CALIFORNIA COMMUNITY COLLEGES
AND
FOOTHILL --- DE ANZA
COMMUNITY COLLEGE DISTRICT

#91-0006
### Developing TQM (Total Quality Management) Curriculum and Applications in a Community College

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<tr>
<th>FISCAL YEAR</th>
<th>ID NUMBER</th>
<th>COLLEGE</th>
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<td>1991-92</td>
<td>91-0006</td>
<td>De Anza</td>
<td>Foothill-DeAnza</td>
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#### PROJECT TITLE

Developing TQM (Total Quality Management) Curriculum and Applications in a Community College

<table>
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<th>FUNDING CATEGORY &amp; AWARD</th>
<th>ELIGIBLE PROGRAM</th>
<th>PROJECT CATEGORY</th>
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<tr>
<td>Grant = $14,500</td>
<td>B --- Improving Teaching Ability</td>
<td>Curriculum Design</td>
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<tr>
<th>PROJECT PRODUCT</th>
<th>PROJECT TOPIC #1</th>
<th>PROJECT TOPIC #2</th>
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<td>Resource Materials</td>
<td>Curriculum Develop</td>
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<tr>
<th>PROJECT DIRECTOR</th>
<th>PROJECT SUPERVISOR</th>
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<tr>
<td>Elaine Gaertner, Program Developer Office of Business, Industry, and Government</td>
<td>Peter Landsberger, Dean Business/Computer Sys</td>
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#### PROPOSAL DESCRIPTION

This project developed a team of instructors familiar with Total Quality Management who were then prepared to teach TQM on campus and to industry. The team assembled a resource collection of texts, video packages and instructional devices to assist faculty in teaching TQM. Additionally, a baseline curriculum for industry and for cross disciplinary integration of TQM in general business, Applied Sciences, Physical Sciences and CIS disciplines was developed.
Developing TQM (Total Quality Management) Curriculum and Applications in a Community College

This project will develop De Anza College's capacity for cross-disciplinary application of Total Quality Management in classroom instruction, beginning with the Business/Computer Systems Division, sections of the Applied Sciences Division, Physical Sciences and the Office of Business, Industry and Government.

The Office of Business, Industry and Government is an entrepreneurial unit within the College providing comprehensive training and educational resources to Silicon Valley organizations. In 1990, the Office provided nearly 300 contract courses, seminars and workshops, met all of its own funding requirements and provided $100,000 in revenue to the College, its academic divisions and the faculty training/retraining fund.

Demand for employee training programs in statistical process control and Total Quality Management has increased significantly. (In 1989, one company contracted for TQM training. Since then, more than 30 companies have inquired about its availability.) Because American interest in and acceptance of TQM significantly trails that of the Japanese and industry is fully utilizing TQM professionals in development and applications, qualified faculty are generally unavailable to De Anza.

Further, Total Quality Management requires a complete revision in industrial philosophy and definition of quality control. An institution preparing itself to teach TQM must first teach and develop comfort levels with statistical tools and then work on a cross-disciplinary basis to teach key concepts of planning, theory and psychology of learning, principles of variation and other critical thinking and problem-solving skills.

This project will develop a team of instructors who are familiar with Total Quality Management philosophy and prepared with instructional techniques to teach TQM both on-campus and in industry. It will establish a permanent resource collection of related texts, video packages and instructional devices to assist faculty from a variety of disciplines in teaching TQM. It will also prepare a baseline curriculum for industry and for cross-disciplinary integration of TQM in general Business, Applied Sciences, Physical Sciences and CIS courses. The curriculum will be evaluated by an outside auditor specializing in quality systems prior to introduction through a series of Instructional skills Workshops and teaching demonstrations.
Dissemination will go beyond Instructional Skills Workshops to include a marketing plan from the Office of Business, Industry and Technology, consultation to other community colleges and institutions, incorporation into activities of the College’s Center for Applied Technologies and the California Supplier Improvement Program, as well as participation in FII conferences and publications as requested.

In addressing instructional improvement at De Anza College, the project also responds to key elements of the 1990-91 Basic Agenda for Vocational Education, including making vocational education programs more relevant and effective in preparing students for employment, updating the vocational curriculum by incorporating modern industrial techniques and tying vocational courses to both immediate and long-term labor market requirements.
Developing TQM (Total Quality Management) Curriculum and Applications in a Community College

1. Specific Educational Program Being Addressed

Educational Program Addressed

This project will develop De Anza's capacity for cross-disciplinary application of Total Quality Management in classroom instruction, beginning with the Business/Computer Systems Division, the Applied Sciences Division and the Office of Business, Industry and Government.

Among the eligible programs of the Fund for Instructional Improvement, this project addresses improvements in the teaching abilities of faculty members and improvement in traditional instructional programs.

The project responds to elements of the 1990-91 Basic Agenda Criteria for Vocational Education, specifically:

- Make vocational education programs more relevant and effective in preparing students for employment.
- Update the vocational curriculum by incorporating modern industrial techniques.
- Tie vocational courses to both immediate and long-term labor market requirements.

The project also responds to the agenda's criteria for Human Resources by implementing faculty and staff development programs to improve the skills of college personnel and by attracting qualified faculty from the ranks of business and industry.
INSTRUCTIONAL RELATIONSHIPS: De Anza College
Office of Business, Industry and Government
Center for Applied Competitive Technologies
California Supplier Improvement Program

The Office of Business, Industry and Government is an entrepreneurial unit within De Anza College providing comprehensive training and educational resources to Silicon Valley organizations. Nearly three hundred contract courses, seminars and workshops are delivered annually at corporate workplaces and on-campus during the year. In 1990, the Office met all of its own operating fund requirements and provided $100,000 in revenue to the College, its academic divisions and the faculty training/retraining fund.

The benefits to De Anza from contract instruction activity go far beyond generation of discretionary dollars. Educational partnerships developed through the Office with business and industry enhance De Anza's image in the community and attract company employees to classes on campus. Contract programs develop curriculum at no cost to academic divisions, and the Office frequently identifies new instructors who become resources to the divisions.

Enrollments for contract classes exceeded 3,000 in 1990. A large percentage of these were for courses in basic skills and English as a Second Language (ESL), which continue to be critical training needs in industry. Other requests from employers resulted in the development of new courses in such areas as Total Quality Management/continuous process improvement, supervisory training, contract cost analysis, government accounting, material requirements planning (MRP), Japanese culture and business practices and conflict resolution.

The College is funded by the California Community College Chancellor's Office as one of the first four Centers for Applied Competitive Technologies (CACTs), created to provide technical assistance to small and medium-sized companies for implementing advanced manufacturing technologies. The Center will initially offer employers training and consulting services in computer integrated manufacturing (CIM), total quality management (TQM) and just-in-time (JIT).

A related economic development instructional effort is the California Supplier Improvement Program (CalSIP), a joint project of the Chancellor's Office, the Department of Commerce and the Employment Training Panel. CalSIP will provide needed quality training for suppliers to the aerospace industry. CACT is involved in coordinating curriculum development and program implementation for CalSIP.

To achieve maximum benefits across the range of instructional options offered by the College and its related offices, it is essential to forge interdisciplinary, interdependent relationships with the Business/Computer Sciences and Applied Sciences divisions.
2. Specific Problems Being Addressed

Specific Problem Addressed
Requests for employee training programs in statistical process control and Total Quality Management have increased significantly, and plans are underway for the development of modularized curriculum in this area. One major task we face is identifying instructors for these jobs. It has been difficult to meet the demand from industry with the few who have both technical skills and instructional expertise.

The increase in requests for workplace training in Total Quality Management has increased dramatically. In 1989, one company requested TQM training. Since then, more than 30 companies have inquired about availability of TQM training through De Anza's Quality Assurance Department and our business and industry program. Because of limited material and instructional resources and the unavailability of the most qualified faculty, the College could meet the initial TQM requirements of six firms. The high industry profiles of those firms underscores the increasing awareness and expected future demand for TQM training: FEI Microwave; Hewlett-Packard; Ion Implant Services; Apple Computer; Northern Telecom; Syntex; Tandem Computers.

Compared to the relatively long-term application of Total Quality Management by the Japanese, American industrial interest in TQM has emerged recently, but is growing at phenomenal rates. Application of TQM requires a complete revision in industrial philosophy and definition of quality control. Rather than focussing on post-production quality control by inspection of the final output, TQM requires a continuous evaluation of on-going processes that affect quality output.

An institution preparing itself to teach Total Quality Management must first teach and develop comfort levels with statistical tools--and then go beyond into the key concepts of planning, theory and psychology of learning, principles of variation and other closely related complex-thinking skills.

Because each organization must develop its own standards and processes for Total Quality Management, no single system can be distilled and taught by rote. However, curriculum and instructional approaches can be developed to communicate the underlying principles common to all successful TQM ventures (As identified by Ernst & Young Quality Improvement Consulting Group):

- Customer-first orientation
- Top management leadership of the quality improvement process
- Focus on continuous improvement
- Respect for employees and their knowledge; active involvement of employees in the improvement process
- Reduction of product and process variation
- Provision of ongoing education and training to employees
• Familiarity with a statistical way of thinking and the use of statistical methods throughout the organization
• Emphasis on prevention rather than detection
• View of vendors as long-term partners
• Performance measures that are consistent with the goals of the organization
• Standardization—the development of and adherence to the best known ways to perform a given task
• Product or service quality that begins with its definition and design
• Cooperation and involvement of all functions within an organization
• Awareness of the needs of internal customers
• Substantial cultural change

The following model (Figure 1) from Total Quality: An Executive's Guide for the 1990s (Ernst & Young Quality Improvement Consulting Group) demonstrates the complexity of milestones which mark an organization's development to Total Quality Management.

A quick scan of these significant and far-reaching factors makes it clear that no single existing curriculum—or set of curriculum—currently addresses these requirements for success in Total Quality Management on an integrated basis.
3. Population To Be Served

Population to be Served
The project will first address the needs of De Anza College and the Office of Business, Industry and Government by developing a cross-disciplinary model relating Total Quality Management to instruction in Quality Assurance, Business, Computer Sciences and Applied Sciences. The availability of the model serves the College's faculty first and, ultimately, all students enrolled in related courses.

The requirements of broader populations can be met in whole or in part by dissemination of materials, availability of curriculum and development of specific applications for The Center for Applied Competitive Technologies and the California Supplier Improvement Program.

Instructional Skills Workshops are specifically targeted to assist De Anza faculty who are already highly skilled in statistical and quantitative processes, but who need further development of overall Total Quality Management philosophy and concepts and instructional techniques unique to TQM.
4. Objectives

Proposal Objectives
The project has four objectives:
1. To develop a team of instructors who are familiar with Total Quality Management philosophy and concepts and prepared with instructional techniques to teach TQM.

2. To increase faculty knowledge of Total Quality Management and to develop a shared focus on how to incorporate TQM into De Anza's curriculum and teaching methods.

3. To use Total Quality Management to integrate interdisciplinary approaches and methods into the general Business, Accounting, Purchasing and Quality Assurance programs of De Anza College, as well as at the Office of Business, Industry and Government.

4. To increase the number and quality of instructional resources (Both human and material) to meet institutional and community business demand for training in total Quality Management.
5. Workplan Narrative

The project will be directed on a daily basis by Elaine Gaertner, Program Developer of the Office of Business, Industry and Government. Under her leadership, a highly influential professional working group of experienced industry and academic representatives has already convened for over 20 hours of issues identification. To accommodate professional schedules, the group has met weekends with 100 percent attendance. (Working group list follows this section.) This group has agreed individually and corporately to assist with the development of Total Quality Management curriculum and to participate in the training of De Anza faculty in TQM philosophy, concepts, processes and related instructional techniques.

The value of the in-kind services represented around De Anza's Total Quality Management table is incalculable. Only the extremely high level of commitment of these individuals, in recognition of industry's requirement for this program, makes it possible for the College to prepare this proposal. Development costs are kept at a minimal level solely because compensation for the group will be limited to a small honorarium. (Two full-time instructors participate in the working group. Their compensation at the College's non-instructional activity rate will be borne within the budget of the Office of Business, Industry and Government.)

Jeffrey W. Elliott will be Lead Facilitator for the series of curriculum development workshops and train-the-trainer sessions. (Vitae follows Budget Summary.) Currently responsible for leading the Manufacturing Branch of Lockheed Missiles and Space Company, Inc. in the transformation to modern quality management, Mr. Elliott has presented Total Quality Management disciplines for De Anza College at Hewlett-Packard and Apple Computer. An internationally-recognized expert in the field, he has agreed to accept a consultant's fee which is a fraction of his professional rate.

In addition to preparing materials specific to each field trip and workshop, Mr. Elliott will confer with Ms. Gaertner concerning purchase of instructional materials and media materials. Textbooks under consideration include: The Deming Dimension (Henry Neave, SPC Press); Quality Control Handbook (Juran); Leadership for Quality (Juran); Planning for Quality (Juran); Kaizen: The Key to Japan's Competitive Success (Imai); Understanding SPC (Wheeler); Statistical Methods for the Improvement of Quality (Thomas Ryan); Quality Control and Industrial Statistics (Atchison Duncan); Tools and Methods for the Improvement of Quality (Oppenheim and Oppenheim, Gitlow and Gitlow); Productivity and Quality Improvement: A Practical Guide to Implementing SPC (Jack Hradesky).

Video packages under consideration for inclusion in the permanent resource collection for Total Quality Management are: Total Quality Control from a Management Viewpoint; Ishikawa's Basic Concepts of Total Quality Control; SPC Decision Support for the Plant Floor; and The New Management Challenge: Techniques for Continuous Change. The project team will augment its investigation of specific Total Quality Management requirements of local industry with a series of field trips and tours. The calendar anticipates
touring a large semiconductor manufacturing facility such as Apple Computer (an on-going business customer of the Office of Business, Industry and Government), a small-scale customer order manufacturer and one hospital or biomedical firm. This will allow the group to observe a variety of processes within a large-scale manufacturing setting, an administrative environment and a custom-order setting where short-run SPC techniques would be used, developing their understanding of the range of potential applications of TQM.

It is expected that each seminar will include specific curriculum development as well as examination of a critical issue or key concept of Total Quality Management in preparing the team for its future role as trainers. Workshop topics will include: TQM Philosophy and Planning; Short-Run SPC; Hoshin Planning/Seven New Tools for Management; Quality Function Deployment/Policy Compliance.

The team will review the outside auditor's recommendations concerning the curriculum and delivery model prior to participating in Instructional Skills Workshops and teaching demonstrations in March, April and May 1992. Mr. Elliott will also work individually with team members as required to develop their skills as trainers in the Total Quality Management model.

Total Quality Management Working Group
Rosemary Coates  California Regional Distribution Manager
            Hewlett-Packard Company
Don Emerson   Staff Quality Engineer
            Amdahl Corporation
David Hooper  Training Coordinator, Senior Manufacturing/Quality Engineer
            Stanford Telecommunications, Inc.
Erik Houts    Manager, Product Assurance
            Varian
Dr. Tom Little Continuous Improvement Manager, Missile Systems Division
            Lockheed Missiles and Space Company
Ron Mills     Chief Executive Officer
            Denron, Inc.
Kathy Plum    Quality Assurance Department Head
            De Anza College
Suzanne Schafer Quality Trainer
            Silicon Graphics Computer Systems, Inc.
Gary Stephenson Quality Improvement Manager
            Raychem Corporation
Pat Weber     Reliability Engineer Specialist
            Lockheed Missiles and Space Company
Chuck Womer   Instructor, Business/CIS Division
            De Anza College
6. Expected Outcomes

Expected Outcomes
The following outcomes are expected at the completion of the project:

- De Anza College will have developed a coherent set of Total Quality Management offerings characterized by common philosophical and instructional approaches.

- A core group of faculty members, including new instructors attracted from business and industry, will be prepared to teach Total Quality Management curriculum.

- The College will be positioned to implement a model of a cross-disciplinary structure for this program. The model will be replicable by other campus programs and institutions.

- A new set of offerings will be available relating to industry's need for workforce expertise in Total Quality Management at the management, middle management and production worker level.

- One less tangible, but highly important, outcome will include the cementing of relationships with key industrial leaders with the ability to influence utilization of and support for the College's range of educational and community services.

All expected outcomes have implications for programs beyond that of the Business Division, the Quality Assurance Department and the Office of Business, Industry and Government. Additional faculty, the instructional resources collection and the cross-disciplinary model will apply immediately to on-going programs in the Business Division and the Quality Assurance Department.

Because Total Quality Management's long-term focus is on the role of team-building and communications, we anticipate implications for instructional approaches to cultural diversity, especially for English as a Second Language and basic skills programs.

Additionally, the Vice-President for Instruction has undertaken a new planning initiative which will attempt to define quality indicators for the instructional program of the College. This planning process will benefit significantly from an increased depth of understanding of Total Quality Management throughout the institution.
7. Evaluation Plan

Evaluation
The resulting curriculum and instructional resources will be reviewed by an outside auditor or auditor team specializing in industrial quality management programs to assure their utility in current industrial and business environments.

The Advisory Council to De Anza College's emerging Quality Assurance Department will evaluate curriculum and proposed instructional systems. The Office of Business, Industry and Government will also consult with satisfied client companies such as Hewlett-Packard, Apple and Syntex to secure their response and recommended revisions to the materials.

The Project Team will establish its own quality indicators for its work in progress and will develop evaluation criteria for future applications as programs are delivered in industry and at De Anza College.
8. Dissemination Plan

Dissemination

Internal dissemination of results of the program will include three Instructional Skills Workshops with teaching demonstrations in March, April and May of 1992 at the De Anza College Teachers’ Resource Center. The Office of Business, Industry and Government will develop a marketing plan to make targeted industries and businesses aware of the availability of workplace Total Quality Management programs and to emphasize the integration of TQM principle concepts and processes into existing courses offered by the College.

The Project Director will be available for FII conferences as requested. Further, the Director and selected team members may provide consultation to individual colleges and institutions. All course outlines and the models for the training workshops will be replicable and will be made available upon request for a minimum handling charge.

Results will be shared with the Vice-President for Instruction to assist in the initiation of her long-range planning effort. It is also anticipated the program will be of interest to selected professional publications and journals. Curriculum and models will also be shared with the College’s Center for Applied Technologies (CACT) and the California Supplier Improvement Program (CalSIP) which are undertaken in conjunction with the State Office of the Chancellor.
9. Budget Narrative

[NO "BUDGET NARRATIVE" ACCOMPANIES THIS DOCUMENT.]