

Institute for  
Improvement in  
Quality and  
Productivity



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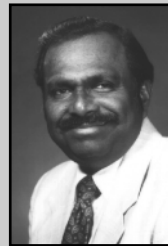
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## Deming's Management Philosophy Is It Still Alive?

B. Abraham

*Bovas is the Director of the IIQP and has been a consultant with the Institute since its inception. His main areas of interest include Quality Improvement, and the management and implementation of statistical procedures.*



Bovas Abraham

Several years ago W. Edward Deming (W.E. Deming- *Out of the Crisis*, Published by Massachusetts Institute for Technology, Center for Advanced Engineering Study, Cambridge, Mass.; also his earlier books) proposed the fourteen points for management (see page 10) and passionately argued for Management by Facts. This author would characterize Deming's ideas as Management by Statistical Thinking. Are these ideas still alive or dead?

Management ideas have evolved over several decades. It possibly started with Management by Doing (performing everything by himself/herself or by a chosen few), and then changed into Management by Delegating (get other people to do the jobs with given details). Then came the popular Management by Objectives or Results (get specified results by specified time). These systems were appropriate for certain periods of time and became out of date

with time as people's background, outlook, and vision changed. Deming recognized the flaws in these systems and tried to articulate a new philosophy. He wanted a transformation to a new management system in which ideas of Variation, Knowledge, and Psychology played a prominent role. He referred to these as Theory of Variation, Theory of Knowledge and Theory of Psychology. He also emphasized the idea of a continuous improvement system through the Plan, Do, Study, Act (PDSA) cycle.

In essence, he was advocating a management philosophy based on Statistical Thinking which consists of

- ◆ Notion of a process
- ◆ Measurement and data based approach
- ◆ Understanding and dealing with variation
- ◆ Use of statistical tools, and
- ◆ Systematic approach to improvement.

Deming advocated a management system in which the management shared responsibilities with others, decisions are based on facts supported by data, variation is understood and dealt with, knowledge of products, processes, customers, and suppliers is acquired and participation and cooperation of employees is encouraged. The global market place and the competition to win new

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We welcome your comments. The editor reserves the right to edit all submissions.

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*Please Circulate and Recycle*

# Deming's Management Philosophy

*...Continued from Page 1*

customers and retain the old ones have forced organizations to seek effective ways to manage. Some embraced Deming's ideas as they had embraced others in the past without thinking that it needed company-wide initiatives. Some of these efforts were not sustainable. In any event other ideas such as Total Quality Management, Continuous Improvement, Reengineering, Time-based Competition, Visionary Leadership, etc. emerged. Recently, we also noticed the emergence of Knowledge Management, Innovation Management, etc. as well. Some business leaders are talking about Knowledge as a major asset of an organization and there is a growing awareness that knowing about and transferring of Knowledge is critical for success.

Peter Drucker (Harvard Business Review: Knowledge Management) said that 21st century organizations cannot follow the military style management model of the previous decades. We are faced with an information-based economy and Knowledge is at the core. Sharing of Knowledge is also critical. Recent advances in computing, information technology, and the internet have made it easier to collect, store and distribute large amounts of data in a fraction of a second. There is a perception that collection and analysis of large data sets create Knowledge. However, obtaining large amounts of data does not mean more Knowledge. Knowledge is neither data nor information. Appropriate data can lead to information which can in turn lead to Knowledge. Thus the data need to be converted to relevant information and Knowledge. Statistics deal with the acquisition of Knowledge from data. We also see that quality systems have evolved and the ISO 9000 has a 2000 version coming out in December 2000. The changes in the ISO 9000:2000

system contains continuous improvement and it gives more importance to Statistical Thinking than the previous versions. Companies such as Motorola, Allied Signal (Honeywell) and General Electric (GE) have been implementing a program known as Six Sigma. This is a quality improvement program with the objective of reducing the number of defects to 3.4 per million items. It is also seen as a business strategy which involves the heavy use of statistical tools within a structured system to gain the Knowledge needed to obtain better quality products and services faster and cheaper. In this strategy the following improvement model is used: Define, Measure, Analyze, Improve and Control. This is very similar to Deming's PDSA wheel. The strategy also calls for different levels of training: Green Belt, Black Belt, and Master Black Belt. In these, the Black Belt training is the most intensive - covering about 4 weeks. Statistical tools and methods are the major part in the training and the objective is to instill Statistical Thinking in improvement projects. Thus the Six Sigma initiative is a natural continuation of Deming's initiatives.

Although we do not hear much about the 14 points and the Deming philosophy, all the new management improvement initiatives include data oriented approaches and Statistical Thinking. Recent concepts such as Knowledge Management, Innovation, etc. are part of the Deming philosophy. The fourteen points (see page 10) for the transformation of management and Deming's theories of Variation, Knowledge and Psychology are embedded in the new management approaches. Hence, we conclude that Deming management ideas are still alive. (see page 10 for Deming's Fourteen points)

*to page 10... "Deming's Fourteen Points"*

# De-mystifying Six Sigma

G. Dennis Beecroft

*Dennis is the Managing Director of the IIQP. He has extensive work experience both in industry and at the University of Waterloo. He works with many companies on their quality issues.*



G. Dennis Beecroft

The major quality topic consuming many organizations and authors is Six-Sigma. Little did anyone suspect that this concept developed by Motorola in the early 1980's under its president Robert Galvin, would demand such attention. It is being promoted by many as a new revolutionary tool that can yield tremendous financial benefits for the organizations that adopt it. However, others are saying that there is really nothing new; the Six-Sigma tools have been around for several years. Like most arguments there is truth in both positions.

Quality improvement concepts have evolved and continue to evolve over time. New concepts build on previous information and experiences. Six-Sigma includes some new significant management areas that make improvement efforts more successful than previous approaches. Most past improvement programs focused primarily on the quality improvement tools and the disciplined step by step approach, addressing the problem to be solved or process to be improved. However, management of the overall program has been ignored or inadequately addressed. While Six-Sigma includes the emphasis on the quality improvement tools and the disciplined approach to improvement, it also addresses the overall management of the improvement projects. I would like to address three of these management areas: management leadership, resources, and training.

**Management Leadership:** Six-Sigma programs are 'driven' by the senior management team of the organization. Joseph Juran stated that "all improvement takes place project by project ... and in no other way". This project based quality improvement strategy is the Six-Sigma driving force for management. However, projects selected must produce significant bottom-line results. Some organizations select projects that will generate a minimum return of \$200,000. Once these projects are selected, the necessary resources are assigned to execute them. The status of the projects is regularly monitored, at least monthly, by the senior leadership team. This regular management review ensures that the projects are completed quickly, usually in less than 6 months. Once the projects are completed, the results of the implementation are measured to determine the actual bottom line impact.

**Resources:** The resources assigned to the projects are full time. This is a significant departure from the practice of what most organizations do today. Typically, improvement projects are assigned on top of one's regular duties. This results in significant time conflict between one's normal tasks and the improvement project. It is usually the project that suffers, as there is insufficient time to work on them, and as the regular tasks must get completed first. Most improvement projects are drawn out over longer and longer time periods and in many cases are never completed. The Six-Sigma projects are deployed through a management structure consisting of several levels: executive leadership, champions, master black belts, black belts, and green belts. Both the master black belt and black belt positions are dedicated full time to the improvement effort. The black belt is responsible for leadership and execution of the improvement project. The role of the master black belt is to provide

training, to mentor black belts, and to consult the teams. The project team must also involve the financial department. Since all the projects focus on bottom line results, measurement of bottom line impact is a key element. Projects are initially selected on the basis of anticipated results and once they are completed actual results must be documented.

**Training:** Significant training of the individuals involved in the improvement projects is a key area of Six-Sigma. The training consists of quality improvement tools, methodology, and advanced statistical methods. To be eligible to participate in the training, one must have an assigned project. Training is given as needed during the execution of the project. For example, a typical black belt would receive four one-week sessions with a three-week break between each session to allow work on the project. A master black belt would receive the same training plus two additional one-week training sessions. The other team members, green belts, receive two three-day sessions with three weeks between each session to allow work on the project. While the quality improvement tools are not new, the levels and amount of training is much greater than what most organizations normally provide for their improvement teams.

In conclusion, Six-Sigma is significantly different from most past improvement programs because of its focus on the management of the project. Senior management is involved from the start to the finish of the improvement projects: they select the projects, assign the resources, closely monitor progress and finally validate that the bottom line benefits that are achieved. Clearly what is important to senior management is recognized by the employees of the organization as important and is completed in a timely manner. ♦

## Recent IIQP Presentations

### Uses of Symbolic Computation in Queuing Theory

University of Waterloo  
Waterloo, Canada February 2000 Steve Drekić

### Uses of Symbolic Computation in Queuing Theory

University of Western Ontario  
London, Canada February 2000 Steve Drekić

### A Preemptive Resume Queue with an Expiry Time for Retained Service

INFORMS Spring Conference  
Salt Lake City, USA May 2000 Steve Drekić

### Tools for the Symbolic Computation of Moments Via Transforms

INFORMS Spring Conference  
Salt Lake City, USA May 2000 Steve Drekić

### Tree Models in Industrial Statistics

Annual Meeting of the Statistical Society of Canada  
Ottawa, Canada June 2000 Hugh Chipman

### Risk Adjusted Monitoring of Surgical Outcomes

Joint Statistical Meetings  
Indianapolis, USA August 2000 Stefan Steiner

### Discussant, Session on Statistics in Industry and Technology

Joint Statistical Meetings  
Indianapolis, USA August 2000 Hugh Chipman

### Tree Models: Roots and Recent Branches

Southern Ontario Chapter of Statistical Society of Canada / American Statistics Association  
Toronto, Canada October 2000 Hugh Chipman

### Statistical Process Control Using Two Measurement Systems

Fall Technical Conference  
Minneapolis, USA October 2000 Stefan Steiner

### A Statistician Looks at Six Sigma

IIQP Networking Seminar, University of Waterloo  
Waterloo, Canada October 2000 Jock MacKay

### Analysis of Data from Multiphase Studies

University of Michigan  
Ann Arbor, USA October 2000 Jerry Lawless

### Survival and Event History Analysis for Data from Longitudinal Surveys

University of Waterloo  
Waterloo, Canada October 2000 Jerry Lawless

### Using Quality Costs to Support Continuous Improvement

Finishing Technologies 2000 Conference,  
National Trade Centre, Exhibition Place  
Toronto, Canada October 2000 G. Dennis Beecroft

### Kriging Estimation Within a Decision-Making Framework for Evaluating Process Technology in a Wastewater Treatment System

INFORMS Fall Conference  
San Antonio, USA November 2000 Will Welch

### Managing Multiple Models

Department of Mathematics, Concordia University  
Montreal, Canada November 2000 Hugh Chipman

### Transient Analysis of the $M^X/M/\infty$ Queue

INFORMS Fall Conference  
San Antonio, USA November 2000 Steve Drekić

### Great Ideas for Problem Solving

Continuous Improvement Symposium 13  
General Motors of Canada  
Oshawa, Canada November 2000 Jock MacKay

### Analysis of Data from Multiphase Studies

University of Toronto  
Toronto, Canada December 2000 Jerry Lawless

### Quality Systems & Statistical Thinking

IISA 2000 - 2001 JSM Conference  
New Delhi, India December 2000 G. Dennis Beecroft

### Multivariate Prediction with Latent Variables

IISA 2000 - 2001 JSM Conference  
New Delhi, India December 2000 B. Abraham

# Upcoming IIQP Courses

## Meet some of our Seminar Leaders....



**Bovas Abraham**  
*Director, IIQP*



**G. Dennis Beecroft**  
*Managing Director, IIQP*



**Hugh Chipman**  
*Consultant, IIQP*



**Jock MacKay**  
*Consultant, IIQP*



**Stefan Steiner**  
*Consultant, IIQP*



**Gary Waller**  
*Associate Provost, Academic  
and Student Affairs, UW*

## DATA MINING

### ONE DAY SEMINAR

Data mining is the process of extracting valid, novel, potentially useful and ultimately understandable information from data. This one day course will provide an introduction to tools and techniques used for data mining. Through critical examination of strengths and weaknesses of tools and illustrative examples, the potential of data mining will be separated from marketing hype.

### You will learn:

- ◆ Data mining basics
- ◆ Pre-modeling steps (data selection, cleaning and graphic techniques)
- ◆ Specific mining algorithms (classifications, regression, segmentation, and dependency modeling)
- ◆ How to assess findings

### Course Dates

February 27, 2001

April 3, 2001

### Cost

**Only \$350 +GST**

*Cost includes: Tuition, lunches, handouts, coffee  
and refreshments*

# COST OF QUALITY FOR CONTINUOUS IMPROVEMENT

## T W O   D A Y   S E M I N A R

Cost of Quality (COQ) is an excellent continuous improvement (CI) management tool. COQ can be used effectively to identify, prioritize, and then track CI projects by breaking down quality costs into four standard categories: prevention, appraisal, internal failure and external failure.

### You will learn how to:

- ◆ Categorize elements of COQ
- ◆ Select and track projects
- ◆ Choose vendors & price products using COQ
- ◆ Use Cost of Quality for CI in QS-9000 / ISO 9000

### Who should attend...

- ◆ Financial Officers
- ◆ Quality Managers and Professionals
- ◆ Continuous Improvement Team Leaders

### Course Dates

March 7-8, 2001

June 19-20, 2001

### Cost

**Only \$695 +GST**

*Cost includes: Tuition, course notes, handouts, lunches, coffee and refreshments*

# DESIGN OF EXPERIMENTS

## T W O   D A Y   S E M I N A R

A designed experiment is a special type of process study that involves changing one or more process characteristics to investigate their effects.

Designed Experiments (DOE) are one of the required continuous improvement tools in QS-9000. This 2 day course will teach you to effectively use this key methodology to improve quality and reduce costs.

This course will provide you with the right tools to understand, plan and execute an experiment. You will also gain the experience in deciding if experimentation is a good approach to your particular problem(s).

### You will learn:

- ◆ What is an experiment?
- ◆ Experiments vs. other data based approaches
- ◆ Complete factorial experiments - looking at several factors simultaneously
- ◆ Fractional factorial designs - efficient ways to look at many factors
- ◆ Taguchi's robust designs to reduce variation
- ◆ Implementation - planning and executing experiments

### Course Dates

March 1-2, 2001

May 31 - June 1, 2001

### Cost

**Only \$695 +GST**

*Cost includes: Tuition, course notes, handouts, lunches, coffee and refreshments*

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# TRAINING EFFECTIVENESS

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## TWO DAY SEMINAR

Training effectiveness is a requirement for QS-9000 Quality System Requirements under Element 4.18 Training. In this new introductory workshop is based on the Kirkpatrick Model.

### You will learn:

- ◆ Options and Recommendations for developing evaluations
- ◆ Procedures for measuring effectiveness
- ◆ Roadblocks to effective evaluation
- ◆ How to evaluate at the four levels (reaction, learning, behaviour, and results) and pros and cons of different approaches

### Who should attend...

- ◆ Human Resources Personnel
- ◆ Training Professionals
- ◆ Management Leaders
- ◆ Quality Professionals

### Course Dates

February 1, 2001

May 24, 2001

### Cost

**Only \$350 +GST**

*Cost includes:* Tuition, course notes, handouts, lunch, coffee and refreshments

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# THIRD EDITION ISO 9001:2000

## AN UPDATING OVERVIEW

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## TWO DAY SEMINAR

This course is designed for organizations who are already registered to ISO 9000 and need to know more information on the updated edition.

The Third Edition ISO 9001:2000 has made several changes creating a more user-friendly standard. It has simplified its language, reduced the required documentation, and made several changes based on customers and users' feedback. This edition will be easier to implement, use and upgrade from the previous editions.

In this updating course, find out about the changes and how it impacts your organization and your registration status.

### You will learn:

- ◆ Background on 2000 Edition
- ◆ Overview of Changes
- ◆ Impact on Current Quality System
- ◆ Transition Guidance
- ◆ Review of Critical Changes
- ◆ How to Implement Changes
- ◆ Changes to Auditing

### Course Dates

March 13, 2001

June 13, 2001

### Cost

**Only \$350 +GST**

*Cost includes:* Tuition, course notes, handouts, lunch, coffee and refreshments

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# IMPLEMENTING ISO 9001:2000

## T W O D A Y S E M I N A R

This course is designed for organizations that are implementing or planning to implement ISO 9001:2000.

The Third Edition of ISO 9001:2000 has made several changes creating a more user friendly standard. It has simplified its language, reduce the required documentation, and made several changes based on customers and users' feedback. This edition will be easier to implement and use from the previous editions.

This course will provide valuable information and tools to assist in the successful implementation of your quality system - ISO 9001:2000.

### You will learn:

- ◆ Evolution of Quality
- ◆ Background of 2000 Edition
- ◆ Planning for Implementation
- ◆ Gap Analysis
- ◆ Documentation - Procedure Writing
- ◆ Overview of Requirements
- ◆ Auditing Overview

### Course Dates

January 30-31, 2001

May 15-16, 2001

### Cost

**Only \$695 +GST**

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- ◆ Please add GST to all course fees (GST #: R119 2606 85)
- ◆ All IIQP courses can be tailored to suit specific needs or applications and presented within your company. Such courses are often developed by modifying or combining existing courses, depending on the request.
- ◆ Instructors are University of Waterloo faculty and IIQP staff who are professionals with extensive industrial training and consulting experience.

## Cancellation Policy

Refund of fees will be made only if notice of cancellation is received at least 10 working days prior to the start of the program. Substitution of participants from the same organization is permitted.

## How do I register?

You can register by returning the form below or contacting the Institute at the following address:

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**Fax:** (519) 746-5524

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RR-00-07 (NT)

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*B. Abraham & M. Brajac*

RR-00-06

## **Principal Components of Simple Least Squares: A New Weighting Scheme for Principal Component Regression**

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## SPC Online

To keep up with the changing times and the new technology, the IIQP is now developing online courses through the internet. Our first course, Statistical Process Control (SPC) is currently under development and testing. This course is being created by faculty in Statistics working with the IIQP.

It will cover such topics as: understanding variation; run charts; control charts; control limits; process capability; Cpk and Ppk; Cp and Pp indices; and much more.

This course will provide some good basics for SPC that can be learned at your own pace in the comfort of your own office or home.

Watch future newsletters for future developments and updates and for more information on how you can register.

If you would like to be added to our mailing list to be notified when this course is available online you can reach us at:

[iiqp@math.uwaterloo.ca](mailto:iiqp@math.uwaterloo.ca)

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