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ABSTRACT

This document, which is designed for educators at community and technical colleges throughout Texas, presents and examines employer-defined workplace competencies for high-technology occupations and outlines instructional strategies and capstone experiences for use in improving technical education and preparing students for high-technology occupations. Discussed in chapter 1 are state mandates and guidelines and national indicators. Chapter 2 is devoted to generic workplace critical elements, measures, standards, and tasks for technical occupations requiring an associate in applied science degree or the equivalent. Twelve instructional methodologies appropriate for integrating workplace competencies into technical programs are explained in chapter 3. Chapter 4 describes the use of capstone experiences as a directed external work-based learning experience. The bibliography lists 165 references. Appendixes contain the following: summary analysis of occupational profiles/wages for high-demand, high-wage occupations; a survey to determine workplace skills for two-year associate in applied science degrees; employer ratings of workplace competency statements; a planning document for verifying generic workplace competencies; employer views regarding responsibility for teaching workplace competencies; external learning experiences; course identification for generic workplace competencies; teaching aides for external work-based learning experiences; and a list of organizations contributing to this report. (MN)

EMPLOYER DEFINED WORKPLACE COMPETENCIES FOR HIGH TECHNOLOGY OCCUPATIONS

With a Commentary on Instructional Strategies and Capstone Experiences

Developed at College of the Mainland
for
Innovative Texas Community and Technical College Educators

by
Dorothy Ellen McNutt

1996

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Dorothy Ellen McNutt
Project Director

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Chapter 1

INTRODUCTION

Chapter 1

INTRODUCTION

Several legislative actions and state reports have reinforced the need for community and technical colleges to establish workplace competencies and standards for their technical programs. Since the publication of the 1993 Texas *Technical Education Program Guidelines* (TEPG) requiring program content to "include competencies and provide proficiency in basic workplace transferable skills," state community and technical college educators have appealed for extended definitions of workplace competencies and technical assistance for infusing these competencies into the curriculum.

Evidence of the need for assistance is shown in a 1994 study conducted by the Texas Higher Education Coordinating Board, Community and Technical College (THECB, CTC) Division. The study reported on currency of curriculum, basic skills requirements, the inclusion of workplace and technical competencies and computer literacy in all approved < 16 semester credit hour, < 23 quarter credit hour, and > 359 noncredit contact hour certificate programs. From the 67 state community and technical colleges, 606 programs were reviewed. Of these only eight were in full compliance with the study criteria and TEPG requirements. Two recommendations were:

> "Each new or revised program submitted to the THECB, CTC Division should include current affirmation of technical occupational competencies, workplace and basic skills, and computer literacy.
>
> "To achieve clarity and reestablish a sense of fairness, the THECB, CTC Division should communicate to the community and technical colleges the definitions of Basic Skills, Workplace Competencies and Computer Literacy, as well as a synopsis of important elements of the TEPG as they relate to program approval." (THECB, 1994)

State Mandates and Guidelines

Under Public Law 101-392 and the *State Plan for Vocational and Applied Technology Education* (State Plan), Fiscal Years 1995-1996, requirements for fund utilization highlight:

- the upgrading of curriculum and faculty,
- flexible and innovative curricula linked to business and industry standards,
- a competency-based format based on measurable achievement of basic work skills and work-related behaviors,
- assessment procedures assuring the opportunity for all students to attain mastery-level basic work skills and work-related behaviors,
- application of applied basic work skills into the curriculum of each technical program,
- arrangements with the private sector to provide services and equivalent training at a lesser cost.

Under the THECB, CTC Division, *Plan for the Evaluation and Continuous Improvement of Texas' Community and Technical Colleges*, technical programs must demonstrate 100 percent compliance with the following standards: Mastery of basic skills and workplace competencies based on industry standards . . . utilizing external or capstone experiences (THECB, 1994).

The Master Plan for Career and Technical Education includes goals and objectives that will increase the input of business, industry, and labor into program planning and the technical education delivery system (Master Plan, 1993). One objective sought by the Texas higher education community is to afford all students the opportunity to acquire competencies essential for success in the workplace: ". . . to ensure successful attainment of the Master Plan's goal . . . the infusion of workplace competencies into integrated . . . curricula based on skill mastery . . . for high skills/high wage occupations." Also, the Master Plan seeks to "improve technical education instruction to reflect business and industry skills standards and certification strategies." In addition, the Tech-Prep Program Model stresses confirmation of workplace competencies and utilization of external or capstone experiences in technical and professional career preparation.

Teaching workplace skills appropriate to business and industry standards is highlighted in *Performance Measures and Core Standards for Post-Secondary Technical Education Programs*, a publication that details success measures for technical programs. Two measures in the publication are long-term employment success of technical graduates and technical programs that include a capstone experience as a measure of competency certification (THECB, 1992).

National Indicators

Nationally, impediments to efficient school-to-work (college-to-work) transitions are defined by the U.S. Department of Labor (DOL). One of these impediments is inadequate directed work-based experiences offered prior to graduation. How to achieve better workplace competencies is the subject of national and statewide discussion and debate. The national focus is on "youth" leaving or graduating from high school; yet, many fail to recognize the adult students who enter post-secondary technical programs for Associate in Applied Science (AAS) degrees and training for higher skilled, higher demand, and higher wage occupations.

Recent studies on education and economic competitiveness conclude that the United States is lagging behind international economic competitors because the educational system has not produced a highly skilled work force with workplace knowledges, skills, and behaviors employers need (NCOE and AACJC, 1990; National Center on Education and the Economy, 1990; Carnevale, et al, 1992). One strategy for "catching up" is to increase the linkages and collaboration between colleges and employers and to create more directed work-based learning experiences for students.

The June, 1992, publication of *The Secretary's Commission of Achieving Necessary Skills* (SCANS) gained national recognition for the extension of the "three R's." In prior years employers asked repeatedly for workers who could "read, write, and do simple arithmetic"; however, the SCANS research reveals that employers want more. Not only do they want the basic or foundation skills (literacy and computational skills, the thinking skills, and the personal qualities such as dedication and trustworthiness); but also, the workplace competencies that high-performance workplaces require (managing resources, working amicably and productively with others, acquiring and using information, mastering complex systems, and working with a variety of technologies).

SCANS expanded the basics of education for K through 12; and, in the prior decade, the Southern Association of Colleges and Schools (SACS) expanded the requirements for a two-year associate's degree to include mathematics/natural science, social/behavioral science, and the humanities/fine arts. However, as a rapidly expanding universe of "high-wage opportunities" emerge in a global economy, college students and adult workers will need newly defined knowledges, skills, and behaviors to succeed in the emerging high technologies.

Report Organization

Dependent upon the regional location of the Texas community and technical colleges, the culture, philosophy, and management of the college, and local employer groups, this report should encourage creative discussions regarding: higher-order workplace competencies, effective methodologies for teaching and learning, work-based learning experiences, capstone experiences, and revisions of two-year technical degree programs.

To assist college educators in meeting the needs of new and returning students and workers and in improving technical education, this report includes chapters on: a classification of new, generic workplace competencies for technical occupations; instructional strategies appropriate for the infusion of workplace competencies in technical curricula; and, a framework for "capstone experiences" as directed external work-based learning experiences. The references are assembled to encourage further inquiry. The appendices are a collection of forms and reports emanating from the background literature, research, survey results, and faculty workshops.

Chapter 2

GENERIC WORKPLACE CRITICAL ELEMENTS, MEASURES, STANDARDS, AND TASKS FOR TECHNICAL OCCUPATIONS REQUIRING AN ASSOCIATE IN APPLIED SCIENCE DEGREE OR EQUIVALENT

Chapter 2

GENERIC WORKPLACE CRITICAL ELEMENTS, MEASURES, STANDARDS, AND TASKS FOR TECHNICAL OCCUPATIONS REQUIRING AN ASSOCIATE IN APPLIED SCIENCE DEGREE

The purpose of this study was to identify generic, nonspecialized, high-order workplace competencies for high wage, emerging, priority, and targeted occupations, requiring a two-year technical degree or equivalent certification. The study was conducted in seven overlapping phases: qualification of occupational clusters; analysis of workplace knowledge, skills, traits, attitudes, and behaviors of successful workers; refinement of competencies; competency validation by Texas employers; assessment of employer responses; composition of tasks; and nominative and summative evaluations by statewide educators. This chapter reports on the results of all phases of the competency development process, then concludes with a listing of the measures, standards, and tasks for each of the identified workplace critical elements.

Qualification of Occupational Clusters

The first phase of this study was to qualify occupational clusters which met the standards for the high wage, emerging, priority, and targeted occupations. The State Occupational Information Coordinating Committee (SOICC) Report, June, 1994, defined high wage for fast growing occupations as $10 an hour; thus, > $10 an hour was set as the first parameter. Emerging technologies were defined by the *Texas Innovation Network System* (TINS), 1992, publication of job descriptions. Priority occupations were specified in the *1994 State Priority & Regionally Targeted Occupations for Texas,* (Texas Education Agency, 1994); and, targeted occupations were nominated from the majority of Texas Quality Work Force Planning Committees (TQWFPC).

Nine occupational clusters were approved by the Advisory Steering Committee: Aerospace & Aeronautics; Agriculture; Biotechnology; Energy and Environmental; Information; Lightwave; Manufacturing, Design, and Engineering; Medical/Health Care; and Transportation. Seventy-five different occupations were classified under the clusters. Each occupation was then evaluated for its high-wage potential. (See Appendix A, *A Summary Analysis of Occupational Profiles and Wages for Emerging, Priority, Targeted, and High Wage Occupations, 1994, Requiring an AAS Degree or Equivalent.*)

Analysis of Workplace Skills, Competencies, and Tasks

The second phase of the study involved an analysis of the workplace knowledge, skills, traits, attitudes, and behaviors of successful workers in the clusters. Skill, competency, and task statements were derived from the following resources: the *Secretary's Commission on Achieving Necessary Skills* (SCANS); national Developing A Curriculum (DACUM) results from both state and national collections; Standardized Occupations of Components for Regional Analysis and Trends in Employment Systems (SOCRATES) skills and duties descriptions; TINS; national skills standards projects; and other job profiles, job maps, and occupational analyses. Obtained from over 400 discrete documents dating from 1989 to 1994, over 1,200 generic workplace skills, competencies, and tasks were identified and classified, refined, and translated into generic workplace tasks. From these tasks, 51 broad, basic competency statements were written and assigned to nine categories:

- Identifies, evaluates, organizes, plans, allocates, and manages resources within work area.
- Acquires, evaluates, and uses information.
- Works cooperatively with others.
- Manages complex interrelationships.
- Works with a variety of occupational specific and ancillary technologies.
- Practices quality concepts and applications.
- Improves circumstances or conditions in the work environment.
- Values the free enterprise system.
- Exhibits mastery of verbal and written English and verbal fluency in a secondary language, such as Spanish.

Validation by Texas Employers

Texas employers were surveyed in late 1994 to determine the importance of and the instructional responsibility for the 51 competency statements. Survey questionnaires were mailed to all employers in the 24 TQWFPCs and various state employer

advisory committee members, as nominated by community and technical college administrators. The questionnaire listed the basic competency statements under the nine categories and solicited an evaluation and ranking of each statement on a scale of one to five.

There was a 28 percent return of the survey questionnaires. The importance of each competency statement was assessed by calculating the mean for each statement and by determining the rank order of statements assigned under the nine categories. A weight of five was assigned for statements of high importance; four, for important; three, for slightly important; two, low importance; and one, no importance. (See Appendix B, *A Survey to Determine Nonspecialized Workplace Skills for the Two-Year Associate in Applied Science Degree.*)

The responding employers rated all competency statements > 3.5; and, 67 percent, > 4.0. Statements regarding Management of Information, Working with Others, Safety, Wellness, Lifelong Learning, Free Enterprise/Economics, and Mastery of English and Spanish received ratings of > 4.0; most statements regarding Resources, Complex/Interrelated Systems, and Working with Technologies were rated < 4.0. The ratings for statements regarding Quality ranged from 3.81 to 4.50 and were equally divided between < 4.0 and > 4.0. (See Appendix C, *Importance of Workplace Competency Statements as Determined by Employers in Quality Work Force Planning Committees.*)

Revision of Competencies

Further assessment of the questionnaires led to a refinement of the categories and an expansion of each competency statement. Critical elements first identified by SCANS were modified and two elements were added, "Languages" and "Traits, Attitudes, and Behaviors." These seven elements were adopted as key indicators; and, the nine categories were collapsed into seven measures or descriptions of outcomes/competencies. The competency statements were expanded to 47 standards or qualitative level or rates of outcomes/competencies. And, 816 tasks or instructional work for mastering a measure and for achieving a standard were assigned to offer ample choices for the redesign of college curriculum.

Evaluation by Educators

Three evaluative workshops were held in the spring, 1995. The workshops provided information and solicited comments regarding the research process; outcomes and graphics; the new, generic workplace competencies; the classification of these competencies; instructional strategies; and capstone

experiences. The first workshop was presented for academic and technical faculty and administrators at College of the Mainland. The second workshop was conducted at a Faculty Roundtable for the Texas Gulf Coast Region Community Colleges' faculty, as nominated by their chancellors and presidents. The third workshop was staged during the 1995 spring conference of the Texas Association of Community and Technical Educators' (TACTE). Additional assessment of the competencies and classifications was made by the Advisory Steering Committee in October, 1994, and April, 1995.

The newly defined critical elements, measures, standards, and tasks which follow may be considered important and necessary to the success of technical graduates, when community and technical college educators redesign AAS degree programs. A critical element is a key indicator; a measure, a description of an outcome/ competency; a standard, a qualitative level/rate of an outcome/competency; and, tasks, instructional work for mastering a measure and achieving a standard(s). Each measure, standard, and task employs verbs that require high-levels of cognition--application, analysis, synthesis, or evaluation. To encourage local employer participation, commitment, support, and investment in curriculum revision at each community and technical college, open areas for new or revised task nominations follow each standard. (See Appendix D, *A Planning Document for Verification of Generic Workplace Competencies.*) While intellectually demanding, mastery of this collection or selected combinations from the collection should enable the new technician to function knowledgeably and responsibly in an increasingly complex workplace and society.

Critical Element: Resources

Measure: Identifies, evaluates, organizes, plans, allocates, and manages resources within work area.

Resources Standard 1: Masters basic knowledges, skills, and behaviors necessary to manage resources.

Tasks:

Defines the elements and steps involved in making decisions.

Establishes plans, methods, and procedures to maintain quality.

Employs scientific problem-solving and research techniques.

Develops an ongoing operational plan, specifications, and procedures for the work site.

Coordinates internal and external processes and projects.

Identifies scope of and responsibility for a project or work assignment.

Assesses general surroundings and utilizes internal and external resources for achieving goals.

Schedules, manages, and evaluates processes and projects.

Applies statistical tools for project tracking, process analysis, and improvement.

Documents, summarizes, and reports project progress and results.

Tasks unique to the specific occupation.

1. _____

2. _____

3. _____

4. _____

5. _____

Resources
Standard 2: Prioritizes work area activities to meet organizational goals.

Tasks: Recognizes the importance of goal setting and different planningstrategies at various organizational levels.

Develops objectives, benchmarks, measures for work progress to meet organizational goals.

Identifies, ranks, and organizes tasks.

Plans for project control.

Establishes priorities and realistic completion dates.

Justifies project timeliness to meet organization goals.

Designs feedback loops for project management.

Maintains contingency plans for work group.

Plans projects utilizing computer software.

Tasks unique to the specific occupation.

1. _____

2. _____

3. _____

4. _____

5. _____

Resources
Standard 3: Manages own time without supervision.

Tasks: Makes "sequencing" decisions on a routine basis: decides the order in which work is done.

Utilizes slow or downtimes--unstructured time--productively.

Coordinates schedule with other work areas.

Manages multiple priorities and tasks.

Completes tasks ahead or within the necessary time frame.

Tasks unique to the specific occupation.

1. _____

2. _____

3. _____

4. _____

5. _____

Resources

Standard 4: Prepares, distributes, and coordinates schedules for work area.

Tasks: Determines project resource requirements.

Estimates product and process time requirements.

Analyzes flowability, identifies critical path, and proposes a plan.

Schedules tasks to meet deadlines.

Schedules personnel to meet requirements of project.

Constructs a timeline chart; e.g., Gantt, PERT.

Develops time management schedule using a computer-generated spreadsheet.

Monitors organizational turnaround time requirements.

Tasks unique to the specific occupation.

1. _____

2. _____

3. _____

4. _____

5. _____

Resources

Standard 5: Oversees schedules and work flow for self and work group.

Tasks: Assesses work loads.

Avoids changing job scope after work is in progress.

Coordinates schedules effectively with several people at once.

Demonstrates flexibility by adjusting schedule in response to changing circumstances.

Maintains time and productivity records.

Evaluates continually the procedures and timeliness of the project activities.

Recognizes and eliminates nonproductive activities.

Evaluates progress of project based on prior agreements for time and schedules.

Tasks unique to the specific occupation.

1. _____

2. _____

3. _____

4. _____

5. _____

Resources

Standard 6: Interprets organizational cost and revenue forecasts.

Tasks: Describes the need for financial records.

Explains the organizational accounting and budget system(s) and related processes.

Interprets the organization's general financial statements and budgets.

Analyzes profit and loss reports.

Makes profit-oriented decisions.

Assists with departmental or unit financial planning.

Assesses and projects customer demand for a product or service.

Tasks unique to the specific occupation.

1. _____

2. _____

3. _____

4. _____

5. _____

Resources

Standard 7: Prepares budgets and tracks expenditures for work area.

Tasks:

Projects and prioritizes current work site needs.

Projects costs and revenues.

Incorporates economic justification in the budget preparation process.

Justifies and documents needs for work area.

Analyzes benefits of lease vs. purchase agreements.

Evaluates human resource requirements for the work site.

Identifies total labor costs (salary, benefits, insurance, etc.).

Describes procedures and processes that comprise overhead.

Converts word problems to mathematical expressions.

Prepares multiyear budget using a computer-generated spreadsheet.

Makes budget presentation to management and reworks budget, as needed.

Controls costs.

Negotiates service and maintenance contracts.

Evaluates job cost.

Initiates purchase requisitions.

Tracks rate of expenditures using computer-generated spreadsheet.

Monitors budget variances.

Tasks unique to the specific occupation.

1. _____

2. _____

3. _____

4. _____

5. _____

Resources Standard 8: Controls work area budget and makes expenditure adjustments to meet objectives.

Tasks:

Analyzes the cost/benefit justification of requested resources and engineers to minimize total costs.

Develops cost estimates and negotiates purchases at lowest cost.

Consolidates purchase orders when possible.

Weighs maintenance costs against new equipment or construction costs.

Reconciles differences between inventory and financial records.

Orders project supplies and materials.

Contracts for services.

Secures authorization for expenditures.

Coordinates labor and materials needed to achieve project completion.

Prepares oral and written progress reports regarding expenditures; e.g., cost summaries.

Adjusts budget based on work site changes, costs, and revenue.

Eliminates unnecessary meetings.

Minimizes travel expenses, using teleconferencing, and other cost-saving techniques as alternate strategies.

Completes expenditure documentation.

Prepares final project report with appropriate justification for unbudgeted expenditures or variances from budget.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Resources
Standard 9: Acquires, assigns, and distributes materials to work group.

Tasks: Determines the materials needed for the work site (e.g., supplies, equipment, tools, etc.).

Identifies sources of materials.

Specifies and orders only the required quantity and quality of materials.

Stores, maintains, and distributes materials in good condition.

Controls and maintains supply inventory according to established needs.

Oversees appropriate use of materials.

Tasks unique to the specific occupation.

1. _____

2. _____

3. _____

4. _____

5. _____

Resources
Standard 10: Controls allocation of materials and space in the work area.

Tasks:

Differentiates between Just-In-Time (JIT) inventory, Material Requirements Planning (MRP), and First In First Out (FIFO) systems.

Utilizes techniques for material control, material forecasting, and capacity planning.

Develops a loss-prevention program for the work area.

Takes proper care to avoid damage to or loss of materials.

Returns defective or unused materials to distributor.

Minimizes waste of materials.

Coordinates use of work area, equipment, tools, and supplies.

Creates a work space layout with narrative and graphics.

Designs a plan for space allocation.

Describes the need for security of facilities.

Prevents damage to facilities.

Promotes facility accessibility through a variety of methods, such as proper signage.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Resources
Standard 11: Assesses knowledges and skills of self and work group.

Tasks: Recognizes the importance of effective human resource utilization in a competitive environment.

Specifies internal customers', co-workers', supervisor's, and work group's workplace needs.

Determines standards for job performance.

Develops a plan for production and identifies human resource requirements.

Generates a staffing plan.

Writes job descriptions.

Assesses job skills and functions (person vs. position) of work group.

Matches employee responsibilities to skills and abilities and employer expectations.

Develops schedules and assigns members of work group based on individual acuity level, skills and ability, and budget restraints.

Complies with labor agreements.

Delegates powers of authorization, responsibilities, and tasks, as appropriate, to subordinates or others.

Prioritizes and organizes work assignments; establishes deadlines.

Defines, refines, and coordinates work flow with others in the organization.

Reviews schedules and work assignments with supervisor.

Prepares work environment.

Automates or streamlines manual tasks.

Assigns tasks clearly and diplomatically, defining the specific criteria for job completion.

Instructs work group on assignments.

Conducts meetings with work group.

Follows up on assigned or delegated work tasks.

Encourages high productivity levels.

Follows through to accomplish objectives.

Assumes responsibilities by taking over the duties of members of the work group when necessary.

Analyzes trends--prepares for future human resource needs.

Tasks unique to the specific occupation.

1. _____

2. _____

3. _____

4. _____

5. _____

Resources

Standard 12: Evaluates performance of and provides feedback to work group.

Tasks:

Interprets managerial philosophy and approaches to working effectively with people.

Explains how training, performance appraisals, and participation can increase productivity.

Evaluates contractual relationships.

Assesses quality of own work regarding the organization's product or service.

Recognizes the organizational impact of the individual and work groups on problem-solving efforts.

Demonstrates insight in maintaining work group morale.

Monitors performance of delegated tasks.

Behaves in a nondiscriminatory manner.

Settles conflicts between employees.

Addresses human resource issues, such as harassment and equality.

Provides feedback and/or corrective instruction, as needed.

Prepares reports on problems and recommends solutions.

Completes activity, production, and incident reports.

Reinforces continuous improvement thinking and quality control.

Describes alternative ways to improve productivity and to control costs.

Identifies, defines, and solves problems through job design, job assignments, and work schedules.

Conducts performance evaluations.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Critical Element: Information

Measure: Acquires, evaluates, and uses information.

Information Standard 1: Identifies, obtains, assimilates, integrates, and appraises information.

Tasks: Gathers, analyzes, and uses relevant information to solve problems and make decisions.

Masters terminology as it applies to the organization.

Engages the scientific method for problem resolution and decision-making:

- Identifies and develops criteria to state and analyze a problem.
- Identifies resources and develops networks that can provide necessary information for solutions.
- Isolates relevant information and develops alternative solutions.
- Identifies and analyzes risks involved in solutions.
- Tests alternatives to determine the best solution.
- Assesses others' ability to comprehend and resolve the problem.
- Articulates solutions conforming to the criteria and organizational vocabulary.
- Acknowledges need for a supportive attitude from and toward relevant others.
- Implements and measures the effectiveness of the chosen solution.

Explains the importance of the different nonverbal communications in messages transmitted and received.

Determines when new information must be created.

Develops forms to collect various types of information.

Locates, reviews, and researches from appropriate sources.

Identifies relevant information through in-depth interviews to gain necessary facts about a person, thing, or an event.

Accesses the technical support system for information resources; e.g., libraries, bulletins, service representatives, co-workers, manuals, electronically-produced data bases, field.

Reads specialized and complex documents independently setting purpose and time parameters, recognizing and solving difficulties without aid, and transferring information gained to appropriate applications.

Thinks independently about various types of complex materials from a wide range of resources.

Interprets the language of mathematics using proper mathematical terminology and syntax; recognizes, formulates, and explains procedures for the application of mathematics to a broad and varied range of problems.

Verifies accuracy of information.

Creates instrument for confirming validity and reliability of information.

Separates and clarifies opinions from facts.

Interprets applicable local, state, and federal regulations regarding the organization and transmits information to ensure compliance.

Identifies the legal aspects of an information system; e.g., information ownership, copyrights vs. public domain, and licensing.

Identifies and assimilates manufacturer and employer procedures.

Recognizes the confidentiality of some information; routes information only on basis of organizational policy and procedure.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Information Standard 2: Interprets and communicates verbal and printed information.

Tasks: Engages current business and industry nomenclature.

Discusses the relationship between communication and good management.

Evaluates the variables in the communications process.

Avoids the major barriers to communication.

Identifies the characteristics of positive, negative, and persuasive messages.

Explains how formal and informal communication networks impact decision-making and problem-solving at the work site.

Masters the different types of organizational communications.

Designs concise, clear, coherent, complete, and correct communications.

Interfaces and shares ideas and information with all levels of employees to enhance information systems.

Applies standard and technical oral and written communications principles when working with vendors, internal and external customers, work team, co-workers, and management.

Presents information, ideas, and solutions in a meaningful form appropriate to listeners and situations; i.e., uses the correct level of complexity to the audience and the occasion.

Respects time limitations of others; prepares well for discussions, conferences, etc.

Justifies the importance of timeliness of message delivery in the communication process.

Converts information from one form to another in a timely manner.

Transmits information at the appropriate time and place and to the appropriate personnel.

Interprets organizational and technical manuals.

Comprehends the relevance of Standard Operating Procedures (SOPs).

Researches, clarifies, and communicates policies and SOPs.

Revises work site operating guidelines, as needed.

Demonstrates various ways to display the same information; selects an appropriate medium for conveying a message.

Creates materials for teleconferences.

Summarizes and abstracts reports, correspondence, technical publications, directories, records, and specifications. Creates diagrams graphs, charts, statistical data, tables, maps, etc.

Chooses appropriately among telecommunications systems; e.g., telephone, facsimile, telex, electronic mail, voice mail/messaging, teleconferencing, networking, etc.

Interprets instructions accurately and follows-through to completion.

Recognizes need for collaboration with co-workers and supervisor.

Consults and seeks consultation on complex communications.

Clarifies specifications prepared by others.

Gives and explains instructions to others.

Prepares and delivers oral presentations and briefings in structured and nonstructured settings using several types of media to enhance presentations.

Designs and organizes visual and auditory aids.

Integrates oral and visual presentations to facilitate systematic notetaking.

Conveys active listening skills in face-to-face communications; e.g., seeks clarification and confirmation, maintains eye contact, encourages dialogue, listens intently.

Applies discretion regarding questions asked and statements made during a presentation.

Refers questions outside area of knowledge, expertise or responsibility to the individual(s) most qualified to answer.

Employs effective nonverbal communication; e.g., posture, gestures, facial expressions, tone, touch, and space.

Differentiates between assertive and aggressive behavior during presentations.

Avoids using negative vocal intonations, e.g., anger, frustration, haste, panic, ridicule, fear, apathy, confusion, to name a few.

Paraphrases statements; i.e., questions and restates to avoid misunderstanding, diagnoses concerns, analyzes conflicts, and resolves conflicts.

Researches and develops proposals: collects and evaluates information; develops plan of action; establishes controls and variables; runs experiment(s); draws conclusion; evaluates and fine tunes proposal.

Writes business memos, letters, and proposals; and status, project, and technical reports.

Avoids plagiarism seeking to reference all quoted material.

Oversees projects: researches pertinent documents; inspects, corrects, and presents results in report format; presents alternatives formally and informally at various levels; makes corrections and improvements; interfaces with various departments for implementation; monitors and reports on implementation; advises management on progress; writes and presents final report.

Interprets units within the metric system (volume, weight, length, area, temperature, pressure) and converts to English units of measure or vice versa.

Applies empirical data in graphical, algebraic, and statistical form.

Performs follow-up activities on communications.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Information Standard 3: Converts information/data from one form to another.

Tasks: Archives information from paper files, computerized data bases, and nonprint media records and documents.

Monitors the entries in and accuracy of various logs, inventories, and documents.

Secures information according to policy and procedure.

Collects and organizes information from reference books, journals, and electronic data bases.

Creates new or improved record-keeping systems; e.g., inventory, bill processing, documentation.

Prepares technical documentation: defines purpose, researches references, outlines and drafts document, requests feedback and revises document, and presents or distributes document.

Coordinates information flow: collects, monitors, analyzes, verifies, reports, and files information.

Composes or revises and disseminates operating guidelines for the work site.

Prepares statistical reports, graphs, and charts.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Information Standard 4: Uses computers to create and present information.

Tasks:

Places the computer in perspective within the societal and organizational framework.

Discusses the impact of automation on the organization.

Employs openness and adaptability to new computer technology and applications.

Abides by laws and regulations governing the user, hardware, and software.

Examines issues concerning responsible use of computer systems.

Interprets and creates quantitative data--schedules, inventory levels, employee records--via the computer.

Communicates in current computer terminology.

Suggests software and hardware improvements.

Enhances the analysis of information and the improvement of processes via computers.

Utilizes national and international telecommunication links to send and retrieve information: network electronic messaging systems, electronic mail, and teleconferencing.

Employs DOS and Windows commands.

Keyboards, modifies, stores, retrieves, and verifies word and numerical information.

Demonstrates hands-on, operational knowledge of word processing, spreadsheet, data base, statistical processing, and graphic software.

Generates reports, data charts, and graphs from raw data using application software.

Chooses the best format for display; e.g., line or bar graphs, tables, pie charts, narrative.

Accesses a variety of computer data bases.

Prepares and loads product or service information into a data base.

Obtains information from on-line computer data bases; e.g., Lexus, New York Times, ERIC, CompuServe, Prodigy, etc.

Utilizes technical documentation at the application level.

Develops internal controls.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Critical Element: Interpersonal Relationships

Measure: Works cooperatively with others.

Interpersonal Relationships Standard 1: Participates as a member of a work team.

Tasks:

Explains the components of group dynamics and the stages of group development.

Describes the major types of groups or teams and defines the advantages and disadvantages of each type.

Specifies the major elements of team synergy in affecting team decisions.

Compares the processes and dynamics of work groups and determines the relationship of the group to the individual and to the organization.

Distinguishes between individual roles and responsibilities and team roles and responsibilities.

Identifies benefits of group work and individual work and recognizes when a group can more effectively solve a problem and vice versa.

Recognizes and builds on individual strengths.

Visualizes the impact of each individual's work on a project.

Engages the behaviors and actions which best support a team and which contribute to work performance.

Mentors team members on various team styles and rules: building phases and processes; elements of self-direction; factors for sustaining continuous improvement; and, assessment and feedback principles.

Defines empowerment as it relates to team process control.

Performs team leader duties: delegates tasks and promotes team unity.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Interpersonal Relationships Standard 2: Contributes to group effort, ideas, information, and improvement.

Tasks: Displays skills, knowledges, and attitudes necessary for team functioning.

Takes personal responsibility for goal setting and team planning.

Clarifies team goals and works effectively and efficiently with team members to accomplish the goals.

Shares tasks necessary to complete a project.

Participates in team meetings using acceptable team processes and techniques.

Adjusts to new information or ideas; devises new options and approaches; and makes reasonable compromises.

Conducts work site surveys: identifies project requirements; acquires work site information; identifies responsibilities; leads work site team coordination meetings; performs walk-through; reviews environmental constraints; documents findings; obtains team concurrence; distributes findings.

Coordinates activities of work group to optimize production.

Adjusts to job moves or rotations; adapts to new teams, departments, or sections; and conveys flexibility and willingness to modify own preferences, priorities, and work styles.

Critiques and evaluates team effectiveness and efficiency.

Resolves differences for the benefit of the team as a whole.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Interpersonal Relationships

Standard 3: Generates credibility and trust.

Tasks: Employs ethical practices.

Adheres to quality concepts and contributes to continuous team improvement.

Chooses actions that support the best efforts and ideas of team members.

Develops and maintains good working relationships with persons at all levels.

Coordinates work with individuals and other teams.

Accepts responsibility for team decisions and actions.

Focuses on team success, as opposed to centering on individual achievement.

Acts as a team leader and a team member, as appropriate.

Demonstrates a willingness to perform tasks outside the job position description.

Uses tact and consideration; maintains composure and professional demeanor; motivates work team by using encouragement, praise, support, feedback, and accurate information.

Determines barriers to meeting team task deadlines and proposes new approaches, assignments or processes to assure timely task completion.

Demonstrates good follow-through techniques on assigned tasks.

Tasks unique to the specific occupation:

1. _____

2. _____

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5. _____

Interpersonal Relationships Standard 4: Sifts through clues and extrapolates solutions.

Tasks: Gains satisfaction from problem-solving and creative activities.

Gathers information for team decision-making.

Conducts tests and investigations to obtain valid and reliable information for work team.

Masters interview skills for inquiry and research.

Questions in nonthreatening way to gain fuller understanding of others' ideas.

Recognizes the appropriate time to request assistance.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Interpersonal Relationships

Standard 5: Communicates ideas to justify position.

Tasks: Shares ideas and information openly.

Facilitates team meetings.

Challenges status quo at appropriate junctures; i.e., questions current practices or operations.

Responds appropriately to others' ideas and proposals.

Recognizes negative peer pressures and chooses appropriate responses.

Encourages team members by listening to feedback.

Defends proposals in a pragmatic, goal-oriented fashion; questions in a nondefensive manner.

Articulates details of project assignments.

Tasks unique to the specific occupation:

1. _____

2. _____

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Interpersonal Relationships Standard 6: Builds consensus.

Tasks: Exhibits skill in goal setting, decision-making, and problem-solving techniques related to individual, group, and organizational change processes.

Employs conflict resolution and consensus building techniques.

Differentiates between compromise and consensus.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

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Interpersonal Relationships Standard 7: Listens to feedback from co-workers and makes adjustments.

Tasks: Appreciates the perspective of others.

Portrays supportive attitude toward team members.

Interprets the concepts, processes, and decisions within and between teams.

Addresses the needs and requests of others.

Modifies team processes and approaches based on team effectiveness, efficiency, and evaluation.

Reviews periodically team objectives and activities.

Accepts instructions from team members.

Resolves conflicts through feedback techniques.

Gathers and analyzes feedback from internal and external customers.

Modifies behavior based on feedback and evaluation.

Tasks unique to the specific occupation:

1. _____

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Interpersonal Relationships

Standard 8: Teaches others new skills, helps others learn.

Tasks: Utilizes the basic principles of organizational behavior and monitors transactions and interactions in the workplace.

Explains personality development and how personality affects behavior, human relations, and performance.

Describes biases of perception.

Recognizes and interprets unusual behavior.

Describes why people resist change.

Teaches co-workers, internal and external customers, and significant others.

Shares expertise with and welcomes input from colleagues.

Disseminates resources and explains procedures and policies specific to the work site.

Provides technical information and training to work team.

Cross-trains in skills outside immediate work area.

Develops peer network and networks with other work groups.

Markets skills to work groups.

Serves on training committees; participates in planning for training functions.

Determines training needs of work group; advises trainers on needs.

Provides consulting, mentoring, and coaching services within area of expertise: evaluates requests; develops options; contacts resource groups; develops materials; recommends solutions; provides verbal or written evaluation reports.

Writes training plan and objectives: outlines training procedures; creates training materials; presents, monitors, and evaluates effectiveness of training; modifies training.

Demonstrates proficiency in operation of work site equipment and in operating within organizational systems.

Conveys information in a way that allows others to see the applicability and relevance to tasks.

Trains workers using the demonstration/performance method, enabling trainees to apply concepts and theories.

Comprehends value of multistep, sequential, and planned instruction.

Selects visual and audio media, tools, and equipment for training.

Monitors each trainee's progress; provides constructive feedback and reinforcement.

Completes required documents, logs, and certification for each trainee.

Assesses trainees performance and determines additional training needs with each trainee.

Interprets organization federal, state, and local safety, health, and environmental laws to work group.

Conducts safety awareness training: teaches work site operations and proper use of tools and equipment; explains data collection techniques.

Assists with training of new employees: orients new employees to organization; introduces new employees to work group; conducts on-the-job training; and, introduces new employees to work site culture, systems, processes, and operations.

Tasks unique to the specific occupation:

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Interpersonal Relationships Standard 9: Works to satisfy clients', internal and external customers', and supervisor's expectations.

Tasks: Addresses the importance of a positive business reputation.

Identifies components that comprise customer satisfaction.

Visualizes the correlation between customer satisfaction and quality products and services.

Reasons how customer satisfaction regarding quality of service or product may vary from customer to customer.

Maintains positive human relationships of, proper appearance and professional image for effective job performance; and exercises self-control in customer relationships.

Establishes early customer relationships.

Maintains rapport with supervisor and other significant personnel.

Assures quality control of product or service by recognizing consumer perception of value; by reviewing warranty requirements, consumer protection laws, and repair procedures and materials; by inspecting in-process work; by bringing damage report deficiencies to attention of supervisor; by welcoming on-site inspections; and by performing predelivery inspections.

Develops and maintains good working relationships with vendors, distributors, governmental regulators, and outside consultants.

Explains legal consequences of inappropriate negotiations, agreements, and exchanges.

Performs liaison with regulatory agencies.

Interacts intelligently and effectively with regulatory authorities and personnel or compliance control officers.

Communicates effectively with internal and external service providers.

Resolves differences and conflicts among co-workers and external representatives, such as vendors, service, and regulatory personnel.

Engages in negotiations using offers and counter offers to reach a compromise or consensus.

Appreciates the variety of human purposes, goals, and values to be realized in solving problems.

Applies new information to new situations, draws conclusions, and makes and communicates decisions.

Clarifies, defines, and describes problems.

Analyzes situations to obtain the basic facts and feelings.

Adjusts quickly to new facts, feelings, and ideas.

Compares possible solutions in the best interest of the organization.

Presents facts and arguments objectively.

Chooses and defends the choice with the employees or clients involved; makes reasonable compromises.

Implements solution and follows up on resolution with concerned parties.

Provides prompt, cost-efficient, and reliable service to customers.

Translates customers' expectations.

Demonstrates empathy and courtesy for customers.

Questions internal and external customers in diagnosis of malfunctioning products or ineffective service.

Follows procedures for customer paperwork to insure customer satisfaction.

Protects client or customer confidentiality.

Applies personal code of ethics: e.g., nonaccepting of gratuities, gifts, loans, or perishables; practicing honesty; respecting property rights and privacy.

Explains actions that lead to customer dissatisfaction.

Identifies actual or potential internal or external customer problems: probes for hidden meanings; collects data; assesses problem impact; troubleshoots; consults with supervisor; keeps customer informed of problem status; determines problem responsibility; coordinates problem resolution; logs problem.

Recognizes the organization's requirements, limitations, and resources for satisfying customers' needs.

Defines the importance of time in handling a customer complaint.

Handles problem conversations and responds tactfully and diplomatically to irritated or dissatisfied customers.

Creates customer feedback mechanisms.

Gathers, analyzes, and records complaints and feedback from internal or external customers.

Accepts job responsibilities and accountability.

Tasks unique to the specific occupation:

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Interpersonal Relationships Standard 10: Communicates ideas to justify position; motivates others; and maintains vision, credibility, courage, and adaptability.

Tasks: Comprehends basic principles of psychology and human relations.

Describes theories of motivation, behavior, and contingency leadership.

Discusses the various elements of establishing and maintaining a positive image.

Demonstrates skills, knowledges, and characteristics of an intrapreneur and leader.

Masters specific leadership skills most often cited in the following categories: diagnostic, perceptual, and behavioral.

Exceeds quantitative and qualitative standards and expectations.

Remains open-minded.

Works with integrity.

Listens to feedback from co-workers, clients, and customers.

Adapts easily to change.

Makes positive use of the rules and values followed by others.

Accepts challenges, takes calculated risks, innovates.

Builds consensus.

Makes decisions concerning problems that may not have a singular resolution.

Balances personal and professional affairs in a manner that does not interfere with both responsibilities.

Supports organizational philosophy.

Models behaviors consistent with the organizational culture.

Demonstrates dedication and commitment to the job and organization.

Promotes cooperation and collaboration; takes minority viewpoints into consideration.

Respects the rights of those in authority to make decisions.

Acts on behalf of manager.

Coordinates staff or co-workers: shares calendars; maintains communication network; promotes team building; evaluates workloads; holds staff meetings; trains staff; recognizes outstanding achievements; asks for feedback.

Monitors own performance--self-manages--and continuously improves.

Tasks unique to the specific occupation:

1. _____

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Interpersonal Relationships Standard 11: Chooses ethical courses of action.

Tasks: Describes the components of ethical conduct on the job.

Develops a set of personal ethics.

Models ethical behavior; employs ethical practices.

Makes judgments reflective of ethical values and standards of professional conduct.

Relies on the ethical principles of autonomy, beneficence, justice, nonmaleficence, veracity, and fidelity.

Adheres to legal and ethical business standards: complies with governmental regulations; participates in quality assurance programs; complies with licensure requirements; complies with organizational policies and procedures.

Identifies and appreciates the ethical dilemmas involved in the organization.

Establishes credibility through competence and integrity.

Tasks unique to the specific occupation:

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Interpersonal Relationships

Standard 12: Maintains vision and courage.

Tasks: Displays imagination, discernment, and foresight.

Recognizes concepts, traits, and skills which are common to successful employees.

Explains the necessity of maintaining morale at the work site.

Shares ideas and information openly.

Addresses the needs and requests of others.

Handles emergency situations.

Leads and directs people to attain the goals of the work site.

Recognizes need for assistance.

Tasks unique to the specific occupation:

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Interpersonal Relationships Standard 13: Responsibly questions existing processes, procedures, and policies.

Tasks:

Creates an environment where problems are viewed as challenges, not as roadblocks and stumbling stones.

Accepts responsibility and consequences for one's actions.

Questions or justifies a position logically and appropriately.

Negotiates and persuades co-workers and supervisory personnel at the work site.

Solves problems and makes decisions techniques related to individual, group, and organizational change processes.

Explains how productivity may be dependent on adequate problem-solving in the work site.

Gains satisfaction from problem-solving and creative activities.

Establishes and maintains rapport with others.

Exercises diplomacy and judgment; practices confidentiality.

Implements change through mastery of management techniques and strategies.

Interprets and applies business etiquette.

Leads continuous quality improvement activities and evaluation.

Manages change.

Analyzes and evaluates a situation; presents a workable solution in the best interest of the organization.

Challenges status quo at appropriate junctures; i.e., questions current practices or operations.

Employs conflict resolution techniques to bring about positive outcomes.

Tasks unique to the specific occupation:

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Interpersonal Relationships Standard 14: Appreciates differences among people from diverse cultural, educational, and social backgrounds. Makes judgments and decisions on the basis of a person's skills and performance.

Tasks: Describes one's own culture.

Appreciates what people hold in common.

Addresses the benefits and problems arising from a pluralistic society.

Seeks to eliminate work site barriers caused by jargon, technical knowledge, and social roles.

Respects rights of co-workers, internal and external customers, and other personnel.

Recognizes the interplay of demographics, cultures, legislation, and jobs in shaping work site culture and behaviors.

Evaluates the impact of internationalizing work site processes; of sociocultural distinctions and their effects on management; of diversity issues and problems on productivity; and of different work styles.

Compares historical and cultural influences on people's beliefs and values.

Respects cultural and religious differences among work group members.

Appreciates the values, achievements, and forms of expression of other cultures.

Discusses the elements involved in international and intercultural communications.

Recognizes the ambiguities, vagaries, and value-laden nature of languages.

Adjusts communication as appropriate for different people and situations.

Adapts to regional dialect requirements; i.e., adapts communication skills for non-English-speaking clients or customers.

Defines cultural differences regarding greetings, etiquette, gift exchange, business hierarchy, social and business standing of men and women, impact of ancestral traditions, influences of politics and business transactions on negotiations affecting the advantages of leverage, cultural perspectives of time in business and social settings, and the affect of family roles in business.

Distinguishes among different cultural business protocols: e.g., time and issues awareness, management behaviors and strategies, value systems, dress codes, and social practices.

Identifies cultural "pecking order" regarding financial status, education, birthright, gender, politics, etc.; and discusses the impact on international business transactions.

Appreciates the cultural antecedents and practices that underlie variances in management practices, particularly communication and decision-making.

Compares and contrasts cultural approaches to the use of tools and equipment.

Illustrates the cross-cultural, economic, political and legal conflicts in doing business internationally.

Develops and maintains good working relationships with international vendors, distributors, and consultants.

Mediates cross-culturally.

Assists in orientation of work group to culture and customs of co-workers.

Develops and maintains good working relationships with persons at all levels of the organization.

Supports the basic right of all workers to have a workplace free from harassment.

Recognizes the negative repercussions of using humor at the expense of another person.

Accommodates co-workers with disabilities.

Visualizes a barrier-free work site.

Practices effective community relations.

Assigns work according to skills, abilities, and performance of worker.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Critical Element: Systems

Measure: Manages complex interrelationships.

Systems Standard 1: Interprets systems--knows how political, governmental, economic, and legal systems function.

Tasks:

Improves systems thinking abilities: focuses on a framework for seeing interrelationships; distinguishes among the major concepts of systems thinking or dynamic complexity; questions stocks and flows, reinforcing processes and positive feedback loops; balances processes and negative feedback loops and delay.

Differentiates between closed and open systems.

Identifies components of systems (input, throughput, output).

Compares centralized vs. decentralized governance.

Discusses politics as power within a setting of other major societal institutions; i.e., the requisites, structures, legitimation, the exercise of power, the socialization of power relationships, and power as it relates to stability and change.

Summarizes the role of a democratic citizen in the political and governmental systems.

Explains the demography, representation, organization, and functions of the United States (U.S.) Congress.

Identifies the role and scope, organization, and functions of the Executive Branch of U.S. Government.

Specifies the demographics, recruitment, organization, and functions of the U.S. Federal Judiciary.

Defends the U.S. legal principles as they relate to the Constitution, the Amendments, and the Bill of Rights.

Monitors the actions of state governmental institutions: the Governor, executive boards and commissions, the legislature and judiciary.

Participates in local, state, and national politics.

Impacts local political or governmental decisions.

Discusses the impact of international politics on national, state, and local governance.

Judges the effectiveness of local, state, and federal government.

Interprets local, state, and federal rules and regulations impacting the job and the work site.

Explains the impact of government regulations on the organization and the employee; e.g., liability insurance, workman's compensation, social security, immigration, taxes on wages, etc.

Complies with Americans with Disabilities Act (ADA), Equal Employment Opportunity Commission (EEOC), Immigration Reform Control Act, Employee Retirement Income Security Act, Workman's Compensation, Occupational Safety and Health Administration (OSHA), and Environmental Protection Agency (EPA) regulations.

Assesses political issues, government regulations, and public policies; votes in all local, state, and federal elections.

Demonstrates knowledge of business law:

- Defines and applies legal terms and concepts as they pertain to the work site.
- Applies legal principles in the decision-making process.
- Engages basic legal guidelines in work situations.
- Explains regulatory legislation as it relates to the work site; e.g., copyright, patent, and liability laws.
- Discusses bankruptcy and legal responsibilities.
- Consults with legal advisors as appropriate.

Addresses the social ramifications of computer applications related to privacy and reliability of systems.

Recognizes the financial and social implications in wasting and disposing of resources.

Maintains sense of accountability to community.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Systems Standard 2: Values the free enterprise system as it relates to the production, distribution, and consumption of goods and services, as well as, the use of income, capital, and commodities.

Tasks: Comprehends the fundamentals of basic economic principles:

- Defines and explains basic economic terms.
- Applies basic economic principles.

Identifies the major macroeconomic problems confronting the economy of the United States:

- Discusses the significance of the U. S. Government, partisan politics, ethics, and personal accountability as these relate to the economies of the organization.
- Develops an awareness of international integration and the rise of supranational economic systems.
- Conceptualizes the internationalization and multinationalization of business enterprises.

- Comprehends factors which affect the stock market industrial average.
- Describes the U.S. monetary system.
- Differentiates among the four major market models: pure competition, pure monopoly, monopolistic competition, and oligopoly.
- Distinguishes among the forms of business ownership (sole proprietorship, partnership, corporation, cooperative).
- Visualizes the interrelationships, dynamism, and complexity of systems within business organizations and the general economy.
- Justifies methods of distributing profits.
- Explains the importance of productivity and efficiency and the individual's responsibility for and contribution to profitability.
- Clarifies fixed and variable costs.
- Explains how inventory and asset control, overhead, maintenance costs, and cost of downtime affect business or industrial economics.
- Discusses the financial and administrative controls necessary for successful business operations.
- Explains the function of and steps for control and compares strategies for controlling resources, costs expenditures and productivity.
- Applies financial ratios.
- Defines return on investment, return on assets, and operating profits.
- Interprets the organizations financial statements and annual reports.

Identifies contemporary microeconomics issues:

- Describes the characteristics of a free enterprise economic system (ownership of property, profit motive, risk taking, competition, supply and demand).
- Translates the marketing function and the major issues in the local marketing environment.
- Summarizes the steps necessary to start a business; i.e., need, site selection, marketing plan, financial plan, management plan.
- Identifies key profitability factors for a business.
- Evaluates the impact of day-to-day operations on business profitability.
- Exhibits a perspective on interrelationships among the local economy, personal income, and employment.
- Compares the advantages and disadvantages of different financial institutions within the community.
- Specifies the relationships between local demographics and consumer trends.

Tasks unique to the specific occupation:

1. _____
2. _____
3. _____
4. _____
5. _____

Systems Standard 3: Knows how organizational and technological systems function.

Tasks: Describes the history, the goals, products, or services of the organization.

Identifies the major competitors of the organization and the nature of the competition.

Describes how the product or service integrates in and contributes to the larger market.

Identifies the direction of the future of the organization in regard to the current marketplace.

Interprets how promotion and sales are utilized in marketing and advertising.

Analyzes basic organizational structures and processes; describes positive and negative influences on each type of structure.

Compares the roles of the individual and the work group as a part of the organizational and technological systems.

Identifies the main characteristics of the various organizational forms (e.g., formal, line-staff, matrix, information, functional, line, etc.).

Describes and charts organizational structure (chain-of-command), functions, systems, processes, and terminology.

Clarifies basic business operations and productivity components (profit/loss, rate of return, revenue/expenses, inventory, public/private).

Follows organizational policies and procedures that govern support systems; e.g., accounting, budgeting, inventory, payroll, personnel, research and development, etc.

Responds to the demands of internal systems: marketing, inventory control, storage, distribution, transportation, budgeting and accounting, etc.

Identifies tax responsibilities of the organization; e.g., sales tax, income tax, foreign taxes, etc.

Recognizes cash flow problems; discusses strategies for correcting problem.

Applies basic production concepts and theories to production situations.

Interprets the main functions of management and how these functions apply to the work group and to the individual.

Compares the skills and knowledges, the roles and job of supervisors and managers.

Identifies characteristics of problem employees, the necessity of discipline, classifications of disciplinary problems, and disciplinary due process.

Explains how relationships among departments and other organizational units affect productivity.

Articulates the impact of storage, distribution, and transportation systems on work group, individual efforts, and productivity.

Applies principles of physical sciences to avoid hazardous conditions and to protect oneself and others.

Appraises the individual's impact on the profitability of the organization.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Systems Standard 4: Predicts impact of own and work group's actions on the operations of organizational and technological systems.

Tasks: Models behaviors consistent with the organizational culture.

Assesses unfavorable relationships among departments and organizational units as they affect productivity.

Enforces a corporate code of conduct; models ethical behavior.

Interprets and applies organizational regulations, standards, policies, and procedures.

Demonstrates the importance of open relationships between line and staff.

Identifies the relationship of one job activity to another in causing an environmental or safety problem.

Interfaces with all levels of employees in the work site to enhance information systems.

Identifies and evaluates business opportunities for the organization.

- Works as an intrapreneur to assure prosperity for the organization.
- Assesses national and international trends.
- Evaluates business or industry growth potential.
- Evaluates major competitors.
- Discovers new target markets for a product or service.
- Analyzes the impact of U.S.A. and international laws on business operations.
- Identifies opportunities for expansion of business or industry.
- Recognizes a business plan that will provide an acceptable profit.
- Describes the risk and profit motive factor.
- Identifies strategies that will maximize profit potential.
- Facilitates moves from research and development to production.

- Relates the value-added concept to the organization's product or service.
- Explains the relationship between costing and pricing; why cost factors are not constant; and factors to consider when establishing price.
- Recognizes and acts on intrapreneurial potential of self and others.
- Identifies and complies with business regulations, standards, and licensing requirements.
- Manages financial and physical resources.
- Evaluates the role and activities of organized labor in the workplace and community.

Tasks unique to the specific occupation:

1. _____
2. _____
3. _____
4. _____
5. _____

Systems Standard 5: Supports total quality management principles.

Tasks: Contributes to developing and maintaining quality processes.

Masters quality terms and definitions.

Explains the basic concepts and elements of quality control through the product life-cycle from product concept, research, development, purchasing, production, control, and testing.

Defines, applies, and reinforces the major initiatives of Total Quality Management (TQM): customer satisfaction; employee empowerment; continuous improvement; teamwork;

benchmarking; leadership; shared vision and constancy of purpose; training; process; measurement and assessment; reduced cycle time; elimination of waste and defects; and cost of quality (cost of nonconformance).

Strives for internal and external customer satisfaction: demonstrates empathy, good manners, and courtesy; responds diplomatically.

Clarifies how customer satisfaction and quality varies.

Establishes and evaluates plans, methods, and procedures to achieve quality.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Systems Standard 6: Distinguishes trends and anomalies in any one system's performance.

Tasks: Tracks current economic conditions, database information, and market trends pertinent to the success of the organization.

Analyzes and interprets test data for compliance with specifications.

Uses quality process analysis tools and basic statistical methods.

- Applies statistical techniques to gather information, to plot, and to interpret charts, to establish data reliability, and to identify expected results.

- Employs the scientific method in general for qualitative and quantitative analysis, problem identification, data gathering, direct and indirect observation, and predictions.
- Synthesizes major elements in quality control and assurance:
- Monitors the changing work environment.
- Analyzes trends in area of responsibility.
- Prepares documentation of work in area of responsibility.
- Determines sources and methods of assuring work area productivity.
- Implements sound financial principles, pertaining to system requirements; e.g., produces and maintains audit trails.
- Maintains system and physical security.
- Maintains control of processes: applies standard operating procedure; monitors the process; reviews collected data; maintains control parameters; troubleshoots process problems; takes corrective action as required; insures quality control.

Applies evaluation techniques to analyze procedures, data flow, problem areas, programs, work scheduling, and control in order to effect cost reductions.

Evaluates incidents with a site-wide perspective: applies evaluations to site-wide concerns.

Identifies and corrects technical errors.

Modifies behavior based on feedback and evaluation; encourages team behavioral changes based on feedback and evaluation.

- Employs brainstorming; problem-solving; checksheets; weighted voting; nominal group technique; criteria ranking form; paired comparisons; process flow diagrams; customer surveys; force field analysis; Gantt charts; and PERT charts to assess and resolve problems.

- Describes a production process: makes a process chart; constructs histograms, run charts, scatter diagrams, and normal distribution curves from data obtained by counting or measuring; and determines production quality by calculating process capability and tolerance bands and comparing them on a normal distribution curve.

- Adjusts and controls a process by using information from a control chart: designs control charts for x and R for a process; uses a measurement-control chart for x and R to keep a process in control; and uses an attribute-control chart for p to keep a process in control.

- Tracks work processes through the use of basic statistical measures: calculates mean, mode, and median for a set of data; draws a histogram to represent frequency distributions of data; and calculates the range and standard deviation to describe a set of data.

- Recognizes anomalies in data collection.

- Interprets descriptive statistics, statistical charts, and tables appropriate to work site.

- Creates displays for a given set of data; e.g., graphs, tables, charts.

- Reports deviations from prescribed list of responsibilities, standard operating procedures, and protocol.

- Determines the rate of occurrence in a process through the use of probabilities: finds the probability of an event; determines the number of ways an event can occur; and draws a diagram and/or a chart to help find probability.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Systems Standard 7: Leads quality teams through continuous improvement strategies.

Tasks: Recognizes the interrelationships and dependencies among employer and employees, internal and external customers.

Relates job operations to the entire organization.

Outlines the steps in a problem-solving process and applies to work site systems.

Maintains work flow: prioritizes work; organizes work; applies time-management techniques; monitors and communicates progress; and completes assigned tasks.

Interprets the process of delegation, the rationale for delegation, and the drawbacks of delegation.

Interviews, selects, trains, and evaluates performance of work group members.

Analyzes the design, productivity, and use of the work area.

- Organizes for quality control; practices; and monitors quality as a team worker.
- Leads team in developing flow charts for process analysis.
- Exceeds quantitative and qualitative standards and expectations.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Systems Standard 8: Recognizes international standards that are associated with the competitive quality arena.

Tasks: Recognizes the importance of quality performance in a world competitive environment.

Interprets international standards associated with the competitive quality arena.

Supports efforts of the organization to receive ISO-9000 certification.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Systems Standard 9: Adheres to safety regulations and procedures according to federal, state, local, and work site safety and health laws and with regard to process, product, and people.

Tasks: Plans safety into every assignment and job.

Follows safety requirements applicable to the work area: job, tools, and equipment.

Explains the characteristics and potential impact of ergonomics on work site design, productivity, and safety.

Interprets established housekeeping procedures.

Maintains clean, safe, and organized work area.

Monitors work area to ensure adherence to safety standards.

Informs the supervisor or work team leader of unacceptable or questionable workplace practices and recommends corrective action.

Identifies, reports, and documents unsafe conditions.

Reports all accidents, safety violations, and injuries.

Takes corrective action on unsafe conditions; intervenes to stop an unsafe act.

Abides by rules regarding hazardous materials and wastes, specifically under the Occupational Safety and Standards Act--OSHA standards.

Describes proper safety procedures for working near or with pressurized and electrical systems, energy, heat, cold, rotating machines, and chemicals.

Lifts and moves heavy objects using correct procedures.

Defends safety precautions, techniques, procedures, and maintenance requirements.

Promotes and encourages safety among co-workers.

Assumes responsibility for the safety of others.

Illustrates proper lockout techniques.

Participates in safety training programs.

Shares safety ideas and improvements with others (individuals, groups, units, divisions).

Conducts safety meetings.

Describes causes and preventions of accidents.

Identifies potential real and hidden costs of work site accidents.

Appraises safety programs.

Recommends improvements to the safety program.

Identifies and abides by applicable safety codes, regulations, and standards.

Obeys safety symbols and signs.

Applies regulations for fire protection.

Identifies fire exits.

Exits work site according to egress regulations.

Keeps aisles clear of equipment and materials.

Operates portable fire extinguishers according to rules and specifications.

Extinguishes fires according to rules and specifications.

Follows infectional control measures.

Follows the chain-of-command or authority for emergency response.

Recognizes potential emergency situations.

Cooperates with federal, state, and municipal governments in response to emergencies.

Creates a work site disaster recovery plan; tests disaster recovery plan; documents the system; defines critical applications; assigns tasks to responsible persons; modifies disaster recovery plan; maintains disaster recovery plan; develops alternate disaster recovery plans; distributes the plan.

Locates and properly uses emergency and protective equipment, tools, clothes, and areas.

Qualifies to administer basic first aid in case of emergency.

Maintains currency in American Red Cross CPR and first aid training.

Implements emergency procedures, when necessary.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Systems Standard 10: Maintains total wellness of self: mental, physical, emotional.

Tasks:

Explains the fundamental principles of the general life sciences: health threats and causes of diseases; disease prevention and control; bacteria and viruses; chemical abuse; life processes; and stages of physical and emotional growth.

Applies knowledge of life sciences, such as biology and human growth and development, to overall well-being.

Pursues life-long health and well-being by regularly participating in physical activity.

Adheres to a balanced, healthy diet.

Participates in health enhancing physical activity at least three times a week for 30 or more minutes per occasion.

Recognizes the risk and safety factors, the benefits, costs, and obligations associated with regular participation in physical activity.

Applies principles of body mechanics to such activities as lifting, walking, running, etc.

Manages stress-related events or activities.

Recognizes the negative impacts of inhaling, ingesting, injecting, or absorbing chemicals.

Maintains weight appropriate to height, age, and other physical or medical factors.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Systems Standard 11: Recognizes and acts upon needs for continuing education, obtaining credentials or licensure, and participating in professional organizations.

Tasks: Values lifelong learning for self and others.

Evaluates current knowledge, skills, behaviors, and related training opportunities.

Compares professional and personal goals with organizational philosophy and goals.

Meshes personal and professional goals.

Composes career goals and a professional growth plan.

Establishes time frame for achieving goals and takes action.

Reviews progress for goals; reevaluates goals.

Keeps abreast of technological advancements, business and industry trends.

Maintains technical proficiency and workplace skills.

Utilizes in-house resources and company benefits for upgrading knowledges and skills.

Participates in organizational training opportunities, external workshops, seminars, conferences, trade shows, manufacturer's and vendor's training.

Seeks credits or Continuing Education Units (CEUs) in advanced job-related coursework.

Attends local community or technical college or university and accumulates credits or CEUs.

Transcripts in-house courses from American Council on Education (ACE) National Guide.

Pursues advanced degree.

Obtains and maintains industry or business standard certifications.

Recognizes organizational and departmental human resource needs.

Participates in training and curriculum development for work group.

Relies on personal resources before approaching others for help.

Maintains currency with regulatory guidelines.

Interprets current legislation, regulations, and policies regarding work area and occupation.

Maintains English, mathematical, and computer skills.

Experiments with computer technologies.

Subscribes to business and industry publications.

Reads trade journals, operation and maintenance manuals, newsletters, brochures, and other periodicals.

Participates in user groups or internal customers' activities.

Joins and supports professional societies and organizations.

Joins community service organizations.

Participates as an advisor to local schools and colleges.

Identifies effective methods to secure, maintain, and terminate employment.

Recognizes the importance of financial planning for retirement.

Takes initiative in the evaluation of one's own performance.

Responds to suggestions and criticisms with a positive attitude (i.e., is receptive to the feedback, is not defensive, aggravated, sullen, etc.).

Utilizes feedback constructively to remedy identified area(s) of weakness(es).

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Systems Standard 12: Recommends modifications to existing organizational and technological systems to improve products or services. Develops new or alternative organizational or technological systems to improve performance.

Tasks: Demonstrates current knowledge of products, customers, and organization.

Analyzes, modifies, and creates systems for operational improvement.

Eliminates waste and defects, recognizing the cost of nonconformance or variations.

- Explains costs incurred by waste or by correction of process, product, and services.
- Takes corrective action before it is required.
- Works with affected constituents to resolve mutual problems.
- Evaluates energy management alternatives.
- Contributes to process reengineering.
- Collaborates with others to establish industry-wide standards and self-regulation.

Develops, revises, disseminates, and explains procedures and policies specific to the work site.

Employs statistical process controls to negotiations, trend analysis, quality, and courses of action.

Analyzes organizational structure for the best methods of achieving goals and productivity; recommends modifications or alternatives through written and verbal communications.

Designs systems: determines customer requirements; analyzes current processes; develops plan to change a process; establishes system parameters; defines support and resource limitations; complies with government and industry standards; analyzes systems resources/tools/limitations; develops milestone schedule; consults with manager(s) and team; estimates costs;

performs computer system modeling; develops preliminary changes; draws systems layout; recommends changes to system; presents to management.

Creates or revises, communicates, maintains, and evaluates operating procedures in the work site.

Strives to assure profitability of all processes on an on-going basis.

Produces flawless products or services in a just-in-time atmosphere.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Critical Element: Technology

Measure: Works with a variety of occupational specific and ancillary technologies.

Technology Standard 1: Judges which equipment, including computers and related technologies, will produce the desired results in the work area.

Tasks:

Applies the fundamental principles of the general physical sciences: concepts of heat and cold, temperature (Celsius and Fahrenheit), pressure, motion, energy, resistance, and chemical reactions (reactives, corrosives, compatibles, flammables, etc.).

Interprets the principles of electricity, simple machines, and hydraulics.

Locates basic information on the periodic table.

Explains the impact of changing technology on the work environment.

Translates organizational standards and specifications for commonly used tools and equipment.

Demonstrates basic knowledge regarding production and service processes.

Utilizes computer hardware and software at the application level.

Appreciates the necessary interaction of people and computers for productivity.

Interprets the social, legal, and ethical ramifications of computer privacy.

Assesses the advantages and disadvantages of leasing equipment and tools including computers and peripherals.

Demonstrates the uses of basic hand and power tools specific to the occupation.

Recommends equipment purchases: identifies need; identifies constraints (budgetary, standardization); notes compatibility with

other equipment; examines expandability; checks for conformity with specifications; researches available equipment; evaluates selected equipment; submits recommendation; generates purchase order.

Locates vendors and new sources and techniques for changing or upgrading existing equipment.

Plans workplace layout and equipment requirements.

Writes technical reports to describe the operating characteristics, malfunctions, deviations from design specifications, and functional limitations of equipment and tools specific to the occupation and work site.

Performs measurements in English and metric systems.

Visualizes the appropriate technology to achieve high productivity.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Technology Standard 2: Selects technology and chooses protocol in the work area.

Tasks: Oversees and manages operation of equipment.

Manipulates equipment that serves as an accessory and support for specific technical skills.

Describes the functions of a computer operating system; explains applications of DOS; identifies proper file names and types of files; illustrates directory structure; illustrates path; recognizes error messages and corrects problems.

Creates, edits, and prints a document using a word processing software package.

Creates, edits, and prints a worksheet and various graphs using a spreadsheet software package.

Creates, edits, and prints from a database software package.

Describes the interaction of different parts of machines and the interaction of these machines with broader production systems.

Analyzes work flow in the work site to determine the best use of equipment.

Suggests improvements in work methods and procedures for repairing, calibrating, troubleshooting, or installing equipment.

Assembles and sets up equipment from instructions.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Technology Standard 3: Identifies, solves, and prevents problems with work site equipment, including computers and other technologies. Integrates multiple displays of data and links symbols in technological systems.

Tasks: Exhibits research skills which demonstrate the ability to locate vendors, documentation, new sources and new techniques for maintaining and upgrading existing equipment.

Follows the established operating standards (e.g., EPA and other industry standards such as ISO-9000) when using equipment.

Performs advanced troubleshooting procedures using diagnostic tools.

Engages in problem-solving discussions with others to find out why a machine or a process is not working.

Follows organization safety regulations when installing, maintaining, repairing, or troubleshooting instruments.

Recommends service and/or maintenance as required:

- Creates a preventive maintenance program for the work area.
- Reviews scheduled maintenance program.
- Selects maintenance materials.
- Schedules maintenance service.
- Performs maintenance.
- Documents maintenance activities.

Manages equipment and tools by maintaining a tracking system and records; scheduling service, equipment, and tools; and by renting or leasing equipment when time and revenue may be saved.

Updates technical instructions or procedures for equipment.

Takes proper care to avoid damage to or loss of equipment.

Analyzes protocols, methodologies, and systems for transmission of data, text, voice, and graphics.

Integrates operating functions of automated systems utilizing current and standard word processing, spreadsheet, and data base software.

Identifies and defines needed features and functions of operating systems software.

Identifies and defines needed features and functions of applications software.

Adheres to the basic care and proper use required for computers.

Tasks unique to the specific occupation:

1. _____

2. _____

3. _____

4. _____

5. _____

Critical Element: Languages

Measure: Communicates in a primary and secondary language.

Languages Standard 1: Exhibits mastery of verbal and written English and verbal fluency in a secondary language, such as Spanish.

Tasks: Possesses foreign language capability, especially in Spanish; i.e., writing, reading, and conversational abilities.

Speaks a foreign language at a conversational speed, in the context of typical daily activities of the country and culture.

Produces the sounds and prosodic features of a foreign language in a manner comprehensible to native speakers.

Reads short selections in a foreign language on various topics dealing with foreign life and culture.

Writes simple structurally correct sentences in a foreign language describing daily activities.

Tasks unique to the specific occupation:

1. _____
2. _____
3. _____
4. _____
5. _____

Critical Element: Traits, Attitudes, and Behaviors

Measure: Cultivates desirable attitudes and behaviors.

The worker will be:

Accountable	Disciplined	Listener	Professional
Accurate	Discreet	Loyal	Prompt
Aggressive	Drug-free	Mannerly	Punctual
Ambitious	Empathic	Mature	Quality-oriented
Analytical	Energetic	Mechanically-oriented	Questioner
Assertive	Enthusiastic	Methodical	Reliable
Calm	Ethical	Meticulous	Resilient
Clean	Even-tempered	Motivated	Resourceful
Committed	Firm	Neat	Respectful
Competitive	Flexible	Networker	Responsible
Concerned	Focused	Nondefensive	Self-confident
Confident	Friendly	Nonjudgmental	Self-motivated
Congenial	Futuristic	Nonpossessive	Self-starter
Conscientious	Genuine	Objective	Sensitive
Considerate	Goal-oriented	Observant	Service-oriented
Consistent	Gracious	Open-minded	Sincere
Cooperative	Helpful	Optimistic	Social
Courteous	Honest	Organized	Spontaneous
Creative	Humble	Outspoken	Sympathetic
Cross-trained	Humorous	Patient	Systematic
Current	Imaginative	Persistent	Tactful
Decisive	Independent	Personable	Tenacious
Dedicated	Innovative	Pleasant	Thinker
Delegator	Inquisitive	Positive	Thorough
Dependable	Intelligent	Pride	Thrifty
Determined	Interesting	Proactive	Tolerant
Diligent	Intuitive	Productive	Trustworthy
Diplomatic	Learner		Versatile

Chapter 3

INSTRUCTIONAL METHODOLOGIES APPROPRIATE FOR THE INTEGRATION OF WORKPLACE COMPETENCIES IN TECHNICAL PROGRAMS

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INSTRUCTIONAL METHODOLOGIES APPROPRIATE FOR THE INTEGRATION OF WORKPLACE COMPETENCIES IN TECHNICAL PROGRAMS

Instructional responsibilities and teaching strategies for integrating the new, generic workplace competencies in two-year technical programs were identified through a literature review; nominated and confirmed by TQWFPC employers; and, reviewed and evaluated by community and technical college educators.

Instructional Responsibility

As discussed in chapter 2, a survey questionnaire was mailed to employers in the 24 TQWFPCs and various state employer advisory committee members, as nominated by community and technical college administrators. Employer respondents chose between the "College" and the "Employer" as the preferred instructional provider for each workplace competency statement. Recommended by 28 percent of the TQWFPC employer population, the identification of the primary instructional providers rendered statewide employer views and insights. The opportunity to nominate other instructional providers was an option; i.e., the high school, student, family. (See Appendix E, *Responsibility for Teaching Workplace Competencies as Determined by Employers in Texas Quality Work Force Committees.*)

A provider receiving a score of > 55 percent was considered to have a "significant role" in the delivery of a particular competency. The "Employer," as well as the "College," received high scores under four categories, respectively. The "Employer" received higher scores under Resources, Technology, Quality, and Environments (Safety, Wellness, Lifelong Learning). The "College" received higher scores under Information, Systems, Free Enterprise/Economics, and Language/Multilingualism. Of the 51 total competencies both the "College" and the "Employer" shared equally for the instruction of 47 competencies. These 47 competencies fell in the 2nd and 3rd quartiles or > 25 percent and < 75 percent, implying a need for college and employer collaboration and cooperation in most categories. Among the competencies nominated for shared responsibility were:

- Prepares budgets and tracks expenditures for work area.
- Assesses knowledges and skills of self and work group.

- Contributes to group effort, ideas, information, and improvement.
- Generates credibility and trust.
- Listens to feedback from co-workers and makes adjustments.
- Teaches others new skills; helps others learn.
- Appreciates differences among people from diverse cultural, educational, and social backgrounds.
- Makes judgments and decisions on the basis of a person's skills and performance.
- Chooses ethical courses of action.
- Predicts impact of own and work group's actions on the operations of organizational and technological systems.
- Develops new or alternative organizational or technological systems to improve performance.
- Judges which equipment, including computers and related technologies, will produce the desired results in the work area.
- Leads quality teams through continuous improvement strategies.
- Analyzes the design, productivity, and use of the work area.
- Maintains total wellness of self: mental, physical, emotional.

Teaching Strategies

In the spring, 1995, workshops regarding the research on the newly nominated generic workplace competencies and instructional delivery systems and methodologies were conducted for community and technical college educators. The workshops provided synopses of relevant literature and research, advantages and disadvantages of most instructional methodologies, and descriptors of instructional partners and providers.

Through a nominative process these educators offered practitioner insights for the best use of each methodology or combined methodologies and the most effective instructional providers. The result of this process provided a prioritized list of instructional strategies: field experience, internship, simulation, field speakers,

troubleshooting exercises, interdisciplinary instruction, problem-solving debate, team/group process, special/team project, job specific role-playing, and case study. Directed external work-based learning experiences were considered key to the mastery of generic workplace competencies and essential to the confirmation of college-based instruction.

Overview of Instructional Strategies

Community and technical college faculty will continually search for an optimal instructional methodology. However, experience and research indicate that there is no one best way to teach and that each instructor must select a teaching style that can adapt and combine the basic methods of instruction to fit various conditions. Some different methods that faculty utilize are: lecture, self-instructional, computer-assisted modules, demonstration, laboratory and simulation exercises, role play, group discussions, team tasks, case studies, distance multimedia education, and directed external learning experiences. As requirements for human and material resources differ among methods, faculty choices are limited by time, expertise, and financial parameters.

Generally, faculty do choose or combine instructional methods based on program objectives, student characteristics, resources, instructional support systems, and the unique features and advantages of a particular methodology. Additionally, learning outcomes/competencies influence the choice of an instructional method. For example, a lecture combined with readings and group discussions may be employed when the mastery of facts, concepts, or principles is important. If applying knowledge is considered as the primary objective, faculty may choose the case study, simulation, laboratory methods, or directed external learning experiences. Affecting attitudes or feelings remains the challenge for most faculty, some of whom choose to serve as role models and to employ simulation and directed external learning experiences for changing behaviors.

Yet, the primary concern of most faculty is the individual differences among students. As students differ in ability to learn, learning styles, motivational needs, experiences, and attitudes and traits, the major problem becomes designing instruction for a heterogeneous group.

Most faculty practitioners agree that each instructional methodology has merits; but, to assure student mastery of content and practice, as well as changes in attitudes and habits, faculty must test and choose instructional methods using a set of accepted educational guides. The following checklist has facilitated the best choice of a methodology or combined methodologies for faculty:

- high standards for and expectations of students;
- clear specifications of expected outcomes;
- respect for diverse abilities and learning styles;
- coherent, sequential, and "active" learning;
- meaningful learning materials and activities;
- frequent student-faculty contact;
- time for study and practice;
- participative and collaborative learning;
- continuous and relevant practice of learned skills;
- practical problem-solving experiences;
- integration of education and experience; and,
- assessment, immediate and frequent feedback, and tangible rewards.

A brief overview of several instructional methodologies are examined and summarized in this chapter: lecture, group discussion, teams, demonstration, case study, laboratory, individualized, distance multimedia, simulation, and external learning experiences.

Lecture

The lecture method is the most traditional and perhaps most utilized method in college classrooms. Most frequently problems arise for faculty who choose the "monolithic" lecture method and fail to recognize the advantages of combining a lecture with other methodologies. Lectures can be impactful and instructive; but, several procedures and accepted approaches and practices should be observed if this method is used:

- The lecture contains a variety of approaches; e.g., demonstrations, problem-solving groups, questions and answers, media.
- Student participation is required through problem resolution, case studies, controversial topics, etc.

- Faculty elicit each student's attention through voice control, eye contact, relevant examples, quotes, presentation pace, and a variety of stories that link to the topic, to name a few.

- Faculty read only occasionally to the students, as material presented extemporaneously is more effectively received and retained.

- Presentation of concepts and ideas are made sequentially, from simple to complex.

- Copies of transparencies, lecture outlines, notes from extraneous readings, and other support materials are distributed before the lecture.

- Faculty avoid distracting behaviors.

- After each ten-minute lecture segment, faculty summarize major points, as students tend to think about many things, relevant and irrelevant to the topic.

- Assigning readings of related, complex material produces more effective student responses than lecturing about the same material.

In summary, when the instructional objective is merely to transmit information, the lecture method is generally as appropriate as other methods. However, the lecture method is less effective if the course requires application of concepts, mastery of problem-solving abilities, or attitudinal changes.

Group Discussion and Team Tasks

Typically, group discussions or team-assigned tasks are issue-centered and structured. Students have an opportunity to work with others and combine their thoughts and efforts in completion of an assignment or resolution of a problem. The purpose of classroom discussions is to review principles and concepts and resolve issues and problems. Frequently, clarification of the values of participating students is an added bonus. To be most effective, discussions should focus on topics over which there can be differences of opinion, no established right or wrong solution, and controversy or debate.

This strategy is especially effective if the assignment is difficult or unfamiliar to the students. By working in a group or team of no more than eight students and preferably five, the student may find support, understanding, security, and less frustration in accomplishing an assignment. Group interactions and inclusive relationships can assure a higher retention rate among most students (McKeachie, 1983b).

As students share knowledge and experiences more easily in a small, structured group or team setting, group assignments external to the classroom extend the benefits gained from group relationships. Acquiring common experiences may occur spontaneously from an outside assignment, such as an assigned reading or employment, or may result from structured group work as the course progresses. Experiments, role playing, field trips, and other activities may provide the basis for a discussion or a problem-solving activity.

Research regarding the group discussion and team methodology suggests that:

- The method can encourage higher levels of reflective thinking utilizing the higher domain of cognition or application, synthesis, and evaluation.
- The method can increase problem-solving ability. Student-centered discussions seem more favorable for achieving the more complex educational outcomes.
- Facts, concepts, or principles learned through group discussion and measured in 6 months by objective tests are retained longer than those learned through lecture.
- Discussions led by a facilitative instructor produce higher quality answers and responses.
- The discussion method can be more effective than the lecture method when the objective is to change content-specific attitudes.
- When students are rewarded for defending a viewpoint different from their own, attitudinal changes occur more frequently.
- The larger the group or team the more likely the discussion will be monopolized by a few students. Small groups of less than eight students better facilitate shared responsibility and participation, allowing for optimum results.

Demonstration

As a process, demonstration can enable one student or a small group of students to show classmates how to do something or allow faculty to illustrate an idea, concept, or principle. When mastery is required, demonstration aids learning by offering students the opportunity to engage all their senses. If a thorough demonstration of procedures is made prior to student participation, faculty can reduce hazards of the length of trial-and-error time for student experimentation. However, a demonstration

can be ineffective if faculty do not allow active feedback during the activity, resulting only in student imitation without understanding.

Case Study

Case studies require the collection and analysis of information, decision-making, and the formulation of solutions and recommendations. Prior to assignment, the case study requires careful planning by the faculty: i.e., clear and specific objectives and guidelines, precise descriptions, and evaluation techniques.

Multimedia tools, including computer software, film, video, written materials, and oral presentations, can be effectively employed in case study methodology.

Basically, there are two types of case studies: integrated and nonintegrated. An integrated case study is a detailed account of an event or company and is used as reference throughout a course. This type of case study can address issues or contain content problems for each topic. The nonintegrated case study is used when several cases are required to address different and unrelated topics.
The case study method induces student involvement or "interactive" learning. When analyzing a case study that describes a hypothetical or realistic situation, the student can master meaningful and understandable problem-solving approaches.

The Laboratory

The laboratory methodology has been utilized successfully in the science, language, electronics, drama, writing, and computer science disciplines. Generally, the laboratory affords students the opportunity to apply concepts and principles, to practice problem-solving, and to master competencies in a particular area.

Most often the laboratory is designed to reinforce:

- skills (manipulative, inquiry, investigative, organizational, communicative);
- concepts (hypothesis, theoretical model, taxonomic category);
- cognitive abilities (critical thinking, problem-solving, application, analysis, synthesis, evaluation, decision-making, creativity);
- nature of the discipline (the enterprise, professionals and how they work, the existence of a multiplicity of methods, the interrelationship between disciplines);

- attitudes and aptitudes (curiosity, interest, risk-taking, objectivity, foresight, confidence, perseverance, satisfaction, responsibility, consensus, and collaboration, etc.) (Alexander, Davis, Azima, 1978).

Laboratory methodologies, such as simulation and directed off-campus experiences, have similar characteristics; however, they differ in terms of the degree of situational reality and control. When well-designed and closely monitored, the "laboratory" affords student benefits that are familiar to most faculty:

- "hands-on" experience with "live" materials;
- the actual application of the scientific method of inquiry: observation, collection, analysis, interpretation, and evaluation;
- the development of scientific, analytic skills that may be transferable to other disciplines;
- motivational activities fostered through relevant study and practice;
- the opportunity to experience indeterminate or unidentified problems peculiar to the activity.

Individualized

The essence of individualized instruction is instruction designed for each individual student. Faculty who design individualized courses must focus on a variety of learning experiences for different types of students, as students are distinct along several dimensions: entry-level skills, basic literacy, interests, motivation, rate of learning, attitudes, and prior experiences. A comprehensive, complete assessment of each student must be made prior to prescribing an individualized course of planned, self-paced learning activities. Additionally, continuous follow-up activities and close, supportive relationships between the students and faculty must be designed into any individualized instructional program.

Individualized instruction requires more design and development time for faculty and staff, thus creating new funding and faculty load issues for college administrators. Unique and special faculty competencies are required for the design and implementation of this methodology. An intensive faculty professional development program may be necessary before the design phase is begun.

As most individualized instruction is self-directed and as inexperienced, entry-level students generally underestimate the amount of time needed to complete assignments, these same students may place a low priority on an individualized course and experience early failure. Yet, computer-based instruction offers open-ended

opportunities for the development of individualized instruction and, if programmed for immediate response, will not allow procrastination on the part of students. Additionally, courses designed to fit the needs of each student affect other courses in a program, as students may not acquire prerequisite skills on a timely basis for a higher-level course. The absence of basic skills can create problems for faculty as well as students in an integrated degree program.

The features of individualized instruction can offer guidance to faculty in the design of any course and choice of other methodologies. Certainly, consideration of each type of student throughout the design, construction, and implementation phase of a course or program is an imperative requirement for excellence.

Distance Multimedia Education

The transformation of instruction through computer-supported technology has enabled faculty to overcome distance, time, space, pace, access, and curriculum limitations, without adversely impacting student success and mastery learning. Technological impact on teaching and learning will continue to erase differences between site-based and distance education, to change faculty and administrative responsibilities, and to encourage worldwide networking. Today distance education is supported by computer networks as well as different mediums of exchange; e.g., paper materials, audio/video materials, one-way audio, two-way audio, one-way video and two-way audio, and two-way video.

As a large segment of the community and technical college students are full- or part-time workers, distance education becomes an attractive option. Most adult learners enjoy freedom of choice, have a low tolerance for time wasted, and want to determine their own learning experiences in terms of time, space, pace, medium, and access. Essential to the success of meeting these needs and allowing these choices is substantive and critical interaction among the faculty and students. A critical component in the design of distance education is planned, interactive communications among faculty and students. Computer networks can offer an electronic option for this social imperative, either through synchronous or real-time sessions or through asynchronous or delayed sessions as with electronic correspondence. Teleconferencing is another methodology that affords this necessary interaction. Using this method, instructors can establish interactive, synchronous sessions with students and known experts in open-ended discussions.

Wide-Area Networks (WAN) or the "Information Superhighway" impacts the public and private sectors daily. The International Communications Network (Internet) presents an opportunity for a national information infrastructure that would allow information to flow into and out of any organization that is equipped with a computer. Public and private education now access instructional resources through this medium; and, students use the same medium to study and learn.

Activities using the Internet can include: corresponding with experts on specific discipline-related questions, collecting data from a variety of international areas, reviewing discipline-related journals and abstracts, or communicating with other faculty and students at distant locations. Before faculty can guide students in navigating the WAN or Internet, time and resources must be provided for faculty schooling on these new concepts and systems. Until college educators gain experience and confidence in distance education, only traditional methodologies will be used.

Several barriers can prohibit instructional utilization of telecommunication technology:

- utility infrastructure,
- institutional infrastructure,
- technology development,
- rate structures/cost of access,
- funding policies,
- institutional traditionalists,
- institutional policies regarding transfer of distance learning course credit,
- student support services equal to on-campus services,
- faculty support, and,
- clarification of electronic transmission of intellectual property and copyrighted materials.

Presently, the in-state telecommunications infrastructure is inadequate; and, out-of-date equipment is incapable of handling telecommunications technology. Complicated rate structures or cost of access, as well as funding uncertainties, impose financial burdens on most colleges. The expenses required for initial capital outlay and operational software may afford economy of scale, but may not significantly reduce overall costs of instruction. Also, accrediting groups continue to require comparable support services between on- and off-campus courses. Many colleges lack the technical support services needed for producing materials for telecommunications courses; and, frequently the cost of purchasing or licensing the materials is high and may not have a long shelf-life.

Nevertheless, instructional telecommunications can increase the availability of courses, improve access to education for traditionally under-served areas, and provide courses relevant to occupational shortages (THECB, 1995).

Simulation

Simulation methodology involves students in actual and "active" practice in situations that demand problem resolution, motor skill development, role playing, or decision-making. Students can learn by experiencing the consequences of their actual decisions and actions. The best defense for the adoption of simulation methodology is that students are permitted to become involved in directed, "live" learning activities without risking the consequences of a work environment. Testing critical thinking abilities and new skills and behaviors in a simulated environment can serve to motivate students to participate and better perform in future employment situations. Generally, more time and funds are required for the developmental phase of simulation exercises than for the first phase of other more traditional methodologies; however, once developed, simulations may be reused and the continuance costs tend to be more economical.

Computer-based applications have afforded additional simulation opportunities; and, multimedia technology is the basis of many simulations. Through the computer technologies, scientific lab experiments can be made safe and inexpensive; reading assignments for a history course can become interactive with the problems, people and circumstances of a particular era; and, business case studies or "games" can illustrate economic models. Computer-assisted simulations have potential for greatly improving existing instructional practices.

External Learning Experiences

External learning experiences can broaden and deepen a student's educational experiences by providing new and different learning environments, by strengthening and confirming on-campus instruction, and by mastering important career-related competencies. A well designed and well managed off-campus experience can coalesce the emotional and psychological behaviors and the intellectual and physical abilities of a student. External learning experiences initiate a process of connecting learning, working, and living that can have lasting significance. In fact, "education is what you know, what you can do with your hands, your own brain, your own eyes, and how you can get along with others . . . directed off-campus learning experiences give the student this kind of education," stated Charles F. Kettering in an early Antioch College commencement.

In fact, the external learning experience offers the faculty an opportunity to create an individualized student learning plan that can be designed to meet a variety of

discipline-related requirements. For example, a student majoring in criminal justice or child development could work in a community and study a subculture's mores and relationships to the larger society, or, work in another culture outside the immediate community and study the aspects of that culture or the educational, economic, or social system. Central to the success of any external learning experience is a learning plan that stresses the development of discipline-related skills, the direct association with career professionals or skilled practitioners, a well-designed sequence of learning activities that directly relates to the student's major, and an opportunity to further personal growth and development.

Another way to clarify the potential outcomes of these experiences is by focusing on an analysis of individualized objectives incorporated in cooperative education at College of the Mainland: ". . . acquire specific job skills; explore a career/cluster compatible with personal values, beliefs, traits, and behaviors; employ a variety of information sources within an organizational environment; develop information-gathering and listening skills; speak clearly and demonstrate sensitivity to nonverbal communication; work in a team, give and inspire trust and confidence, and respect and take action with co-workers; work with others in defining problems, collecting information, developing and testing hypotheses, overcoming barriers, making and carrying out decisions . . . ." (McNutt, 1975b).

Directed external learning experiences offer a plethora of opportunities to enhance each student's skills, abilities, and behaviors. Faculty must determine appropriate avenues and time needed to significantly impact and change each student, however. When closely examined, external learning experiences that assure excellent learning opportunities and cultural, economic, vocational, intellectual and personal growth are directed external work-based learning experiences or cooperative education, internships, practicums, field experiences, clinicals, and apprenticeship. Under any of these options, a student can:

- apply and test theories in the work environment;
- practice complex technical, work-related skills;
- confirm a career choice;
- master generic workplace competencies;
- improve learning abilities;
- refine oral and written communication competencies;
- evaluate concepts, ideas, methods, techniques, etc., introduced in college courses;

- analyze various approaches to decision-making;
- participate in team preparation, meetings, and processes;
- work under conditions of uncertainty and innovation;
- cultivate desirable attitudes and behaviors;
- conduct "applied" research;
- broaden a view of self, the employing organization, and the community; and,
- identify requirements for achieving personal and professional goals.

Summary

Learning methodologies may be divided into two classes: passive and active. Passive activities include reading, listening, and observing. In each activity the student is concentrating on the acts or thoughts of another person--faculty, authors, or other students. Writing, speaking, and doing are, at least overtly, more active; and, in an active classroom, the student is more or less engaging in some form of self-expression. In either active or passive learning the student may be engaged in critical analysis, problem solving, or reaching a judgment. In either case, the student may only be memorizing for rote recall. The major distinction between active and passive methodologies is that when the student is engaged in passive learning experiences, there is no immediate or direct evidence as to the impact of the experience.

Teacher-centered learning activities, such as lecture or demonstration, place emphasis on passive learning. Group discussion, team activities, case studies, and simulation involve the dynamics of interaction among students and enlarge the scope of learning opportunities. Individual-centered instruction--conferences, directed external learning experiences, laboratory--is more likely to require active, creative, and evaluative learning. As the more active types of learning are evoked, even the passive activities of reading or of listening assume greater meaning because the student engages in these for more definite purposes. Self-directed, self-evaluated learning is more action centered than learning which is teacher-directed.

When choosing an instructional strategy or methodology for teaching workplace competencies, educators must nominate those strategies which afford an interaction with people, things, and the environment. A strategy that encompasses elements from all methodologies--lecture, group discussion, demonstration, case study,

laboratory, individualized, distance multimedia, and simulation—is the directed work-based external learning experience, a capstone experience, delivered through cooperative education, clinical, internship, apprenticeship, or practicum/field experiences.

Chapter 4

THE CAPSTONE EXPERIENCE AS A DIRECTED EXTERNAL WORK-BASED LEARNING EXPERIENCE

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The capstone experience, as a work-based learning experience, is a tested strategy where students learn knowledge both as substance and process (to know and to do) through partnerships with external entities. This strategy or methodology can be an effective choice of faculty for infusing generic workplace competencies in the technical curriculum and for confirming mastery of these competencies. The capstone experience has been defined as "a required learning experience such as a cooperative education course; a clinical education course; an internship; an apprenticeship; or a practicum or field experience that provides the student with the opportunity to apply all previous learning to real world situations, resulting in a consolidation and synthesis of the entire educational experience. The capstone experience certifies mastery of entry-level workplace competencies . . . . Other methods of fulfilling the requirement for the capstone experience include . . . licensure examinations . . . ; national certification examinations . . . ; a capstone course . . . ; and discipline specific special projects . . . ." (THECB CTC, 1995)

Differences Among Capstone Experiences

Directed external work-based learning experiences share many similarities but differ in the locus of control for instruction, course objectives, supervision, student responsibility, and duration. These differences range from total college control for the clinical education course to college and employer shared control and responsibility for the practicum/field experience, the internship, and the cooperative education course; to total employer or joint apprenticeship committee control for the apprenticeship program. For example, in the clinical education course the agreement between the college and clinical site permits faculty to teach in the clinical facility; whereas, in the apprenticeship program, the employer is primarily responsible for the total training program with the college or other agency contracting for the classroom-related instruction. In the shared control programs, both the college faculty and the employer/supervisor mentor and evaluate the student through a prearranged learning program.

Other differences occur in the creation of the learning objectives and competency profiles: from the clinical education course that gives full responsibility to the faculty for the objectives and competency profile; to the individualized learning plan that is devised by the student and faculty or the student, the faculty, and the employer in

the practicum/field experience, the internship, and cooperative education; to the employer or local apprenticeship committee that controls the on-the-job training plan.

College faculty are responsible for the supervision, regular instruction, and evaluation of students in the clinical facility. Under the practicum/field experience, the internship, and the cooperative education course, the on-site employer/ supervisor oversees the student at work and the faculty periodically visits the site to monitor the progress of the student and to evaluate progress toward achieving the learning objectives. Students must be compensated for their work through only two of the five work-based learning experiences--cooperative education and apprenticeship. The clinical education course is an unpaid experience. Students may or may not be renumerated under the practicum/field experience and internship. Credits for and length of the learning experience vary according to requirements of the technical program. (See Appendix F, *External Learning Experiences Locus of Control.)*

Benefits of Agreements

Whether designed as a cooperative education, clinical, internship, practicum/field experience course, or apprenticeship program, all experiences make a critical linkage, a connection, a continuum between education and work. The value of the directed work-based external learning experience is not in its separateness from on-campus activities, but in its capacity to test understandings and to complement and broaden the goals of formal academic and occupational preparation. In "tests of understanding" students must be involved in the appropriate application of concepts and principles to questions or problems that are newly imposed (Gardner, 1991). The community and technical colleges have the opportunity through a college and work instructional system to create new social understandings, to develop new competencies necessary for the internationalized workplace, and to provide self-assessed, self-directed, and self-evaluated learning for students in technical programs.

The accelerating influences of high technology and international events on the workplace and on the daily lives of students force the continuous evaluation and redesign of college curricula and the consideration of new alliances for an expanded classroom. Well planned articulation efforts among the community and technical colleges and business, industry, and labor have facilitated strong networking processes which identify the learning needs of the present and potential student body and the human and material resources necessary to fulfill those needs. The outcome of these efforts results in agreements tying the public or private sector, the college, the students, and the community into partnerships. Strengthening partnerships leads to the establishment of the best training and work configurations for students attending Texas community and technical colleges.

Focusing on the mastery of workplace competencies, community and technical college educators recognize that learning is best facilitated in an atmosphere where the student actively participates, influences the direction of the learning plan, discovers the relevancy of ideas, and evaluates his or her own progress. Practicum/field experience, cooperative education, clinical education, internship or apprenticeship strategies can offer all of these advantages and benefits. These strategies can assure a totally integrated and creditable approach to learning, while remaining responsive to the needs of each student. Directed external work-based learning experiences are not a substitute for in-class learning, but when offered in concert with on-campus instruction can become the "capstone" to a technical degree program. Agreements forged between a college and a business have proven beneficial to all partners.

For the students, agreements can:

- provide for the development of high-level workplace competencies and opportunities for better jobs;
- clarify career opportunities;
- validate instruction through challenging and creative work tasks;
- make campus studies relevant and more meaningful;
- provide mastery of state-of-the-art equipment;
- demonstrate the difficulties of getting something done;
- allow a planned and guided association with people of varying backgrounds;
- foster constructive relationships with colleagues;
- break stereotype barriers;
- give a professional identity;
- favorably influence academic performance and persistence in college;
- afford financial support and improved money management skills;
- increase the opportunities for a better position, higher pay, and advancement after graduation; and,

- demonstrate the value of continuing education (Wilson & Lyons, 1961; Smith, 1965; Lindenmeyer, 1967; McNutt, 1974b; Betty, 1977; Page, 1981; McNutt, 1983; Wilson, 1987; Raizen, 1989; Seifert, 1988; Stern, 1992; Mueller, 1992; Smith-Eggeman & Scott, 1994).

For the faculty, agreements can:

- increase or maintain campus enrollments;
- offer opportunities for upgrading skills and knowledges, consultation, and research;
- improve student relationships;
- provide recognition within the college and the community; and,
- increase access to new human and material resources for college classes (Stull & de Ayora, 1984; Godfrey, 1987; McNutt, 1989).

For the college, agreements can:

- increase revenues;
- establish long term relationships with the employing community;
- increase enrollment and the retention rate;
- enhance or upgrade courses and programs;
- provide for re-education of faculty;
- increase the respect for college personnel;
- support recruitment efforts for top level adjunct faculty; and,
- offer current labor market information (Alfred, 1982; Pettebone, 1982; McNutt, 1983a).

For the business and industrial sector, agreements can provide:

- low cost and high quality specific training;
- a flexible and reliable human resource plan focusing on the institution's success;

- a source of future and well trained employees;
- reduced payroll costs, recruitment costs, and hiring costs;
- increased productivity;
- an opportunity to shape higher education and to give supervisors recognition gained through mentoring and monitoring students;
- an avenue to serve the community and improve the corporate image within the community; and,
- increased employee morale (Parnel, 1981; Broderick, 1982; Mensel, 1982; McNutt, 1983a; Krupar, 1987; Laycock, 1992).

And, *for the community*, agreements can:

- assure the development of education and training resources capable of attracting new businesses;
- support the human resource needs of current businesses;
- assist in maintaining the economic well-being of the citizenry; and,
- encourage better community planning through improved cooperation among the business, labor, industrial, governmental, and educational institutions (McNutt, 1983a).

Barriers to Agreements

In a time of economic, social, and political instability, the nurturing and improvement of off-campus relationships depends greatly on the ability of college educators to work closely with business, industry, and labor representatives and to pool effectively the resources of all public and private institutions. Economic restructuring, realignment of workplace practices, and a diverse work force have created new and dynamic relationships, partnerships, and institutions which can offer technical students enriched opportunities to apply their knowledges and skills and broaden their scope of community.

Yet, few college educators in the United States have focused on the benefits of a well-devised system of directed external work-based learning experiences designed to tap the business and industrial resources for educating the new technician. Problems of and barriers to the articulation and networking processes have served to discourage these educators, thus delaying the development of contractual

agreements and deterring progress towards infusion of workplace competencies in technical and academic curricula. Many times problems develop for one or more reasons:

- There is a lack of understanding by educational institutions of the purpose and role of private enterprise and vice versa.
- Educational institutions have not responded to the needs of business and industry and are thus mistrusted.
- Cooperation is complicated due to education's responsibility to taxpayers and the corporate concern for stockholders, presenting conflicts caused by these divergent loyalties.
- Government restrictions, involving social and financial conformities, interfere with effective cooperative agreements.
- Low utilization of business and industrial personnel in the college classroom or advisory committees furthers mistrust and hampers effective communication and feedback and respect.
- Inadequate funding and credentialing policies offer little incentives to college administrators to require capstone courses in degree programs.
- Inter- and intra-college relationships are dysfunctional.
- Standards and outcomes for directed external work-based learning are inadequately researched, documented, and validated.
- Faculty cannot resolve conflicting philosophical viewpoints.
- Faculty and administrators are inadequately prepared for planning, implementing, and evaluating experiences external to the classroom (Stull, 1981; Gotlieb, 1981; Broderick, 1982; Reed, 1987; McNutt, 1989; Bragg, 1995).

Nevertheless, most worthwhile changes in education have undergone criticism, pressures, and adversity creating new, seemingly unresolvable problems. However, solving problems can lead to constructive change and discovery of new strategies for improved relationships and agreements with the public and private sectors. Today the conditions are conducive to increased collaboration, new interactions, and agreements.

There are many creative approaches to opening the dimensions of the work environment for the benefit of students, educators, and employers. Community and

technical colleges are administering a wide range of programs requiring direct linkages to the community: Tech Prep, work-study, cooperative education, preapprenticeship and apprenticeship training, clinical practice, community-based education, small business centers, economic development services, JTPA training, contracted customized training, to name a few. With these models of articulation, collaboration, and cooperation, educators have a unique opportunity to "tap the capstone" strategies and offer students a more fulfilling and rewarding educational experience assuring mastery of workplace competencies and reward of a successful career.

Design of External Learning Experiences

Critical to the design of directed external work-based learning experiences is the definition, nomination, and adoption of purpose, goals, and the acceptance of sound teaching and learning guidelines. Focusing on the following guidelines can serve as the basis for the design of any work experience course:

> "Integrate theory and application. John Dewey observed students need to examine the relationship that exists between both. Theory without an appreciation of application or application without an understanding of the underlying theory greatly limits the individual.
>
> "Provide an interdisciplinary perspective. The work experience should be examined not only from the major area of study, but from a range of other disciplines as well: the social sciences, the natural sciences and the humanities.
>
> "Develop and reinforce higher order cognitive skills such as analysis, problem solving, and decision making.
>
> "Create an environment in which students develop the capacity to function as reflective learners.
>
> "Aid students to become self directed learners.
>
> "Achieve the academic, career development and personal growth objectives as defined by the program." (Heinemann and DeFalco, 1990)

If proper educational guidelines are adopted by the faculty, the purpose and goals of a directed external work experience can be defined and a technical degree curriculum can be designed for mastery and confirmation of generic and unique workplace knowledges, skills, attitudes and behaviors. (See Appendix G, *Course Identification for Generic Workplace Competencies.*) With specifications of a

technical degree program established, faculty and support staff can address the instructional system for external work-based experiences: i.e., outcomes; student entry-qualifications and orientation; faculty, work sponsors, and counselor roles; course prerequisites, content, "work and study" sequences, duration, credit, forms, records, and documentation; resource acquisition; work site and job development; formative and summative evaluation techniques; and follow-up activities.

A sample of teaching and learning aids designed to create, implement, and evaluate directed work-based learning courses is offered in Appendix H. These aids are entitled: *Comparison of Work Experience and College-Sponsored, Directed Work Experience*; *Charted Activities for Directed Work-Based External Work Experiences*; *A System for Directed External Work-Based Learning Experience*; *Evaluation Form for Study of Your Municipality--A Student Report*; *Evaluation Form for Study of Your Organization--A Student Report*; and, *Evaluation Criteria for Directed External Work-Based Learning Experiences in Higher Education.*

To identify and provide resources for a technical degree program and especially for a work experience course can test the abilities of educators in their knowledge of the local and national social, physical, and cultural environments. For them to relate to and participate in these environments leads to relationships that can create connections between on-campus learning and off-campus events that otherwise would be unrecognized. Being in the "mainstream" of their community enables educators to better access the human and material resources available through business, labor, industrial, and governmental institutions; and, being in the "mainstream" can assure improved work opportunities that will provide a "stepping stone" not a "stumbling block" for students.

For . . .
each is given a bag of tools
a shapeless mass
a book of rules
and,
each must make,
ere life is flown,
a stumbling block or
a stepping stone.

R. L. Sharpe

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Appendices

Appendix A

A SUMMARY ANALYSIS OF OCCUPATIONAL PROFILES AND WAGES FOR EMERGING, PRIORITY, TARGETED, AND HIGH WAGE OCCUPATIONS, 1994, REQUIRING AN AAS DEGREE OR EQUIVALENT

A SUMMARY ANALYSIS OF OCCUPATIONAL PROFILES AND WAGES FOR EMERGING, PRIORITY, TARGETED, AND HIGH WAGE OCCUPATIONS, 1994, REQUIRING AN AAS DEGREE OR EQUIVALENT

	EMERGING, PRIORITY, AND TARGETED OCCUPATIONS	HIGH WAGE INDICATORS	SOURCE(S) OF WAGE DATA
	Aerospace & Aeronautics Technologies		
●	Air Frame Mechanic	$37,000	SOICC
●	Power Plant Mechanic	$———	———
●	Aviation System Avionics Technician	$———	———
☆	**Agriculture Technologies**		
▲	Food Service Manager	>$29,140,	SOICC
✱	Quality Control Technician - Food	$12,000 - $18,500	TINS
✱	Safety/Sanitation Technician	$14,000 - $22,000	TINS
✱	Food Processing Technician	$13,500 - $22,500	TINS
✱●■	Crop Protection/Production Specialist	$18,000 - $22,500	TINS
✱	Agriculture Consumer Information Specialist	$13,000 - $25,000	TINS
✱■	Aquaculturist	$12,000 - $25,000	TINS
✱	Agriculture Technician - Textile	$15,000 - $20,000	TINS
✱	Technical Sales Representative - Agriculture	$13,000 - $30,000	TINS
✱	Poultry Hatchery Supervisor	$12,000 - $25,000	TINS
■	Agriculture & the International Marketplace	Adopted by the State Board of Education, 9-10-88. No occupational profiles or wage data are available.	

✱ Emerging Technologies and Occupations defined by Texas Innovation Network System (TINS), 1992.

■ Identified as 1994 Priority occupation. See "1994 State Priority & Regionally Targeted Occupations for Texas," Texas Education Agency (TEA), May, 1994.

▲ Targeted occupations identified by majority of Quality Work Force Committees (QWFC) and identified as State Priority occupation.

◆ Targeted occupations by majority of QWFC, but not identified as State Priority occupation.

✓ Fastest growing occupations identified by Texas Employment Commission (TEC), Economic research and Analysis Unit, meeting high wage definition or >$10 an hour, State Occupational Information Coordinating Committee (SOICC) Report, June, 1994.

● Identified by the Texas Higher Education Coordinating Board (THECB) Advanced Technology Panel, January, 1993.

★ Added at request of THECB staff.

☆ National Skills Standards Clusters/Occupations, U.S. Department of Labor and U.S. Department of Education, 1994.

A SUMMARY ANALYSIS OF OCCUPATIONAL PROFILES AND WAGES FOR EMERGING, PRIORITY, TARGETED, AND HIGH WAGE OCCUPATIONS, 1994, REQUIRING AN AAS DEGREE OR EQUIVALENT

	EMERGING, PRIORITY, AND TARGETED OCCUPATIONS	HIGH WAGE INDICATORS	SOURCE(S) OF WAGE DATA
☆	**Biotechnologies**		
✱	Biotechnology Research Technician	$17,000 - $21,000	TINS
✱	Biotechnology Production/QC Technician	$17,000 - $24,000	TINS
	Energy and Environment Technologies		
✱■	Laboratory Analyst - Environmental	>$20,000	TINS
✱	Instrumentation & Electrical Specialist	>$23,000	TINS
✱☆	Hazardous Materials Technical Coordinator	>$25,000	TINS
✱●	Regulatory Compliance and Training Specialist (OSHA)	>$26,500	TINS
✱	Waste Recycling Specialist	>$21,500	TINS
✱	Asbestos Contractor Supervisor	>$24,000	TINS
✱	Alternate Fuel Specialist	$18,000 - $50,000	TINS
◆☆	Heating/Air Conditioning Mechanic	>$22,344	TEX-SIS

✱ Emerging Technologies and Occupations defined by Texas Innovation Network System (TINS), 1992.

■ Identified as 1994 Priority occupation. See "1994 State Priority & Regionally Targeted Occupations for Texas," Texas Education Agency (TEA), May, 1994.

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	EMERGING, PRIORITY, AND TARGETED OCCUPATIONS	HIGH WAGE INDICATORS	SOURCE(S) OF WAGE DATA
	Information Technologies		
*●■	Information Technology Support Specialist	>$20,000	TINS
*●■	Network Systems Technician	>$25,000	TINS
*●■	Telecommunications Technician	>$20,000	TINS
*●	Computer Maintenance Technician	$13,500 - $21,000	TINS
*	Office Automation Specialist	$———	———
◆	Secretary	<$15,972	TEX-SIS
*	Database Specialist	$13,000 - $40,000	TINS
●	Computer Engineering Technician	$———	———
●	Computer Systems Installation and Repair Technician	>$20,916	TEX-SIS
▲	Computer Programmer	>$21,444	TEX-SIS/Automated Student Follow-up
✓	Computer Systems Analyst	$30,568	Automated Student Follow-up
☆	**Lightwave Technologies**		
*●■	Laser/Electro-Optics Technician	>$21,960	TEX-SIS
*	Precision Optics Technician (Optician)	>$25,000	TINS

* Emerging Technologies and Occupations defined by Texas Innovation Network System (TINS), 1992.

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EMERGING, PRIORITY, AND TARGETED OCCUPATIONS		HIGH WAGE INDICATORS	SOURCE(S) OF WAGE DATA
	Manufacturing, Design, and Engineering Technologies		
*●■	Manufacturing/Automated Systems Technician (Robotics)	>$24,996	TEX-SIS
*	Computer Aided Manufacturing (CAM) Technician	>$25,000	TINS
*☆	Computer Aided Drafting (CAD) Technician	>$22,836	TEX-SIS
*	Computer Integrated Manufacturing (CIM) Technician	>$23,000	TINS
●	Electromechanical Technician	>$22,824	TINS
●	Instrumentation Technician	>$30,852	TEX-SIS
●	Plastics Engineering Technician	>$28,924	Automated Student Follow-up
★●☆	Industrial/Manufacturing Technician	<$38,646	———
●	Quality Control Technician	$———	———
●	Draftsperson, General	>$22,836	TEX-SIS
●☆	Electronics, Drafting, Technician	>$19,872	TEX-SIS
●	Machinist	>$20,808	TEX-SIS
●	Tool & Dye Maker	>$20,892	Automated Student Follow-up
◆	Maintenance Repairer, General Utility	>$22,884	TEX-SIS
▲☆	Electric Engineering Technician	>$25,992	TEX-SIS

* Emerging Technologies and Occupations defined by Texas Innovation Network System (TINS), 1992.

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EMERGING, PRIORITY, AND TARGETED OCCUPATIONS		HIGH WAGE INDICATORS	SOURCE(S) OF WAGE DATA
☆	**Medical/Health Care Technologies**		
✱✓▲■	Registered Nurse (AAS Degree)	>$29,040	TEX-SIS
✱	Bio-Medical Equipment Technician	>$20,250	TEX-SIS
✱✓●	Diagnostic Imaging Specialist (Sonography)	>$33,396	TEX-SIS
✱✓	Medical Coding Specialist	>$20,000	TINS
✱	Emergency Medical Technician	>$21,816	TEX-SIS
✓	Respiratory Therapist	$24,252	TEX-SIS
✓	Dental Hygenist	$29,740	TEX-SIS
✱	Cardiac Technician (EKG)	$11,000 - $26,000	TINS
✱✓	EEG Technician	$13,500 - $33,925	TINS
✱	Chemical Dependency Specialist	$15,600- $24,835	TINS
✱	Facilities Maintenance Technician	$15,000 - $23,000	TINS
✱✓▲	Medical Laboratory Technician	>$20,892	TEX-SIS
▲	Licensed Practical Nurse	>$19,044	TEX-SIS
✓▲	Medical Secretary	<$16,000	TEX-SIS
Medical/Health Care Technologies continued on next page.			

✱ Emerging Technologies and Occupations defined by Texas Innovation Network System (TINS), 1992.

■ Identified as 1994 Priority occupation. See "1994 State Priority & Regionally Targeted Occupations for Texas," Texas Education agency (TEA), May, 1994.

▲ Targeted occupations identified by majority of Quality Work Force Committees (QWFC) and identified as State Priority occupation.

◆ Targeted occupations by majority of QWFC, but not identified as State Priority occupation.

✓ Fastest growing occupations identified by Texas Employment Commission (TEC), Economic Research and Analysis Unit, meeting high wage definition or >$10 an hour, State Occupational Information Coordinating Committee (SOICC) Report, June, 1994.

● Identified by the Texas Higher Education Coordinating Board (THECB) Advanced Technology Panel, January, 1993.

★ Added at request of THECB staff.

☆ National Skills Standards Clusters/Occupations, U.S. Department of Labor and U.S. Department of Education, 1994.

A SUMMARY ANALYSIS OF OCCUPATIONAL PROFILES AND WAGES FOR EMERGING, PRIORITY, TARGETED, AND HIGH WAGE OCCUPATIONS, 1994, REQUIRING AN AAS DEGREE OR EQUIVALENT

	EMERGING, PRIORITY, AND TARGETED OCCUPATIONS	HIGH WAGE INDICATORS	SOURCE(S) OF WAGE DATA
	Medical/Health Care Technologies (Continued)		
✓★	Physical Therapist	>$25,324	TEX-SIS
✓	Surgical Technicians	<$17,000	TEX-SIS
✓	Occupational Therapist	>$23,424	TEX-SIS
✓	Nuclear Medicine Technologist	>$29,496	TEX-SIS
	Miscellaneous Technologies		
★▲	Plumber/Pipefitters	>$30,243	SOICC
★◆	Correction Officer (Law Enforcement/Criminal Justice)	>$22,188	TEX-SIS
	Related	$———	———
	Transportation Technologies		
★◆	Diesel, Bus, Truck Mechanic	>$20,000	TEX-SIS
★◆	Truck Driver - Heavy	<$18,000	TEX-SIS
★▲☆	Auto Mechanic	<$18,500	TEX-SIS
AVERAGE WAGE		**$23,083**	

* Emerging Technologies and Occupations defined by Texas Innovation Network System (TINS), 1992.

■ Identified as 1994 Priority occupation. See "1994 State Priority & Regionally Targeted Occupations for Texas," Texas Education Agency (TEA), May, 1994.

▲ Targeted occupations identified by majority of Quality Work Force Committees (QWFC) and identified as State Priority occupation.

◆ Targeted occupations by majority of QWFC, but not identified as State Priority occupation.

✓ Fastest growing occupations identified by Texas Employment Commission (TEC), Economic Research and Analysis Unit, meeting high wage definition or >$10 an hour, State Occupational Information Coordinating Committee (SOICC) Report, June, 1994.

● Identified by the Texas Higher Education Coordinating Board (THECB) Advanced Technology Panel, January, 1993.

★ Added at request of THECB staff.

☆ National Skills Standards Clusters/Occupations, U.S. Department of Labor and U.S. Department of Education, 1994.

"High Wage" defined by SOICC, "1994 State Priority and Regional Targeted Occupations for Texas," May, 1994; other primary sources for wage data obtained from Automated Follow-up Data and TEX-SIS Survey data, 1991-92, Graduates of Community and Technical Colleges, June, 1994; and TINS, "Technology and Emerging Occupations, Directions for Texas in the 90's," 1992. If resources differed on wages, the highest starting wage was chosen. Generally, TEX-SIS wages were higher than the Automated Follow-Up Data. TINS wages were speculative in 1992; thus, the wage range meets the high wage definition or >$10 an hour or $20,800 a year for purposes of this study. The "High Wage Indicators" column gives an approximation of an average wage using the criteria described above and in footnote ✓.

Dorothy Ellen McNutt, 1995

Appendix B

SURVEY TO DETERMINE NONSPECIALIZED WORKPLACE SKILLS FOR THE TWO-YEAR ASSOCIATE IN APPLIED SCIENCE DEGREE

SURVEY TO DETERMINE
Nonspecialized Workplace Skills for the Two-Year Associate in Applied Science Degree

Under the Importance of Skills column, please circle one number for each of the skill statements on the basis of "High Importance" (4) to "Low Importance" (0). Under the Responsibility for Instruction column, please check (✓) the organization that should be responsible for the instruction of the skill stated on the left. At the end of the survey, please add any additional skills or comments. Thank you.

SKILLS	IMPORTANCE OF SKILL (Circle a number.) High (4) Low (0)	RESPONSIBILITY FOR INSTRUCTION (Check one or more.) College	Employer	Other (Indicate.)
CATEGORY A: Identifies, evaluates, organizes, plans, allocates, and manages resources within work area.				
1. Prioritizes organizational goals for work area activities.	4 3 2 1 0	___	___	_____
2. Manages own time without supervision.	4 3 2 1 0	___	___	_____
3. Prepares, distributes, and coordinates schedules for work area.	4 3 2 1 0	___	___	_____
4. Oversees schedules for self and work group.	4 3 2 1 0	___	___	_____
5. Interprets organizational cost and revenue forecasts.	4 3 2 1 0	___	___	_____
6. Prepares budgets and tracks expenditures for work area.	4 3 2 1 0	___	___	_____
7. Controls work area budget and makes expenditure adjustments to meet objectives.	4 3 2 1 0	___	___	_____
8. Acquires, assigns, and distributes materials to work group.	4 3 2 1 0	___	___	_____
9. Controls allocation of materials and space in the work area.	4 3 2 1 0	___	___	_____
10. Assesses knowledges and skills of self and work group.	4 3 2 1 0	___	___	_____
11. Evaluates performance of and provides feedback to work group.	4 3 2 1 0	___	___	_____

	High	Low	College	Employer	Other (Indicate.)
CATEGORY B: Acquires, evaluates, and uses information.					
1. Appraises and prepares information from different sources.	4	3 2 1 0	___	___	_____
2. Interprets and communicates verbal and printed information.	4	3 2 1 0	___	___	_____
3. Converts information/data from one form to another.	4	3 2 1 0	___	___	_____
4. Uses computers to create information.	4	3 2 1 0	___	___	_____
5. Uses computers to present information.	4	3 2 1 0	___	___	_____
CATEGORY C: Works cooperatively with others.					
1. Participates as a member of a work team.	4	3 2 1 0	___	___	_____
2. Contributes to group effort, ideas, information, and improvement.	4	3 2 1 0	___	___	_____
3. Generates creditability and trust.	4	3 2 1 0	___	___	_____
4. Sifts through clues and extrapolates solutions.	4	3 2 1 0	___	___	_____
5. Communicates ideas to justify position.	4	3 2 1 0	___	___	_____
6. Builds consensus.	4	3 2 1 0	___	___	_____
7. Listens to feedback from co-workers and makes adjustments.	4	3 2 1 0	___	___	_____
8. Teaches others new skills; helps others learn.	4	3 2 1 0	___	___	_____
9. Works to satisfy clients' or customers' and supervisor's expectations.	4	3 2 1 0	___	___	_____
10. Responsibly questions existing processes, procedures, and policies.	4	3 2 1 0	___	___	_____

	High Low	College	Employer	Other (Indicate.)
11. Appreciates differences among people from diverse cultural, educational, and social backgrounds.	4 3 2 1 0	___	___	_____
12. Makes judgments and decisions on the basis of a person's skills and performance.	4 3 2 1 0	___	___	_____
13. Chooses ethical courses of action.	4 3 2 1 0	___	___	_____
14. Maintains vision and courage.	4 3 2 1 0	___	___	_____
CATEGORY D: Manages complex interrelationships.				
1. Knows how political, governmental, economic, and legal systems function.	4 3 2 1 0	___	___	_____
2. Knows how organizational and technological systems function.	4 3 2 1 0	___	___	_____
3. Predicts impact of own and work group's actions on the operations of organizational and technological systems.	4 3 2 1 0	___	___	_____
4. Distinguishes trends and anomalies in any one system's performance.	4 3 2 1 0	___	___	_____
5. Recommends modifications to existing organizational and technological systems to improve products or services.	4 3 2 1 0	___	___	_____
6. Develops new or alternative organizational or technological systems to improve performance.	4 3 2 1 0	___	___	_____
CATEGORY E: Works with a variety of occupational specific and ancillary technologies.				
1. Judges which equipment, including computers and related technologies, will produce the desired results in the work area.	4 3 2 1 0	___	___	_____
2. Selects technology and chooses protocol in the work area.	4 3 2 1 0	___	___	_____

	High Low	College	Employer	Other (Indicate.)
3. Identifies, solves, and prevents problems with work site equipment, including computers and other technologies.	4 3 2 1 0	___	___	_____
4. Integrates multiple displays of data and links symbols in technological systems.	4 3 2 1 0	___	___	_____
CATEGORY F: Practices quality concepts and applications.				
1. Supports total quality management principles.	4 3 2 1 0	___	___	_____
2. Uses quality process analysis tools and basic statistical methods.	4 3 2 1 0	___	___	_____
3. Recognizes international standards that are associated with the competitive quality arena.	4 3 2 1 0	___	___	_____
4. Leads quality teams through continuous improvement strategies.	4 3 2 1 0	___	___	_____
5. Analyzes the design, productivity, and use of the work area.	4 3 2 1 0	___	___	_____
6. Eliminates waste and defects, recognizing the cost of nonconformance or variation.	4 3 2 1 0	___	___	_____
CATEGORY G: Improves circumstances or conditions in the work environment.				
1. Adheres to safety regulations and procedures.	4 3 2 1 0	___	___	_____
2. Maintains total wellness of self: mental, physical, emotional.	4 3 2 1 0	___	___	_____
3. Recognizes and acts upon needs for continuing education, obtaining credentials or licensure, and participating in professional organizations.	4 3 2 1 0	___	___	_____
CATEGORY H: Values the free enterprise system as it relates to the production, distribution, and consumption of goods and services, as well as the use of income, capital, and commodities.	4 3 2 1 0	___	___	_____

	High	Low	College	Employer	Other (Indicate.)
CATEGORY I: Exhibits mastery of verbal and written English and verbal fluency in a secondary language, such as Spanish.	4 3 2 1	0	___	___	_____

COMMENTS:_____

_____

_____

_____

_____

THANK YOU.

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Appendix C

IMPORTANCE OF WORKPLACE COMPETENCY STATEMENTS AS DETERMINED BY EMPLOYERS IN TEXAS QUALITY WORK FORCE PLANNING COMMITTEES

IMPORTANCE OF WORKPLACE COMPETENCY STATEMENTS AS DETERMINED BY EMPLOYERS IN TEXAS QUALITY WORK FORCE PLANNING COMMITTEES

A survey to determine the nonspecialized or general workplace competencies for the two-year Associate in Applied Science (AAS) degree or equivalent was conducted in late 1994. There was a 28 percent return of the survey questionnaire. The workplace competency statements were derived from an analysis of the Secretary's Commission on Achieving Necessary Skills (SCANS), national DACUM results, job profiles, SOCRATES skills and duties descriptions, and TINS occupational descriptions and competencies. The importance of each competency statement was determined by calculating the mean, after assigning a weight of 5 for statements of high importance; 4 for important; 3 for slightly important; 2 low importance; and 1 no importance. In each category the relative rank of statements is displayed in the right column.

COMPETENCY STATEMENTS	IMPORTANCE OF STATEMENT	RELATIVE RANK
Category A: Identifies, evaluates, organizes, plans, allocates, and manages resources within work area.		
1. Prioritizes organizational goals for work area activities.	4.26	2
2. Manages own time without supervision.	4.73	1
3. Prepares, distributes, and coordinates schedules for work area.	3.88	6
4. Oversees schedules for self and work group.	3.99	5
5. Interprets organizational cost and revenue forecasts.	3.59	10.5
6. Prepares budgets and tracks expenditures for work area.	3.59	10.5
7. Controls work area budget and makes expenditure adjustments to meet objectives.	3.83	7
8. Acquires, assigns, and distributes materials to work group.	3.65	8
9. Controls allocation of materials and space in the work area.	3.64	9
10. Assesses knowledges and skills of self and work group.	4.11	4
11. Evaluates performance of and provides feedback to work group.	4.14	3
Category B: Acquires, evaluates, and uses information.		
1. Appraises and prepares information from different sources.	4.33	4
2. Interprets and communicates verbal and printed information.	4.71	1
3. Converts information/data from one form to another.	4.28	5
4. Uses computers to create information.	4.55	2
5. Uses computers to present information.	4.38	3

IMPORTANCE OF WORKPLACE COMPETENCY STATEMENTS AS DETERMINED BY EMPLOYERS IN TEXAS QUALITY WORK FORCE PLANNING COMMITTEES

COMPETENCY STATEMENTS	IMPORTANCE OF STATEMENT	RELATIVE RANK
Category C: Works cooperatively with others.		
1. Participates as a member of a work team.	4.76	1.5
2. Contributes to group effort, ideas, information, and improvement.	4.66	5
3. Generates credibility and trust.	4.75	3
4. Sifts through clues and extrapolates solutions.	4.26	12
5. Communicates ideas to justify position.	4.44	6
6. Builds consensus.	4.20	14
7. Listens to feedback from co-workers and makes adjustments.	4.43	7
8. Teaches others new skills; helps others learn.	4.34	11
9. Works to satisfy clients' or customers' and supervisor's expectations.	4.68	4
10. Responsibly questions existing processes, procedures, and policies.	4.23	13
11. Appreciates differences among people from diverse cultural, educational, and social backgrounds.	4.35	9.5
12. Makes judgments and decisions on the basis of a person's skills and performance.	4.35	9.5
13. Chooses ethical courses of action.	4.76	1.5
14. Maintains vision and courage.	4.40	8
Category D: Manages complex interrelationships.		
1. Knows how political, governmental, economic, and legal systems function.	3.72	6
2. Knows how organizational and technological systems function.	4.06	2
3. Predicts impact of own and work group's actions on the operations of organizational and technological systems.	3.95	3.5
4. Distinguishes trends and anomalies in any one system's performance.	3.86	5
5. Recommends modifications to existing organizational and technological systems to improve products or services.	4.07	1
6. Develops new or alternative organizational or technological systems to improve performance.	3.95	3.5

IMPORTANCE OF WORKPLACE COMPETENCY STATEMENTS AS DETERMINED BY EMPLOYERS IN TEXAS QUALITY WORK FORCE PLANNING COMMITTEES

COMPETENCY STATEMENTS	IMPORTANCE OF STATEMENT	RELATIVE RANK
Category E: Works with a variety of occupational specific and ancillary technologies.		
1. Judges which equipment, including computers and related technologies, will produce the desired results in the work area.	4.10	1
2. Selects technology and chooses protocol in the work area.	3.74	3
3. Identifies, solves, and prevents problems with work site equipment, including computers and other technologies.	3.98	2
4. Integrates multiple displays of data and links symbols in technological systems.	3.52	4
Category F: Practices quality concepts and applications.		
1. Supports total quality management principles.	4.50	1
2. Uses quality process analysis tools and basic statistical methods.	4.16	3
3. Recognizes international standards that are associated with the competitive quality arena.	3.88	5
4. Leads quality teams through continuous improvement strategies.	3.96	4
5. Analyzes the design, productivity, and use of the work area.	3.81	6
6. Eliminates waste and defects, recognizing the cost of nonconformance or variation.	4.43	2
Category G: Improves circumstances or conditions in the work environment.		
1. Adheres to safety regulations and procedures.	4.78	1
2. Maintains total wellness of self: mental, physical, emotional.	4.63	2
3. Recognizes and acts upon needs for continuing education, obtaining credentials or licensure, and participating in professional organizations.	4.38	3
Category H: Values the free enterprise system as it relates to the production, distribution, and consumption of goods and services, as well as the use of income, capital, and commodities.	4.29	-
Category I: Exhibits mastery of verbal and written English and verbal fluency in a secondary language, such as Spanish.	4.03	-

Dorothy Ellen McNutt, Project Director for a Federal Project Funded Under the Carl D. Perkins Vocational Education Act, 1995.

Appendix D

A PLANNING DOCUMENT FOR VERIFICATION OF GENERIC WORKPLACE SKILLS AND COMPETENCIES

Example

A PLANNING DOCUMENT FOR VERIFICATION OF GENERIC WORKPLACE SKILLS AND COMPETENCIES

COLLEGE	PROGRAM	ADMINISTRATOR	DATE

KEY	MEASUREMENT	STANDARDS	ACTIVITIES	COURSE
* Resources	* Identifies, organizes, plans, allocates resources.	* Prioritizes work area activities to meet organizational goals.	** Describes different planning strategies. Establishes project timeliness to meet organizational goals. Identifies critical path and creates project plan within a time frame.	** Management 2310

* Printed on form
** Completed by applicant college

Dorothy Ellen McNutt, 1995

Appendix E

RESPONSIBILITY FOR TEACHING WORKPLACE COMPETENCIES AS DETERMINED BY EMPLOYERS IN TEXAS QUALITY WORK FORCE PLANNING COMMITTEES

RESPONSIBILITY FOR TEACHING WORKPLACE COMPETENCIES AS DETERMINED BY EMPLOYERS IN TEXAS QUALITY WORK FORCE PLANNING COMMITTEES

A survey to determine the instructional responsibility for nonspecialized or general workplace competencies for the two-year Associate in Applied Science (AAS) degree or equivalent was conducted in 1994 and 1995. There was a 28 percent return of the survey questionnaires. Respondents were directed to choose between the "College" and the "Employer" as the preferred provider for each competency statement. Some respondents chose both providers. The opportunity to nominate other providers was an option. The chart gives the percentage of responses for each provider, as well as "Other Significant Nominations." These "other" nominations are considered significant if 5 percent or more of the respondents listed a provider. A provider receiving a score of ≥55 percent is considered to have a significant role. The "Employer" has a very significant role in Categories A, E, F, and G; whereas, the "College" has an equally significant role in Categories B, D, H, and I. The need for strong employer and college alliances is indicated as most competencies were rated in the 2nd and 3rd percentage (%) quartiles or >25 percent and <75 percent.

COMPETENCY STATEMENTS	RANKING				SIGNIFICANT (+5%) OTHER NOMINATIONS
	FIRST	%	SECOND	%	
Category A: Identifies, evaluates, organizes, plans, allocates, and manages resources within work area.					
1. Prioritizes organizational goals for work area activities.	Employer	58	College	33	High School
2. Manages own time without supervision.	College	44	Employer	30	Family, Student, High School
3. Prepares, distributes, and coordinates schedules for work area.	Employer	65	College	30	
4. Oversees schedules for self and work group.	Employer	66	College	29	
5. Interprets organizational cost and revenue forecasts.	College	56	Employer	44	
6. Prepares budgets and tracks expenditures for work area.	College	54	Employer	45	
7. Controls work area budget and makes expenditure adjustments to meet objectives.	Employer	58	College	39	
8. Acquires, assigns, and distributes materials to work group.	Employer	75	College	24	
9. Controls allocation of materials and space in the work area.	Employer	74	College	23	
10. Assesses knowledges and skills of self and work group.	Employer	48	College	47	
11. Evaluates performance of and provides feedback to work group.	Employer	56	College	42	
Category B: Acquires, evaluates, and uses information.					
1. Appraises and prepares information from different sources.	College	66	Employer	28	
2. Interprets and communicates verbal and printed information.	College	70	Employer	22	High School
3. Converts information/data from one form to another.	College	67	Employer	29	
4. Uses computers to create information.	College	70	Employer	24	High School
5. Uses computers to present information.	College	71	Employer	23	

RESPONSIBILITY FOR TEACHING WORKPLACE COMPETENCIES AS DETERMINED BY EMPLOYERS IN TEXAS QUALITY WORK FORCE PLANNING COMMITTEES

COMPETENCY STATEMENTS	RANKING				SIGNIFICANT (+5%) OTHER NOMINATIONS
	FIRST	%	SECOND	%	
Category C: Works cooperatively with others.					
1. Participates as a member of a work team.	College Employer	43 43			High School
2. Contributes to group effort, ideas, information, and improvement.	College	47	Employer	44	High School
3. Generates credibility and trust.	Employer	40	College	37	Family, Student
4. Sifts through clues and extrapolates solutions.	College	56	Employer	37	
5. Communicates ideas to justify position.	College	62	Employer	30	
6. Builds consensus.	College	53	Employer	39	
7. Listens to feedback from co-workers and makes adjustments.	Employer	48	College	44	
8. Teaches others new skills; helps others learn.	Employer	45	College	44	Student
9. Works to satisfy clients' or customers' and supervisor's expectations.	Employer	54	College	34	Student
10. Responsibly questions existing processes, procedures, and policies.	Employer	55	College	34	Student
11. Appreciates differences among people from diverse cultural, educational, and social backgrounds.	College	48	Employer	30	Family, Student, High School
12. Makes judgments and decisions on the basis of a person's skills and performance.	Employer	48	College	38	Student
13. Chooses ethical courses of action.	College	38	Employer	35	Family, Student, High School
14. Maintains vision and courage.	Employer	39	College	30	Family, Student, High School

RESPONSIBILITY FOR TEACHING WORKPLACE COMPETENCIES AS DETERMINED BY EMPLOYERS IN TEXAS QUALITY WORK FORCE PLANNING COMMITTEES

COMPETENCY STATEMENTS	RANKING				SIGNIFICANT (+5%) OTHER NOMINATIONS
	FIRST	%	SECOND	%	
Category D: Manages complex interrelationships.					
1. Knows how political, governmental, economic, and legal systems function.	College	77	Employer	16	High School
2. Knows how organizational and technological systems function.	College	60	Employer	36	
3. Predicts impact of own and work group's actions on the operations of organizational and technological systems.	College	49	Employer	46	
4. Distinguishes trends and anomalies in any one system's performance.	College	59	Employer	36	
5. Recommends modifications to existing organizational and technological systems to improve products or services.	Employer	76	College	52	
6. Develops new or alternative organizational or technological systems to improve performance.	Employer	51	College	45	
Category E: Works with a variety of occupational specific and ancillary technologies.					
1. Judges which equipment, including computers and related technologies, will produce the desired results in the work area.	Employer	50	College	47	
2. Selects technology and chooses protocol in the work area.	Employer	61	College	38	
3. Identifies, solves, and prevents problems with work site equipment, including computers and other technologies.	Employer	54	College	42	
4. Integrates multiple displays of data and links symbols in technological systems.	College	55	Employer	43	

RESPONSIBILITY FOR TEACHING WORKPLACE COMPETENCIES AS DETERMINED BY EMPLOYERS IN TEXAS QUALITY WORK FORCE PLANNING COMMITTEES

COMPETENCY STATEMENTS	RANKING				SIGNIFICANT (+5%) OTHER NOMINATIONS
	FIRST	%	SECOND	%	
Category F: Practices quality concepts and applications.					
1. Supports total quality management principles.	Employer	49	College	45	
2. Uses quality process analysis tools and basic statistical methods.	College	58	Employer	39	
3. Recognizes international standards that are associated with the competitive quality arena.	College	52	Employer	46	
4. Leads quality teams through continuous improvement strategies.	Employer	55	College	43	
5. Analyzes the design, productivity, and use of the work area.	Employer	54	College	44	
6. Eliminates waste and defects, recognizing the cost of nonconformance or variation.	Employer	54	College	41	
Category G: Improves circumstances or conditions in the work environment.					
1. Adheres to safety regulations and procedures.	Employer	60	College	30	Student
2. Maintains total wellness of self: mental, physical, emotional.	Employer	40	College	31	Family, Student, High School
3. Recognizes and acts upon needs for continuing education, obtaining credentials or licensure, and participating in professional organizations.	Employer	48	College	36	Student
Category H: Values the free enterprise system as it relates to the production, distribution, and consumption of goods and services, as well as the use of income, capital, and commodities.	College	58	Employer	28	Family, High School
Category I: Exhibits mastery of verbal and written English and verbal fluency in a secondary language, such as Spanish.	College	66	Employer	18	Student, High School

Dorothy Ellen McNutt, Project Director for a Federal Project Funded Under the Carl D. Perkins Vocational Education Act, 1995.

Appendix F

EXTERNAL LEARNING EXPERIENCES - LOCUS OF CONTROL

EXTERNAL LEARNING EXPERIENCES – LOCUS OF CONTROL

	COLLEGE CONTROL Clinical Education Course	SHARED CONTROL Field Experience/Practicum	SHARED CONTROL Internship	SHARED CONTROL Cooperative Education Course	EMPLOYER CONTROL Apprenticeship Program
INSTRUCTION:	College primarily responsible. Agreement between college and clinical site. Faculty teaches in clinical area.	An agreement between college and business or industry to provide practical, general learning activities related to the student's general course of study.	An agreement between college and business or industry to provide a highly specialized experience for an advanced student.	A cooperative effort between employer and college. On–site supervisor responsible for day–to–day work and instruction. Faculty responsible for creditability of learning or training plan and campus lectures.	Employer primarily responsible. College responsible for classroom–related instruction.
OBJECTIVES:	Faculty–developed learning objectives. Competency profile maintained.	Student negotiation with faculty assures an agreement regarding outcomes appropriate for credit. Competency profile maintained.	Detailed, individualized learning objectives directly related to specific occupational outcomes. Competency profile maintained.	A cooperative agreement between college, employer, and student. Specific learning objectives and a competency profile directly related to technical degree maintained.	Set by local apprenticeship committee or employer. Employer assigns work and on–the–job training.
SUPERVISION:	College provides strong supervision and regular instruction of students in clinical area.	Faculty monitors progress, visits site, and acknowledges role of college and field trainer. Employer trains and supervises.	On–site supervisor responsible for mentoring and supervision. Faculty periodically visits site.	Faculty regularly oversees progress of student. Employer supervises.	Employer provides on–site supervision.
SALARIES:	Unpaid learning experiences.	Usually unpaid, but may be for stipend, grant, living expenses, or wage.	Usually unpaid, but may be for stipend, grant, living expenses, or wage.	Paid work experience to insure an employer–employee relationship.	Progressive paid employment position.
STUDENT RESPONSIBILITY:	Primarily responsible to college	Responsible to college and business or industry sponsor/employer.	Responsible to college and business or industry sponsor/employer.	Responsible to college and employer.	Primarily responsible to employer.
DURATION:	Dependent on college curriculum.	Varies according to program.	Varies according to program.	Varies according to program. Maximum of three semesters.	Set by local apprenticeship committee or employer. One year minimum.
STATE FUNDING:	By contact hours.	By contact hours.	By contact hours.	By contact hours.	Not eligible.

Appendix G

COURSE IDENTIFICATION FOR GENERIC WORKPLACE COMPETENCIES

Example

COURSE IDENTIFICATION FOR GENERIC WORKPLACE COMPETENCIES

Task/Course Identification

Place a check (✓) to the right and under the course(s) responsible for the Tasks listed in the left column.

Systems
Manages complex interrelationships. (Measure)
Adheres to safety regulations and procedures. (Standard)

Tasks / Course Titles	AAS PROGRAM																							
																							Capstone	Capstone
Plans safety into every assignment and job.																								
Interprets established housekeeping procedures.																								
Identifies, reports, and documents unsafe conditions.																								
Reports all accidents, safety violations, and injuries.																								
Takes corrective action on unsafe conditions; intervenes to an unsafe act.																								
Abides by rules regarding hazardous materials and wastes, specifically under the Occupational Safety and Standards Act (OSHA) standards.																								
Lifts and moves heavy objects using correct procedures.																								
Promotes and encourages safety among co-workers.																								
Assumes responsibility for the safety of others.																								
Participates in safety training programs.																								
Conducts safety meetings.																								
Identifies potential real and hidden costs of work site accidents.																								
Recommends improvements to the safety program.																								
Operates portable fire extinguishers according to rules and specifications.																								
Qualifies to administer basic first aid in case of emergency.																								
Maintains currency in American Red Cross CPR and First Aid training.																								
Tasks specific to the technology:																								

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Appendix H

TEACHING AIDES FOR EXTERNAL WORK-BASED LEARNING EXPERIENCES

COMPARISON OF WORK EXPERIENCE AND COLLEGE-SPONSORED, DIRECTED WORK EXPERIENCE

In work experience the student is:	In the directed work experience course the student is:
1. Hired as a producing worker.	1. Treated as a "learning" worker.
2. Learns only the "How-to-do-it" aspects of his job.	2. Knows the "Why-it-is-done" aspects of the work assignments.
3. Unable to consistently understand the relationship of theory and work.	3. Engages in classroom activities which are integrated with work experiences.
4. Does not receive the benefits of a learning plan.	4. Follows a learning schedule, providing a planned sequence of events and outcomes.
5. Receives little assistance in matters of personal development.	5. Receives counseling pertaining to personal development.
6. Experiences little encouragement, inspiration for additional education.	6. Attains insight into the need for continuing education.
7. Emphasizes work demands over college demands.	7. Receives encouragement to study to remain in college, and to increase knowledge and skills.
8. Works under conditions which may deteriorate.	8. Works in an enterprise and job assignment approved by the college.

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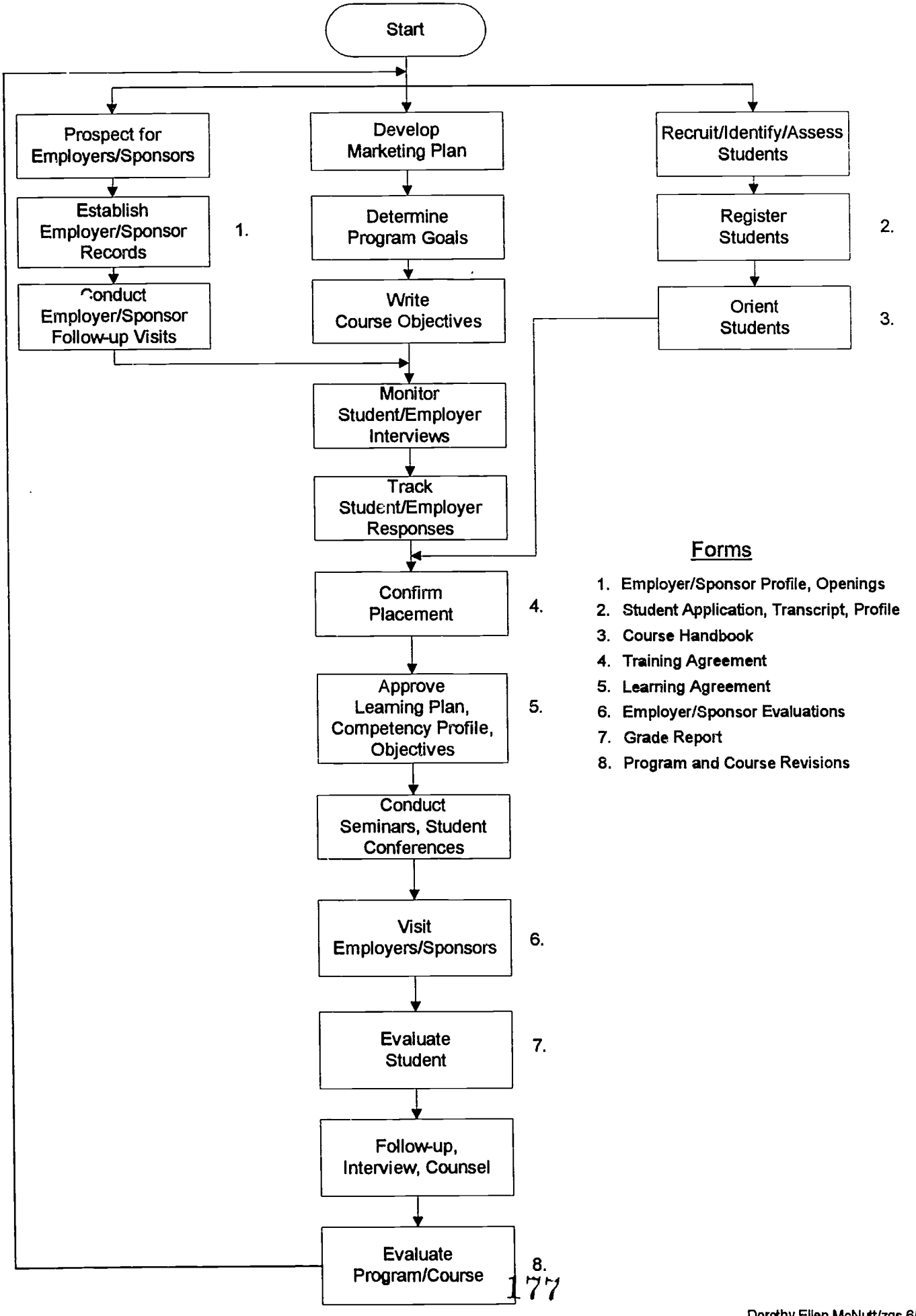
CHARTED ACTIVITIES FOR DIRECTED EXTERNAL WORK-BASED LEARNING EXPERIENCES



Forms

1. Employer/Sponsor Profile, Openings
2. Student Application, Transcript, Profile
3. Course Handbook
4. Training Agreement
5. Learning Agreement
6. Employer/Sponsor Evaluations
7. Grade Report
8. Program and Course Revisions

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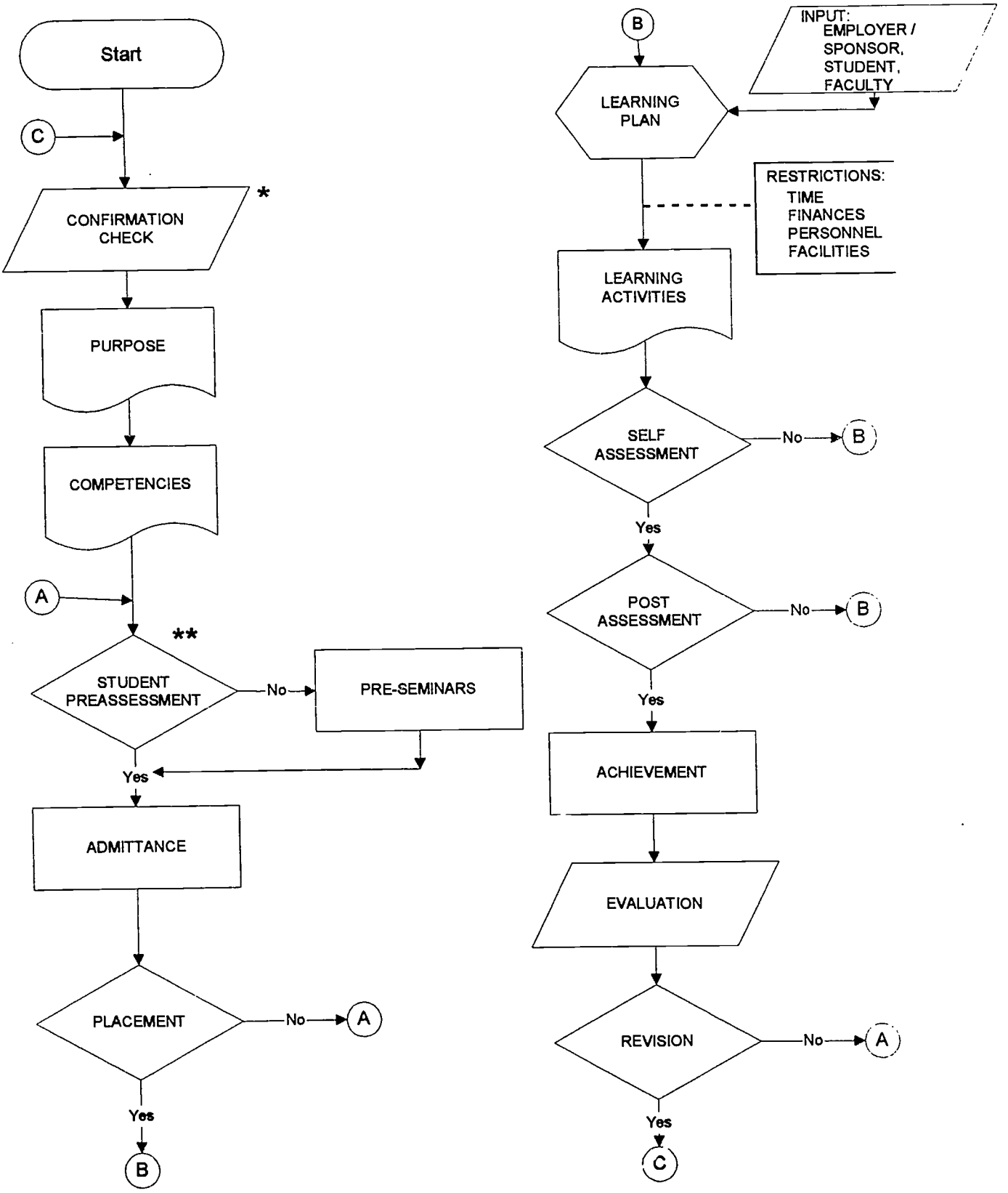
Dorothy Ellen McNutt/zgs 6/95

A System for
Directed External Work-Based Learning Experiences



* Advisory Groups:
- Accrediting Agencies
- Industrial, Business and Community Organizations
- Labor
- Government
- Faculty
- Students
- Universities
- Colleges

** Competencies:
- Knowledge
- Technical
- Interpersonal Behaviors
- Generic Workplace Competencies

EVALUATION FORM FOR STUDY OF YOUR MUNICIPALITY-- A STUDENT REPORT

Student Name _____ Name of City_____

Completeness of Content

History of the City	4	3	2	1
Location of the City	4	3	2	1
Major Enterprises (public/private)	4	3	2	1
Population	4	3	2	1
Community Service Organizations	4	3	2	1
Organization/Structure/Personnel of City	4	3	2	1
Levels of Responsibility (organizational chart)	4	3	2	1
Elected or Appointed Officials with Length of Term	4	3	2	1
Revenue Sources	4	3	2	1
Expenditures	4	3	2	1
Citizen's Responsibilities to Governing Process	4	3	2	1

Clarity of Report

Visual Presentation	4	3	2	1
Audio Presentation	4	3	2	1
Written Presentation	4	3	2	1
Basic Organization	4	3	2	1
Development of Central Theme	4	3	2	1
Coordination--Introduction, Report, Conclusion	4	3	2	1
Originality	4	3	2	1

Comprehensiveness of Report

Source of Information	4	3	2	1
Background Research	4	3	2	1
Interviews	4	3	2	1
Support Data	4	3	2	1
Conclusions	4	3	2	1
Recommendations	4	3	2	1

Rating Key: 4 = Outstanding Accomplishment
3 = Complete
2 = Incomplete
1 = Not Applicable

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EVALUATION FORM FOR STUDY OF YOUR ORGANIZATION-- A STUDENT REPORT

Student Name _____ Name of Organization _____

Completeness of Content

History of the Organization	4	3	2	1
Produce or Service (What does the organization produce or service?)	4	3	2	1
Type of Ownership	4	3	2	1
Location of the Organization	4	3	2	1
Design, Facilities, and Layout				
The Organization	4	3	2	1
Local Plant/Branch	4	3	2	1
Learning Station	4	3	2	1
Organization Structure and Personnel				
Levels of Responsibility (Chart)	4	3	2	1
Supervisor's Role (Who am I responsible to?)	4	3	2	1
Student's/Learner's Role (For what am I responsible?)	4	3	2	1
Sources of Customers, Competitors, Suppliers				
Customers	4	3	2	1
Competitors	4	3	2	1
Suppliers	4	3	2	1
Possible Major Improvements (Approval required of more than one level of supervisor)				
Problems/Improvements	4	3	2	1
Cost/Justification	4	3	2	1
Support	4	3	2	1
Possible Minor Improvements (Approval required by immediate supervisor)				
Problems/Improvements	4	3	2	1
Cost/Justification	4	3	2	1
Support	4	3	2	1

Clarity of Report

Visual Presentation	4	3	2	1
Audio Presentation	4	3	2	1
Written Presentation	4	3	2	1
Basic Organization				
Development of Central Theme	4	3	2	1
Coordination (Introduction, Body, Conclusion)	4	3	2	1
Originality	4	3	2	1

Comprehensiveness of Report

Source of Information				
Background	4	3	2	1
Interviews	4	3	2	1
Support Data	4	3	2	1
Conclusions	4	3	2	1
Recommendations	4	3	2	1

Rating Key:
4 = Outstanding Accomplishment
3 = Complete
2 = Incomplete
1 = Not Applicable

EVALUATION CRITERIA FOR DIRECTED WORK-BASED LEARNING EXPERIENCES IN HIGHER EDUCATION

	NOT APPLICABLE (1)	NEEDS ATTENTION (2)	PROGRESS NOTED (3)	GOOD (4)	EXCELLENT (5)
A. ADMINISTRATION					
1. Policies for directed external learning experience are published in official college documents.	___	___	___	___	___
2. Policies are well defined.	___	___	___	___	___
3. Guidelines covering relationships between the college and employers or sponsors are explicit and pragmatic.	___	___	___	___	___
4. Line of authority and responsibility for the directed external learning experience course(s) is well understood within the administrative structure of the college.	___	___	___	___	___
5. Job descriptions for faculty and staff positions contain specific areas of responsibilities and tasks.	___	___	___	___	___
6. The catalog description of the course(s) is clear to students, faculty, and employers or sponsors.	___	___	___	___	___
7. The professional staff has credentials training, experience, and interest necessary for effectively delivering course(s).	___	___	___	___	___
8. Institutional and professional staff hold membership in national/state organizations.	___	___	___	___	___
B. PROGRAM OPERATION					
1. Budget					
(a) Enrollment and income projections are made each year from course(s) initiation to full operational status.	___	___	___	___	___
(b) Tuition and fees which do not penalize the student are adopted.	___	___	___	___	___
(c) Personnel requirements to support the course(s) during initiation, implementation, and expansion are fulfilled.	___	___	___	___	___

	NOT APPLICABLE (1)	NEEDS ATTENTION (2)	PROGRESS NOTED (3)	GOOD (4)	EXCELLENT (5)
(d) An analysis of per student costs is determined.	___	___	___	___	___
(e) A one- and three-year projection of operational costs is made.	___	___	___	___	___
(f) The budget indicates a reasonable allocation of dollar resources to support the course(s) for the next three years.	___	___	___	___	___
(g) Each program enrolls more than 25 percent of program majors in the course(s).	___	___	___	___	___
2. Environs					
(a) An office(s) is assigned to faculty.	___	___	___	___	___
(b) The office(s) is visible and readily accessible to students.	___	___	___	___	___
(c) Career information materials are displayed and available for students.	___	___	___	___	___
(d) The office(s) is organized for counseling purposes.	___	___	___	___	___
(e) Appropriate furnishings and equipment are provided.	___	___	___	___	___
3. Support System					
(a) An appropriate ratio of students to faculty is maintained.	___	___	___	___	___
(b) A student recruiting and information system is formulated.	___	___	___	___	___
(c) The information system insures that the community, students, employers, and the college are kept informed of the opportunities inherent in the course(s).	___	___	___	___	___
(d) The faculty and administration publish reports for distribution to other administrators, faculty, and the advisory committee and community.	___	___	___	___	___
(e) A student handbook insures that course requirements, policies, and procedures are clear.	___	___	___	___	___
(f) Administrative leadership and backing for the course(s) is evidenced.	___	___	___	___	___

	NOT APPLICABLE (1)	NEEDS ATTENTION (2)	PROGRESS NOTED (3)	GOOD (4)	EXCELLENT (5)
C. CURRICULUM					
1. Course(s) objectives are developed and relate to the overall goals of the program.	___	___	___	___	___
2. The course(s) is developed as an integral and sequential part of the total instructional program.	___	___	___	___	___
3. The course(s) clearly recognizes the needs (cognitive, technical skills, generic workplace competencies, interpersonal skills) of the students.	___	___	___	___	___
4. An effort to relate this course(s) with programs or course(s) offered in the local high schools is made.	___	___	___	___	___
5. A significant portion of the faculty is involved in the development of the course(s).	___	___	___	___	___
6. The faculty is concerned with achieving the objective of the course(s).	___	___	___	___	___
7. Students receive grades based on pre-set objectives and a learning contract.	___	___	___	___	___
8. A policy of credit authorization for the course(s) is adopted and accepted by faculty and administration.	___	___	___	___	___
9. An "External Learning Experience Competency Profile" is on file for each student.	___	___	___	___	___
D. INSTRUCTIONAL MATERIALS/ STRATEGIES					
1. Instructional materials for related seminars, conferences, etc., are selected in terms of course goals and objectives, needs of the students, accuracy and relevancy of material, recency of material, and effective contribution to program operation.	___	___	___	___	___
2. Orientation is provided students prior to actual external directed learning experiences.	___	___	___	___	___
3. Seminars and student conferences are offered to aid students in job search and placement.	___	___	___	___	___

	NOT APPLICABLE (1)	NEEDS ATTENTION (2)	PROGRESS NOTED (3)	GOOD (4)	EXCELLENT (5)
4. Seminars and student conferences are offered <u>after</u> placement in the organization.	___	___	___	___	___
5. Individualized agreements are drafted for <u>each</u> student.	___	___	___	___	___
6. A student project system or learning objectives system exists, is relevant to the needs of the student, and provides an opportunity to apply all previous learning to real-world situations, resulting in a consolidation and synthesis of the entire educational experience.	___	___	___	___	___
E. <u>WORK STATIONS</u>					
1. Positions meet and relate to the career objectives and abilities of each student.	___	___	___	___	___
2. The employers or sponsors are interested in providing work stations for on-the-job instruction.	___	___	___	___	___
3. The employers or sponsors express a willingness to match learning experiences to individual student abilities.	___	___	___	___	___
4. The training experiences offer a variety of learning opportunities.	___	___	___	___	___
5. The employers or sponsors are willing to develop a learning plan with the student and the faculty.	___	___	___	___	___
6. The student engages in the work-based or external experience for a reasonable period of time.	___	___	___	___	___
7. The facilities and equipment at the work station are adequate, safe, and up-to-date.	___	___	___	___	___
8. The employers or sponsors and employees have acceptable reputations in the community regarding social, economic, and labor factors.	___	___	___	___	___
9. If students are paid for their work, they are employed at wages comparable to those paid to workers with similar experience and preparation.	___	___	___	___	___

	NOT APPLICABLE (1)	NEEDS ATTENTION (2)	PROGRESS NOTED (3)	GOOD (4)	EXCELLENT (5)
10. The employers are willing to provide reports on the student's attendance, work habits, and progress.	___	___	___	___	___
11. A job visitation plan to evaluate the work station is activated.	___	___	___	___	___
12. Minimum criteria are established for work positions and stations.	___	___	___	___	___
F. EVALUATION					
1. An anecdotal data file documenting problems, solutions, activities, and accomplishments is maintained by faculty.	___	___	___	___	___
2. Evaluation procedures/forms to determine the extent to which the course(s) objectives are being achieved are utilized.	___	___	___	___	___
3. Continuous course revision based upon a variety of evaluation strategies (students, faculty, administrators, employers, state) exists.	___	___	___	___	___
4. Follow-up studies are conducted to determine the success of students after graduation.	___	___	___	___	___

Dorothy Ellen McNutt
Revised, 1995

Appendix I

ORGANIZATIONS CONTRIBUTING TO THE PREPARATION OF THIS REPORT

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District of Columbia

District of Columbia Public Schools State Office of Vocational and Adult Education

Florida

Volusia County Schools

Illinois

Black Hawk College

Indiana

Amatrol, Inc.

Iowa

Scott Community College

Maryland

Community College of Baltimore
Dundalk Community College
Essex Community College

Massachusetts

Education Development Center

National

J C Penney

North Carolina

Caldwell Community College & Technical Institute
Guilford Technical Community College
Pitt Community College

Ohio

Cincinnati Technical College
Kent State University
Stark Technical College
The Ohio State University

Ontario

Humber College of Applied Arts & Technology

Pennsylvania

Reading Area Community College

South Carolina

Chesterfield - Marlboro Technical College
Greenville Technical College
Orangeburg-Calhoun Technical College
Trident Technical College
York Technical College

Texas

Alvin Community College
Amarillo College
Amoco
Bee County College
Brazosport College
Brookhaven College
Center for Occupational Research & Development
College of the Mainland
Dallas County Community Collect District
Del Mar College
Eastfield College
El Centro College
El Paso Community College
Lamar University at Orange
Lamar University - Port Arthur
Laredo Community College
Lee College
Navarro College
North Central Texas Interlink, Inc.

North Harris Montgomery Community College District
North Lake College
Odessa College
Richland College
San Antonio College
San Jacinto College
South Texas Community College
Tarrant County Junior College
Texas Higher Education Coordinating Board
Texas Innovation Network System (TINS)
Texas Skills Develop Corporation
Texas State Technical College - Amarillo
Texas State Technical College - Harlingen
Texas State Technical College - Waco
The Victoria College
Tyler Junior College
University of Houston

Wisconsin

Madison Area Technical College