The single most important contributing factor to Japanese success in the world markets, according to the noted quality author from Ford Motor Company, L.P. Sullivan, is their system for educating and training all employees on a continuing basis. Education and training in many Japanese companies takes up an average of eight hours per week for every employee. Half is done on company time, the other half on the employee's time. The Japanese philosophy of quality professes that it is one of the main jobs of management to improve employee capabilities through continuous education and training. It is each employee's task to improve upon their skills and knowledge in specific areas of quality technology, and they are measured on this improvement annually. It is their belief that by improving themselves, continuous process and product improvement will come automatically. The Japanese understand that only through continuous education and training will you change the way people think and act. Training and education, therefore, is accomplished to improve both the worker and the product.

**TQM EDUCATION AND TRAINING GOALS**

To be effective AFLC TQM education and training should cover TQM awareness and philosophy, action-orientated skills which include the use of statistical tools to analyze and measure processes, group dynamics and team building skills and knowledge about impediments and barriers to organizational and cultural change. Eventually the entire AFLC workforce of over 90,000 must be trained to insure institutionalization of TQM into our day to day processes.

Successful implementation will also require continuing education and training that will have to be tailored to specific jobs and organizational needs. Special training will have to be developed for TQM facilitators and statisticians and the quality technology tools, such as process management and statistical process control, needed to implement TQM.

One of our concerns in implementing TQM education is the need for instructors with TQM and training expertise. We must develop competent and motivated instructors that will take the "quality revolution" to the people. We intend to select the very best people, from within our current
infrastructure, for our initial TQM instructor cadre. These instructors will train other instructors at their respective Centers and organizations who will, in-turn, train and cascade TQM throughout their organizations.

Curriculum development requires identifying the individual learning styles of AFLC personnel and matching methods of instruction to their styles. This will be done by our in-house courseware designers functioning closely with our TQM and quality expertise or subject matter experts. To do so will require a plan or strategy which we call our education and training development model.

**AFLC Education and Training Development Model.**

The AFLC TQM Education and Training Development Model is a tailored model of the Instructional Systems Development methodology used by the Air Force and directed by Air Force Regulation 50-8, Policy and Guidance for Instructional System Development (ISD). ISD is a systematic process for planning, developing and managing training programs. The Air Force has adopted a model with five broad steps to describe the ISD process. These steps are:

a. Analyze systems requirements,

b. Define education and training requirements,

c. Develop objectives and tests,

d. Plan, develop, and validate instruction,

e. Conduct and evaluate instruction.

The model, co-developed by AFLC and Air Training Command, is divided simply into three phases: Planning, Development, and Implementation. This model incorporates the five ISD steps.

**Planning Phase.**

The Planning Phase consists of two steps designed specifically to analyze the TQM requirements and define the education and training requirements necessary to develop competent TQM skills. A front end analysis will determine the training program goals, survey existing training, identify courseware developers, identify resource requirements, establish the Training Planning Team (TPT) membership, determine the TPT schedules and TPT milestones. The TPT is formed at project initiation and is chaired by the Program Manager, in this case HQ AFLC/OP. The TPT draws upon the expertise of its members in identifying the requirements for training resources using the ISD process. The TPT will consist of members from all the Centers and headquarters deputates. The TPT will also produce the Command TQM Training Development Plan.

The Training Development Plan (TDP) is produced using the best available TQM information at the time of TPT formation. It is a living document that will be revised as management decisions are made and better TQM information and techniques are developed. The TDP provides information on the types of training, facilities required, projected funding support and personnel requirements. Tailored off-the-shelf training also requires the use of this process to ensure better selection of strategy, media, implementation and courseware quality.

During this phase a program summary will be prepared that will describe the education and training program and its operating environment, manpower support concepts and significant training issues. A courseware summary will be developed in which the training concept, target population, resource summary, and implementation are described in further detail. A TPT Charter is also developed that outlines the purpose, team composition, organization, authority, function and schedule of this groups activities.

**Development Phase.**

The Development Phase consists of training analysis and courseware development. Training analysis will define the TQM requirements in detail, which includes identification and verification of education and training objectives and selection of skills and knowledge required to perform TQM duties. Training materials and methodologies (e.g., platform instruction, interactive videodisc) are identified as well as materials for each learning objective. Then the best method or methods are selected for design of the instructional strategies. Instructional strategies include development of preliminary measurable objectives, drafting media descriptions, drafting brief instructional schemes and sequencing the objectives into lessons and blocks of instruction.

Courseware development begins with the development of an instructional plan consisting of instructional media, methods, activities, facilities, support equipment and instructor requirements. It continues with preparation of the course control documents or plan of instruction and training standards and continues with the preparation of the instructional material, such as instructor guides, student guides, student workbooks and measurement devices. Afterwards subject matter experts will conduct a small group instructional tryout to check the course flow and validate the instruction.

**Implementation Phase.**

To ensure an effective instructional system for TQM, it is not only necessary to develop validated, job-referenced instruction, but there must also be planning and preparation for the maintenance and implementation of the TQM training system into planned training curriculum. This will require training for instructors in their new roles and orientations for supervisors and managers in their supportive actions.

Many feel that once developed, a unit of instruction is finished and that no problem will
arise during the implementation phase. It is the responsibility of the curriculum developer to be aware of potential problems. Often, newly developed courseware lessons may be shortened or lengthened, involuntarily of course, in relation to the allotted time. Ideally, ISD courseware dictates scheduling, but in our ever changing world of TQM, where continuous process improvements are constantly occurring, this may not be the case. For example, problems may arise from a mixture of self-paced students and group-paced instruction. In any event, scheduling must remain flexible to meet the needs of a wide range of students as well as student critiques, in-house formal reviews and development of new TQM tools that require training.

CURRENT STATUS

AFLC is presently in the planning phase of training development. We are in the process of completing our front end analysis and have a strategic planning development plan. The TTP has identified six initial TQM general education and training areas and five TQM support tools. The general areas include:

a. Workforce. Training for the general workforce will include awareness and orientation to the TQM philosophies and tools.

b. First Line Supervisors. These individuals will receive TQM awareness and philosophy as well as action-oriented skills which includes the use of statistical methods to analyze processes.

c. Middle Management. Mid-managers will receive the same training as mentioned above as well as group development skills, such as team building, and knowledge about changing organizational culture and overcoming the impediments to TQM implementation.

d. Senior Management. Senior management will receive the same as the mid-managers with additional emphasis on individual responsibilities for coordinating and managing TQM implementation.

e. Executive Management. This course will most likely be a one or two day seminar that will provide these executive managers with a brief overview of the TQM concepts and their translation into organizational activities.

f. TQM Facilitators. Facilitator training will provide in-depth experimental activities covering the four major TQM education and training objectives, extensive knowledge of TQM tools and instructor development training.

The TQM tools include:

a. Statistical Process Control (SPC). SPC is a method for determining the cause of variation based on statistical analysis of the problem. SPC uses probability theory to control and improve processes.

b. Process Action Team (PAT). PAT training is a team building process for developing and maintaining a group of people who are working together for a common goal. The PAT will be taught group problem-solving as well as TQM tools and be expected to maintain a balance between the needs of individuals, the team and the goal.

c. Design of Experiments (DOE). DOE is a body of knowledge used to improve the process of learning from experimentation. This learning, in turn, enables improved process design which leads to reduced costs, stable production processes and desensitized production variables.

d. Value Engineering (VE). VE is a systematic function analysis that leads to actions or recommendations to improve the value of systems, equipment, facilities, services and supplies. VE simultaneously improves quality, reduces costs and improves reliability, maintainability and availability.

e. Quality Function Deployment (QFD). QFD is a set of planning and communication routines and a methodology for transforming customer wants and needs into quantitative terms. QFD provides a framework for PATs to work successfully across different organizations.

SCHEDULE

The AFLC schedule for TQM education and training development and implementation is to have all the core subjects and tools developed by 30 July 1989 (Exceptions: QFD and DOE are scheduled for completion by 30 December 1989). This may seem aggressive for so short a period of time, however, much of the curriculum has been developed across AFLC and exists in varied formats other than ISD. The existence of much of this training and the computerization of the ISD process will make this effort much shorter in duration than originally expected. It will also significantly lower the development costs.

CONCLUSION

In the final analysis, AFLC will do a "quality" job of designing, developing and implementing the core TQM education and training program organically. Identifying objectives, using a proven development model and developing a core that can be tailored to organizational needs will eliminate wasted effort and ensure this program pays for itself. Involving all AFLC Centers and headquarters deputies ensures that it is a collaborative, command effort and amenable to all organizations. By doing it right the first time, AFLC is applying, firsthand, the TQM philosophy to its education and training process.