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CHAPTER

4

Training for Six Sigma

Education (teaching people how to *think differently*) and training (teaching people how to *do things differently*) are vital elements in Six Sigma success. Although education and training are different, for simplicity we will refer to both as simply "training."

The Six Sigma organization is unlike the traditional organization and the knowledge, skills and abilities (KSAs) required for success in the new organization are different than those possessed by most employees. The new KSAs need to be identified and plans need to be developed to assure that employees acquire them. The investment required is likely to be significant; careful planning is required to assure a good ROI.

TRAINING NEEDS ANALYSIS

The first step in the development of the strategic training plan is a training needs assessment. The training needs assessment provides the background necessary for designing the training program and preparing the training plan. The assessment proceeds by performing a task-by-task audit to determine what the organization is doing, and comparing it to what the organization should be doing. The assessment process focuses on three major areas:

Process audit—All work is a process. Processes are designed to add values to inputs and deliver values to customers as outputs. Are they operating as designed? Are they operated consistently? Are they measured at key control points? If so, do the measurements show statistical control? The answers to

these questions, along with detailed observations of how the process is operated, are input to the development of the training plan.

Assessment of knowledge, skills and abilities—In all probability, there will be deficiencies (opportunities for improvement) observed during the process audits. Some of these deficiencies will involve employee KSAs. The first principle of self-control is that employees must know what they are doing. Management's job doesn't end by simply giving an employee responsibility for a particular process or task, they must also provide the employee with the opportunity to acquire the KSAs necessary to successfully perform their new duties. This means that if the employee is asked to assume new duties as a member of a Six Sigma improvement team, they are given training in team skills, if they are to keep a control chart, they receive training in the maintenance and interpretation of the charts, etc. Since employees are expected to contribute to the implementation of the organization's strategic plan, they should be told what the plan is, and how their job contributes to the plan.

Assessment of employee attitudes—Attitudes are emotions that reflect a response to something taking place within an organization. A person's attitude is, in essence, a judgment about the wisdom of a particular course of events. If an employee's attitude is not positive, they will not use their KSAs to help the organization as effectively as they could. Negative employee attitudes about the direction being taken by the organization indicate that the employee either questions the wisdom of the proposed changes, or doubts the sincerity of the leadership. Regardless, it represents a problem that must be addressed by the training plan.

The assessments above can be conducted using audits or the survey techniques described in Chapter 3. Assessments can be conducted by either internal or external personnel. In general, employees are more likely to be open and honest when confidentiality is assured, which is more likely when assessments are conducted by outside parties. However, internal assessments can reveal valuable information if proper safeguards are observed to assure the employee's privacy.

It is important that follow-up assessments be made to determine if the training conducted closed the gap between the "is" and the "should be." The follow up will also provide a basis for additional training. Reassessment should be conducted first to assure that the desired KSAs were acquired by the target group of employees, then the process should be reassessed to determine if the new KSAs improved the process as predicted. It's common to discover that we made a mistake in assuming that the root cause of the process "is/should-be" gap is a KSA deficiency. If the reassessments indicate that the KSA gap was closed but the process gap persists, another approach must be taken to close the process gap.

the AQL." I did a bit of research and discovered that the AQL for the process I was interested in was 0.2%, which was actually written into the purchase order. This was a complex item with many CTQs. When I collected data and calculated the process average defect rate I learned that *every CTQ was averaging 0.2%*! The AQL had become an anchor on quality improvement.

KAIZEN*

KAIZEN is a philosophy of continuous improvement, a belief that all aspects of life should be constantly improved. In Japan, where the concept originated, KAIZEN applies to all aspects of life, not just the workplace. In America the term is usually applied to work processes. The KAIZEN approach focuses attention on ongoing improvement that involves everyone. Its domain is that of small improvements from ongoing efforts. Over time these small improvements can produce changes every bit as dramatic as the "big project" approach. KAIZEN does not concern itself with changing fundamental systems. Rather, it works to optimize the existing systems. All jobs in any given organization have two components: process improvement and process control. Control, as described above, involves taking action on deviations to maintain a given process state. In the absence of signals indicating that the process has gone astray, control is achieved by adhering to established standard operating procedures (SOPs). In contrast, improvement requires experimentally modifying the process to produce better results. When an improvement has been identified, the SOPs are changed to reflect the new way of doing things. Imai (1986) describes the perception of job responsibilities (improvement or maintenance) based on job function (Figure 20.4).

In Figure 20.4 the lower portion involves maintaining the process at its current level by following the SOPs. KAIZEN fits into the upper portion of this picture. However, the upper portion goes beyond KAIZEN. Imai illustrates the relationship as shown in Figure 20.5.

Figure 20.5 illustrates that, as mentioned earlier, KAIZEN does not cover radical innovations (that's where Six Sigma comes in). It can be seen that all levels of management share responsibility for KAIZEN. Since work is always done according to standards, the standards must be viewed as dynamic documents. The fundamental idea behind KAIZEN comes straight from the Deming/Shewhart PDCA cycle:

*KAIZEN is a registered trademark of KAIZEN Institute, Ltd.

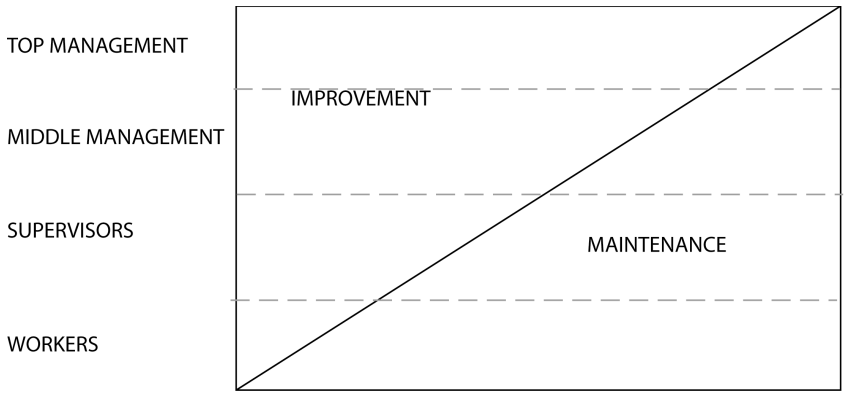

Figure 20.4. Responsibilities and job functions.

- Someone has an idea for doing the job better (Plan)
- Experiments will be conducted to investigate the idea (Do)
- The results evaluated to determine if the idea produced the desired result (Check)
- If so, the SOP will be changed (Act)

Thus, this "Japanese" approach has its roots well-established in the scientific method. The Japanese contribution was to integrate the approach into its management systems to assure that it was done routinely, at all levels of the organization. Also, the Japanese apply KAIZEN to every process and to the entire production cycle, while non-Japanese companies tend to restrict improvement to Research and Development or new-process start-ups. Imai lists the KAIZEN duties given in Table 20.3 for the different levels in management.

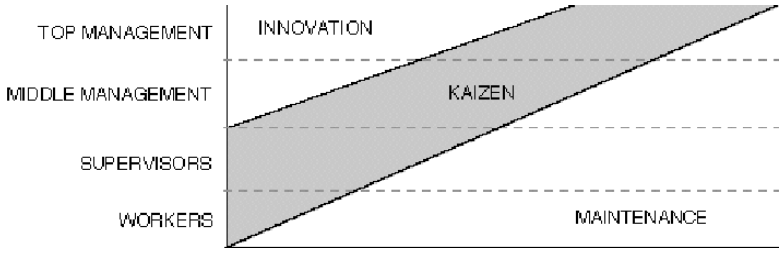

Figure 20.5. Responsibility for KAIZEN and KAIZEN's role in process improvement.

Table 20.3. Hierarchy of KAIZEN involvement.
From Imai, M. *KAIZEN: The Key to Japan's Competitive Success*, p. 8. Copyright © 1986 by the KAIZEN Institute, Ltd.

POSITION	RESPONSIBILITIES
Top management	• Be determined to introduce KAIZEN as a corporate strategy • Provide support and direction for KAIZEN by allocating resources • Establish policy for KAIZEN and cross-functional goals • Realize KAIZEN goals through policy deployment and audits • Build systems, procedures, and structures conducive to KAIZEN
Middle management	• Deploy and implement KAIZEN goals as directed by top management through policy deployment and cross-functional management • Use KAIZEN in functional capabilities • Establish, maintain, and upgrade standards and staff • Make employees KAIZEN-conscious through intensive training programs • Help employees develop skills and tools for problem solving
Supervisors	• Use KAIZEN in functional roles • Formulate plans for KAIZEN and provide guidance to workers • Improve communication with workers and sustain high morale • Support small group activities (such as quality circles) and the individual suggestion system • Introduce discipline in the workshop • Provide KAIZEN suggestions
Workers	• Engage in KAIZEN through the suggestion system and small group activities • Practice discipline in the workshop • Engage in continuous self-development to be better problem solvers • Enhance skills and job performance expertise with cross-education

Generally, KAIZEN is implemented via quality improvement teams at various levels of management. Individual KAIZEN projects are generally not done on a scale that warrants full-blown project management tools such as PERT-CPM, but the "7M" tools are often used to manage KAIZEN projects.

BECOMING LEAN: A TACTICAL PERSPECTIVE

At the strategic level, becoming Lean involves a culture change. Chapters 1 and 3 provide guidelines for making this transition. An organization ready for Six Sigma is also ready for Lean. However, there are some differences in the deployment of the Lean model. Here are some guidelines for deploying Lean at the process level.

1. *Identify the value*. Use all known means to determine what existing and potential customers really want.
2. *Map the value stream*. Identify how work flows to create the value. Determine how information flows to support this process. Identify non-value added activities and set goals for reducing *muda*.
3. *Distribute work evenly*. Balance the process.
4. *Standardize the process*. Identify the core process and eliminate steps needed because of unpredictability by minimizing variation, errors, and defects.
5. *Eliminate "just in case" activities and resources*. Schedule Just-In-Time deliveries. Stop ordering extra items to deal with uncertainty. Stop hiring temps or per diem workers to deal with "unexpected" problems.
6. *Nurture supplier relationships*. Bring the supply chain into the design of work processes. Integrate their delivery and information systems with yours.
7. *Use Design for Six Sigma to create breakthrough improvement.* Remember, you don't create products or services, you create customers. Disregard your investment in existing assets and systems and develop entirely new ways to serve your existing customers better, and to create new customers.
8. *Create "autonomation."* Autonomation is Taiichi Ohno's word to describe a production system that mimics the human autonomic nervous system, i.e., it automatically adjusts to external and internal conditions. For example, when we get too hot, our body automatically reacts to cool us down; we don't have to think about it. Similarly, production systems should react to customer demands, increasing production when demand goes up or decreasing production when