2. Survey Results Guide Total Quality Management (TQM) Course Development in Industrial Technology

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The Basis for a Survey

In order to succeed in today's marketplace, industrial organizations demand highly skilled managers capable of achieving global competitiveness as well as local responsiveness (Hill, 1995). As technological development continues, corporate executives are realizing that traditional management approaches are inadequate to continuously make the required improvements (Bounds, Yorks, Adams, & Ranney, 1995). In order to remain competitive in a global economy, contemporary corporations are breaking down traditional boundaries to create lean, adaptive, and fast moving organizations, which require team-building, network-building, and empowering skills (Hill, 1995). According to Streichler (1994), "Surveys of more than 10,000 managers in the United States reveal that while they are aware of general organizational techniques, they feel the need to improve their knowledge of themselves; basic techniques of time management, personal organization, and personal and group goal setting" (p. 72). In fact, development and application of these skills appear to be the main focus of TQM.

Believing that U.S. organizations urgently need to focus on improving people and process skills, Goetsch and Davis (1994) argued that "the best way to win in global competition is with quality. The best way to produce quality is to continually improve people, processes, and environments. The best way to improve people, processes and environments is the total quality way" (p. 14). In response to the industry's demand for quality, an increasing number of manufacturing companies are involved in implementing and practicing TQM principles (Vajpaee, 1994).

The results of surveys of manufacturing professionals in the Ohio Valley Region indicated that "highest priority was placed on total quality management as the most relevant content for a master of industrial technology program in manufacturing" (Zargari, Savage, & Waggoner, 1995, p. 74). Based on surveys of 13,000 U.S. organizations with 100 employees or more,

Training Magazine's 1995 industry report revealed that:

1. In 1995, a total of $52.2 billion was budgeted for formal training by U.S. organizations.
2. About 54% of budgeted training dollars were aimed at training programs for managers and professionals.
3. Fifty-eight percent of all industries (78% of manufacturing) were engaged in total quality management.
4. From a list of initiatives that were underway in organizations, total quality management was the hottest trend. (p. 70)

To meet the requirements of contemporary organizations, graduate programs in industrial technology should review and update their curricula to ensure that an appropriate blend of technical and managerial skills is provided. The preparation of highly skilled technical-managers should be based on management strategies that could help corporations stay competitive in the world marketplace. For industrial technology programs to serve students and industries, TQM is a topic that must be addressed, studied, examined, and incorporated into their curricula (Aman, 1994).

Based on the preceding statements, the development and implementation of offerings in TQM seemed a necessity for industrial technology (IT) programs.

THE SURVEY

Consequently, a survey to determine the most relevant content for a TQM course for a master of industrial technology program was conducted. The need was based on the following conditions:

In addition to the pertinent literature, the content and syllabi of TQM, Total Quality Improvement, Total Quality Control, and closely related courses currently offered in industrial technology graduate programs were reviewed. Using this information, a 30-item, Likert-type scale survey was developed. It was validated for relevance, readability, and appropriateness by a team of four academic experts in industrial technology who have been involved in design, development, and implementation of management courses in IT graduate pro-

grams. The validated survey was then mailed to chairs of 51 IT departments with at least one graduate program in industrial technology or a closely related field. These chairs were asked to have their leading management, quality control, and/or TQM faculty complete the survey. The respondents were asked to rate each item of content in terms of its importance for inclusion in a TQM course for a master's program in industrial technology. The rating scale was defined as follows: 0 = No opinion; 1 = No relevance; 2 = Unimportant; 3 = Moderately important; 4 = Important; and 5 = Essential.

The Likert-type rating was used because the method would yield a scale within interval properties that was needed to determine the importance of each item relative to the other items and individually (Scheibe, Skutsch, & Schofer, 1975). The "0 = No Opinion" option was used to reflect the opinions of those participants who might not be familiar with the content of a particular statement.

Results

Thirty-four respondents completed and returned the survey for a 66.6% return rate. Using descriptive statistics, the mean ratings of responses for each statement of content was rank-ordered to prioritize the content of a TQM course for a Master of Industrial Technology program.

Based on the analysis of the survey results, the following 15 statements that received a mean rating of 4 or more were considered as "very important" content for inclusion in a graduate TQM course in industrial technology:

1. Study and analyze the key components of TQM ($M = 4.73$).
2. Study and examine the impact of TQM on productivity, quality, and competitiveness ($M = 4.47$).
3. Study and analyze the concepts of shared vision, total employee involvement, and empowerment ($M = 4.44$).
4. Study and analyze the application of TQM tools ($M = 4.35$).
5. Study and analyze goal setting, deci-

sion making, correcting the decision process, and problem solving ($M = 4.32$).

6. Study and analyze the concept of integrating customer requirements into product design ($M = 4.31$).

7. Study and analyze the supervisor's or managers' role in implementing TQM ($M = 4.29$).

8. Study leadership, team building, and team work ($M = 4.26$).

9. Study and examine approaches to implementing TQM ($M = 4.23$).

10. Study and compare the principles and techniques of TQM and conventional management ($M = 4.23$).

11. Study and analyze the application of statistical process control techniques in TQM ($M = 4.18$).

12. Examine ways of establishing a customer focus in industrial organizations ($M = 4.11$).

13. Study and develop skills of implementing TQM guidelines ($M = 4.09$).

14. Study and analyze the advantages and limitations of implementing TQM principles in organizations ($M = 4.02$).

15. Study the characteristics of and methods for establishing a quality culture within an organization ($M = 4.02$).

The following 12 statements that received a mean rating of 3.61 to 3.96 were considered as "important" content for the TQM course:

1. Study Just-In-Time, Total Quality, and World-Class Manufacturing ($M = 3.96$).

2. Study the characteristics of a quality system ($M = 3.88$).

3. Conduct an overview of the purpose/function of education/training in a TQM environment ($M = 3.88$).

4. Study and analyze planning and organizing for improvement, and process thinking ($M = 3.82$).

5. Study and analyze TQM and ethics in the workplace ($M = 3.82$).

6. Study and analyze the cases of organizations that have succeeded and/or failed to establish a TQM environment ($M = 3.79$).

7. Study and analyze methods of improving communication skills ($M = 3.76$).

8. Study the benchmarking approach and its impact on the effectiveness of organizations ($M = 3.73$).

9. Study the objectives of training needs assessment, providing and evaluating training program within the context of TQM ($M = 3.64$).

10. Study and analyze methods of improving interpersonal skills ($M = 3.64$).

11. Study and analyze methods of managing conflicts in the workplace ($M = 3.64$).

12. Study and analyze the partnering concept as related to improving organizational effectiveness ($M = 3.61$).

The following three statements that received a mean rating of less than 3.5 were considered as "moderately important" content for a TQM course at the graduate level:

1. Conduct an overview of the application of Design of Experiment (DOE) ($M = 3.35$).

2. Study quality function deployment ($M = 3.28$).

3. Study and analyze ways of dealing with the physical environment ($M = 3.18$).

Implications

The realities of programming and sequencing suggest that it may not be possible to deliver all items of content in a 3-semester hour TQM course. Therefore, since items with a mean rating of 4 or more were considered important content for inclusion in a TQM course at the master's level, items with lower ratings should be included in the undergraduate curriculum. Based on the analysis of survey results and the respondents' specific comments, a TQM course for the Master of Industrial Technology with a manufacturing specialization was developed. A copy of this course can be obtained from the author.

Changes occurring in technology affect how industrial firms operate, how workers perform, and how industries determine the skills needed to meet industrial requirements. As American industrial leaders realize that providing a quality product to the customer results in a competitive advantage in today's global economy, TQM has emerged as one of the most important management issues in business, industrial, and academic organizations. To enhance the management skills of industrial technology personnel and remain on the cutting edge of the profession, undergraduate and graduate industrial technology students should be provided with an in-depth understanding of TQM principles and techniques. For industrial technology graduate programs to prepare advanced technical-management personnel, curricula must be constantly reviewed to ensure that it includes the most relevant and contemporary content.

References

Aman, S. G. (1994). The essence of TQM: Customer satisfaction. *Journal of Industrial Technology, 10*(3), 2–4.

Bounds, G., Yorks, L., Adams, M., & Ranney, G. (1995). *Beyond total quality management.* New York: McGraw-Hill.

Goetsch, D. L., & Davis, S. (1994). *Introduction to total quality.* New York: Merrill.

Hill, L. (1995). Power and influence. *Training, 32*(10), 37–77.

Meravi, T. J. (1994). Total quality management in industrial technology classroom [Abstract]. *Proceedings of the 27th Annual Convention of the National Association of Industrial Technology*, 37.

Scheibe, M., Skutsch, M., & Schofer, J. (1975). Experiments in Delphi methodology. In H. A. Linstone & M. Turoff (Eds.), *The Delphi method: Techniques and applications* (pp. 37–64). Reading, PA: Addison-Wesley.

Streichler, J. (1994). The important "plus" to technology knowledge for effective managerial leadership [Abstract]. *Proceedings of the 27th Annual Convention of the National Industrial Technology*, 72.

Vajpaee, S. K. (1994). ISO: All you want to know. *Journal of Industrial Technology, 10*(4), 5–6.

Zargari, A., Savage, E., & Waggoner, T. (1995). Curriculum content for the master of industrial technology program in manufacturing. *The Journal of Technology Studies, 21*(2), 73–76.

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