussion of the various quality philosophies, including Deming's 14 points for management.

Part II comprises the next six chapters (Chapters 4-9) and represents the backbone of the text. In following a structured approach that starts with planning and extends to defining customer needs, it adequately exposes the reader to create an effective and efficient workforce and processes to meet such needs, identify performance measures to monitor achievement, and sustain such accomplishments. In an applied course on quality management, these chapters should be covered, possibly with cases and or exercises that force the students to apply the corresponding concepts. One approach to use might be to have students identify organizations/companies and critique their quality management practices. Chapter 4 has a good discussion of the Baldrige criteria and its applications as referred to by previous winners. I would personally have preferred to see additional details of the "Seven Management and Planning Tools" in the chapter. While the "Bonus Materials" available via the website may very well provide these details, inclusion in the text would make the book more complete. Since Chapter 5 focuses on customers and how to determine their prioritized needs, it would have been preferable to include exposure to the "House of Quality" in this chapter. This concept is however discussed in a later chapter (Chapter 12).

The material on design of surveys in Chapter 5 is quite relevant. I also enjoyed the material on designing high performance work systems in Chapter 6, and the various references provided as supporting material via the website. Since the majority of the tasks in an organization are performed by teams, the treatment of the roles and responsibilities of team members in this chapter is also appropriate. The topics of process management and improvement are covered in Chapter 7. In this context, it would have been preferable to include some discussion of the basic "Seven Quality Tools" that are discussed later (Chapter 11). The flow chart in particular and perhaps the process map would be relevant in this chapter (there are some examples of this in the chapter, hence formally introducing these tools might do better justice to the examples). A good discussion of the PDCA cycle is found in the chapter. Since most processes involve the completion of certain tasks in predetermined sequences and are subject to constraints, a segment on project management that includes PERT (Program Evaluation and Review Technique) and CPM (Critical Path Method) should perhaps be considered for inclusion.

The topics of performance and information measurement are covered in Chapter 8. In the discussion of performance appraisal of human resources, it would have been helpful to have included a discussion of the notion of measures from the 'same system' and those from a 'different system.' This follows the logic advocated by Deming whereby variation in performance measures can be attributable to either common causes or special causes. While individuals themselves may not be empowered to make changes to the system, variation due to common causes may be considered part of the 'same system.' Hence even though numerical values may be assigned to the performance rating of different individuals, they could be from the same system thereby negating perceived performance differences between the individuals. On the contrary, for performance ratings that are outside the system, possibly due to 'special causes,' there are likely distinct differences between individuals. Since Chapter 8 also contains material on how to analyze performance data, this would be an appropriate place to introduce some of the basic tools (i.e., Pareto Chart, histograms, etc.) that are discussed in a later chapter. In the treatment of quality costs, it would have been useful to include a discussion of 'hidden quality costs,' for example, the cost of management and engineering time associated

with identifying the cause of failures and determining remedial actions. A good treatise on the various theories of leadership can be found in Chapter 9. The chapter also includes references to various organizations through the "Quality Spotlight" supplementary material available via the web. The diversity of organizations included in the supplementary material, such as those in the fields of healthcare, finance, manufacturing, and education is welcome.

Part III deals with Six Sigma and the technical system and is contained in Chapters 10–13. Statistical foundations and methodology are introduced in this section. The discussion of probability distributions in Chapter 10 refers the reader to the "Bonus Materials" on the companion website. However, given the importance of the normal distribution in quality control, it would have been helpful to have included, at least minimally, discussion of the normal distribution within the chapter itself, particularly since there are examples in the chapter that use the standard normal distribution. It would also be helpful to include a table of t-distribution values in the Appendix since an example in the chapter uses the t-distribution. It should be noted that in Figure 10.14 (Illustration of the Central Limit Theorem), the labels "Actual Distribution" should be replaced with "Sampling Distribution of the Sample Mean." Since the authors included a discussion on hypothesis testing, it would also be appropriate to introduce the concept of the probability value (p-value). If students are going to use a statistical software to conduct hypothesis testing, such software usually reports the p-value. Since confidence intervals are also included in the discussion, the equivalency of confidence intervals and hypothesis testing also merits some discussion. The chapter includes a brief description of ANOVA, and regression and correlation. Some discussion of the assumptions underlying the use is merited. Since conclusions derived from the use of these models hinge on satisfying the assumptions, some treatment of how to address violations of assumptions would also be relevant. Without such a discussion, students may make inappropriate use of the methodologies. Moreover, in the discussion of regression analysis, measures of "goodness of the model" should also be stated, and precautions to be taken when using models for prediction addressed.

Six Sigma and process improvement tools and techniques are presented in Chapter 11. This chapter has a good discussion of the DMAIC (Define, Measure, Analyze, Improve, and Control) approach. It also presents the "Seven Basic Tools for Quality Control" and "Lean Tools." The presentation of the applications in health care and service organizations is particularly valuable. It should be noted that in discussing the theoretical basis for Six Sigma, the authors use the shift in the process mean by one and a half standard deviations. However, the 1.5 standard deviation shift from the target value is not really a theoretical justification but is based on empirical evidence. At Motorola, one of the pioneers of the Six Sigma methodology, it was believed that their processes could drift by up to this amount and not be detected. In the example applying Six Sigma to reduce medical errors, the use of the Failure Modes and Effect Analysis (FMEA) methodology is suggested. However, FMEA is not introduced until later in the book in Chapter 12. It would thus be appropriate to either include discussion of FMEA in this chapter, or use another example that does not use this methodology, moving the current example to Chapter 12. In the discussion of run charts, it would also be helpful to discuss patterns of non-randomness, for example clustering, trends, and oscillation, and how to detect such occurrences.

Design for quality and product excellence is the topic of Chapter 12. There are several good features of this chapter. First, it covers the Quality Function Deployment (QFD) tool which translates customer requirements to product features, to part requirements, and eventually to scheduling production. The QFD example presented in the chapter is quite thorough. Issues such as Design for Manufacturability (DFM), which ensures whether a designed product

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can be manufactured feasibly, Design for Environment (DFE), and Design for Excellence (DFX) are also included. As the concern for environment and sustainability grows, these are topics that will see expanded coverage in the coming years. Since the ANOVA technique has been introduced in a previous chapter, it might have been useful to use the application of ANOVA in the discussion of Gage Repeatability and Reproducibility.

Statistical process control is the final chapter (Chapter 13) in the text. The chapter provides an overview of the commonly used control charts for variables and those for attributes. One possible improvement in the chapter would have been to move those topics in the "Designing Control Charts" section, which is currently towards the end of the chapter, to precede the section on construction of control charts. This would motivate the student to place adequate emphasis on those issues that affect decision making from the control chart prior to constructing the charts themselves. One reason for doing this is the discussion of the concept of rational subgroups. This forms a key basis for selecting samples when control charts are constructed. If such issues are not clarified up-front, decisions arising from the control charts may not be as meaningful as they could be. In the discussion of inferences from control charts, some comments on the operating characteristic (OC) curve and average run length (ARL) for detecting out-of-control conditions merits consideration. Similarly, in the section on interpreting patterns in control charts, it might be appropriate to state some specific rules for detecting out-of-control patterns and the criteria that they are governed by, instead of stating general rules. For example, the rules proposed by Western Electric and/or found in software packages (such as Minitab) could be included. Some of these rules are however shown in an illustration. Further, some comments on the overall Type I error would be appropriate when using multiple rules. In the discussion of the c-chart, the Poisson distribution is used as the basis. It would be desirable to include the necessary assumptions that must be satisfied, in the context of control charts, to validate the use of the Poisson distribution. Along these lines, it should be noted that the p-chart is based on the Binomial distribution. Here again, discussion of the inherent assumptions and how they relate to control charts, would be desirable. Instances of where such assumptions related to either the p-chart or the c-chart would not be satisfied will also prevent the reader from making wrongful applications of the appropriate control charts.

Overall, the text provides a sound foundation of the principles of quality management. Given the numerous references to applications of the methodology in practice, the reader emerges convinced of the utility of the exposed material. It further provides a sense of confidence to seek new areas of application. ■

NAMES IN THE NEWS

CAROL LATTA, Executive Director, Decision Sciences Institute

Jatinder (Jeet) N. D. Gupta, University of Alabama in Huntsville, has received the 2010 Outstanding Graduate Teaching Award from the College of Business Administration for his outstanding design, development, and teaching of graduate courses in Information Systems, Operations Management, and Supply Chain Management. This award is based on the nominations and selection by the graduate students and approved by the College Executive Committee. Jeet is Eminent Scholar of Management of Technology, Professor of Management Information Systems and Professor of Industrial and Systems Engineering and Engineering Management.

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Ken Kendall, a distinguished professor of management at the Rutgers School of Business–Camden, has been named 2010 Educator of the Year by the Education Special Interest Group, a national organization that devotes itself to information systems education. He was recognized for his efforts to lead the field of information systems (IS) education in terms of teaching, research, and service. He will receive his honor at the Information Systems Educators Conference in Nashville, Tenn., in the fall. Ken is a past president and Fellow of DSI, and he is the author of *Systems Analysis and Design* (8th ed., Prentice Hall, 2010), which he cowrote with his wife, Julie Kendall.

http://www.thekendalls.org

Tom Foster, Marriott School of Management-Brigham Young University, has been named to the Board of Overseers for the Malcolm Baldrige National Quality Award. The Board provides oversight relative to the Baldrige process and helps to ensure the integrity of the award. Tom is an area leader and professor of global supply chain management at the Marriott School. He has consulted for a number of companies including Hewlett-Packard, Trus Joist Macmillan, and Cutler-Hammer/Eaton Corp. He served on the 1996 and 1997 Boards of Examiners for the Malcolm Baldrige National Quality Award.

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