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AUTHOR Clary, Joseph R.; Iverson, Maynard J.
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ABSTRACT

During 1981-82, a study was conducted by personnel in Occupational Education at North Carolina State University to determine the elements that affect an institution's ability to respond to the training needs of industry. Fifteen community/technical colleges, representing 43 percent of the total enrollees in the system, and 30 major industries in North Carolina provided data through structured interviews. A literature review and an advisory group also provided input for the study. Nineteen elements were identified as being of importance to college responsiveness by both colleges and industry representatives. The top six elements identified referred specifically to college commitment, policy and/or activities, which included: (1) reliability of the institution (to do what was promised); (2) strong personal commitment of the college president to industry training; (3) high quality of the instruction provided; (4) quick response and follow through by the institution; (5) tailoring of courses to meet specific industry needs; and (6) flexibility of the institution to meet the unusual needs of industry. A series of conceptual models was created to explain the situation and provide a means for institutions to improve in responsiveness. Recommendations were made to encourage and enhance the institutions' abilities to respond to industry needs for training. (KC)

Final Technical Report
Occupational Education Research Project

MAXIMIZING RESPONSIVENESS TO INDUSTRY BY NORTH CAROLINA TECHNICAL AND COMMUNITY COLLEGES

by

Joseph R. Clary
and
Maynard J. Iverson
Department of Occupational Education
North Carolina State University
Box 5096, Raleigh, NC 27650

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North Carolina Department of Community Colleges
Division of Planning and Research Services
Occupational Education Research Services
Raleigh, NC 27611

The project reported herein was conducted pursuant to a grant from the North Carolina Department of Community Colleges. Contractors undertaking projects under such grants are encouraged to freely express their professional judgment in the conduct and reporting of the project. Therefore, statements made in this report do not necessarily represent official N. C. Department of Community College positions or policies.

ABSTRACT

The State of North Carolina is committed to providing a positive climate for business and industry. A major component of this commitment is the provision of skills training through the 58 institutions in the State Community College System. During the past 20 years, substantial resources have been committed to extensive vocational-technical curriculum programs, extension courses, and customized training for industry. In an effort to improve the system, the Department of Community Colleges in 1981 listed "responsiveness to industry" as one of its research priorities. This report summarizes a study conducted in 1982 which addressed that priority area.

The primary purposes of this project were to identify the elements influencing an institution's responsiveness to industry and to develop a model to improve the efficiency and effectiveness of that response. Specific objectives of the project were to: identify the elements that enhance a technical or community college's ability to respond to the personnel training needs of industry; synthesize a model by which a postsecondary institution may increase its level of responsiveness; design professional development opportunitites for college personnel responsible for industry relationships; identify policy considerations necessary to implement changes in the system; propose a long-range research program in the area of college-industry relationships; and examine possibilities for articulated relationships between institutions in the Community College System and a major research university.

The project staff assembled twelve advisory committee members representing industry, community college administrators, and the Department of Community College staff. This advisory group met quarterly to help guide the development of the project.

A nomination/self nomination process was utilized to identify participant colleges. Presidents at the constituent institutions were asked to nominate two schools known to respond well to the training needs of industry. From a list of 41 nominations, 15 top-rated schools were chosen and asked to provide data.

Project staff members visited each institution twice -- first to develop the data gathering instruments, then to conduct the data collection through structured interviews. During the second visit, interviews were also conducted with representatives of two industries with whom the college had worked.

Data were processed and analyzed by computer. Non-quantitative responses were transferred to individual cards to facilitate sorting, grouping and recording on tables. Responsiveness models were generated utilizing the findings, the review of literature, and inputs from the project advisory committee.

Three regional dissemination workshops were conducted at locations in the three geographic regions of the State. Major findings were presented, implementation strategies were discussed, and subjective evaluation of the models were secured from experienced personnel who attended. A slide-tape presentation and copy of the interim report were also presented at the workshops.

The sample institutions enrolled 40% of the students in the entire system. A variety of programs were offered to meet the needs of industry. Institutional coordinators of industry training averaged eight years in their positions; their counterparts in industry averaged less than four years.

The industries reported using the colleges for upgrade training in 83% of the cases, for new industry training (66.6%), and in training for expansion (36.7%). Occupational education programs, extension, and customized industry training programs had a high priority in the institutions studied. Benefits of the joint training programs to the college, industry and community were viewed somewhat differently by college and industry respondents. They also differed in preferred means of contact: industry representatives favored personal visits while college representatives preferred telephone contacts.

Policy changes recommended by college coordinators included full participation by all divisions, giving FTE credit for industry training, and freeing the coordinator for industry training of unwarranted restrictions.

College coordinators saw industrial experience as a prerequisite to their success; they also identified human relations skills, communication skills, administrative ability, pedagogical skills and knowledge of the role of the community college as important activities.

Possible joint activities between the colleges and a major university involved preparation of instructors/coordinators, designing high technology courses, management training, and articulation.

Nineteen "elements" were identified as being of "some" to "extreme" importance. College and industry respondents were in general agreement on the elements list (correlation coefficient of .733, p=.0001). The top six elements identified referred specifically to college commitment, policy and/or activities which included: (1) reliability of the institution (to do what was promised); (2) strong personal commitment of the president to industry training; (3) high quality of the instruction provided; (4) quick response

and follow-through by the institution; (5) tailoring of courses to meet specific industry needs; and (6) flexibility of the institution (to meet the unusual needs of industry).

A series of conceptual models were provided to explain the situation and provide a means for institutions to improve in responsiveness. Thirteen conclusions were drawn, 16 recommendations were made, and 13 suggestions for further study were proferred.

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(Note: The Third Party Evaluator's Critique, Bibliography, and Appendix are found in Volume II.)

PROJECT BACKGROUND

North Carolina is committed to providing a positive climate for business and industry. Current levels of industrial activity are impressive; in 1982 there were 6,708 manufacturing establishments in the state, primarily involved in textiles, tobacco, food products, chemicals, furniture, electrical/electronic equipment, machinery, fabricated metals, apparel, and paper products. These ten major industries produced goods worth nearly three billion dollars in 1978. Employment in these industries was just under 800,000 for 1981, or about 24 percent of the state's population between the ages of 20 to 65 (N. C. Department of Commerce, 1982).

Growth in industrial investment for the five-year period, 1977-81, totaled 9.6 billion dollars. The in-migration countinues. In a 1982 survey, Fortune Magazine found that more companies named North Carolina as the likely site for a new plant than any state except Texas. The expansion of industry has not been accidental. Governor James B. Hunt, Jr., listed reasons for industry interest in the state as: hardworking and productive people; positive attitudes of communities; an extensive transportation system; and incentives offered to industry, including skills training programs through the Community College System training programs. Designated the "presumptive deliverer of skilled training" and "the backbone of our economy," the 58-institution Community College System was recognized for its impact when Governor Hunt proclaimed 1981 as the "Year of the Community College System in North Carolina" (Jackman & Mahoney, 1982).

During its 20-year history the System has offered over 230 vocational-technical curriculum programs and a variety of extension courses for upgrading

and retraining workers and has provided customized training to nearly 150,000 people in over 1200 new and expanded manufacturing plants (N. C. Department of Community Colleges, undated). State aid to the Community College System for job training in 1979-80, according to a N. C. General Assembly Fiscal Research Division Report (1980), totaled 75.6 million dollars, of which $40.2 million was for technical curricula, $20.6 million for vocational curricula, $13.2 million for occupational extension, and $1.6 million for new and expanding industry. The report to the legislature further suggested that improvements were needed in certain aspects of the industry training program. Consequently, the Department of Community Colleges listed "institutional responsiveness to industry" as one of its top seven research priorities. In a subsequent call for research, a proposal submitted by the Department of Occupational Education, NCSU, was chosen for funding.

PROBLEM STATEMENT

The North Carolina Community College system, and each of its 58 constituent institutions, is committed to the vocational and technical education of adult citizens of the State in programs suited to their needs, interests, and abilities to benefit from such programs. Implicit in this commitment is a job creation or job attracting role, training and placement roles, and in-servicing or upgrading roles. Fulfilling these roles effectively of necessity, requires the development of all kinds of relationships between the institutions and adult learners, many types of organizations, other educational agencies, political entities, and the business and industrial community. What are the elements that impact on these relationships? How are these weighted? What configurations of these offer promise for maximizing positive and effective relationships?

More specifically, the North Carolina Community College system is committed to providing trained personnel for new, existing and expanding industries. To uphold this commitment, each community college must be able to respond readily and consistently to the needs of industry for trained personnel. The colleges are presently serving industry, but the effectiveness of this service varies from college to college and industry to industry. Certain elements undoubtedly influence a community college's ability to respond to industrial personnel needs. Each college can improve its responsiveness to the personnel needs of industry if the college is aware of and uses to its advantage, the elements which enhance the institution's ability to respond.

The purposes of this project were to identify the elements and to develop a model that would allow a college to systematically respond to the needs of industry for trained personnel.

OBJECTIVES

The specific objectives of the research project were:

1. To identify the elements that enhance a Technical or Community College's ability to respond to the personnel training needs of industry.

2. To develop a model, specific to the postsecondary institutions in the North Carolina Community College System, for increasing an institution's capacity to plan and carry out training programs for existing, expanding and/or new industries.

3. To effectively disseminate the findings from this study, design professional development opportunities for personnel assigned responsibilities for industry relationships, and identify policy considerations necessary to implement identified desired changes.

4. To identify and delineate a long-range research program in this area.

5. To examine possibilities for carefully articulated relationships between institutions in the Community College System and a major teaching, research, and service university.

REVIEW OF RELATED LITERATURE

An extensive review of the literature revealed limited research relating to the area of community colleges' responsiveness to industry. Most items were project reports, articles or other "think" pieces. However, a working bibliography containing over 100 references was developed. The bibliography was formulated through a computerized search of the ERIC system, a review of dissertation abstracts, and a hand search of related journals and books. A summary of pertinent findings follows.

There are a number of programs created by community colleges to serve the needs of industry. These programs consist of: 1. accelerated courses for industries; 2. concurrent enrollment in accelerated sequential courses; 3. classes in three-hour blocks; 4. "weekend college" classes held on Friday nights, Saturdays and Sundays; 5. scheduling of 4:30 p.m. and 5:00 p.m. classes to enable students to take two courses in the same evening; and 6. certificate programs which are not dead-end but lead to two- and four-year degrees. (Reynolds and Gwatney, 1976).

The term "linkages" is used to describe agreements between post-secondary educational institutions and business organizations. These linkages are both beneficial to the institution and the business organizations. Some of these linkages are: 1. joint cost-benefits analysis of financing college and continuing education courses; 2. joint planning of curricula and presentation methods of college and continuing education courses; and

3. joint committees, composed of members of business and education communities, to discuss matters of education and careers (Strobach, 1976).

Beman and Parsons (1978) suggested a generalized model which can be adapted to the goals and resources of a specific institution when working with business organizations. Institutions should recognize that they are selling a product to the business which must meet competition in terms of cost, quality, and timeliness of delivery. The institution must provide instruction more economically and effectively than the company itself can. Also, the institution should sell only what it can deliver. If the client's needs are beyond the competencies of the faculty, there are essentially two options. One, the institution can admit that it cannot provide the service; or, the institution can suggest the client redefine his needs so that they can be met competently. Above all, it is important that the institution advertise its flexibility. If the framework of institutional policies gives that institution latitude in such items as choice of instructional materials, changes to course outlines, or modification of attendance policies, the institution should make these known to prospective clients. It is also important for the institution to publicize its successes. Productive cooperation between colleges and the business world should be newsworthy because of its relative rarity.

It is important that institutions nurture a working relationship with the business and industrial community. Chasin (1981) recommended the following steps in order to maintain continuous channels of communication with industries:

1. top management from business and industry should serve on the institution's advisory committees in order to have input for the planning of programs;
2. in purchasing goods and materials, the institution should try to do business with the local business establishment whenever economically feasible and thus

develop position relationships; 3. members of the institution should meet with business and industry representatives to determine if specific services or training might be provided by the institution to upgrade the skills of the employees; and 4. personnel from business and industry that have expertise in certain areas should be invited as guest speakers at the institution.

A national study, with a focus similar to this study, was conducted by the National Center for Research in Vocational Education, located at The Ohio State University. The Center asked the directors of community, technical and junior colleges in all 50 states to nominate colleges that had creative and beneficial cooperative programs with industry. The following guidelines were identified by institutions as critical elements for success to implement new collaborative efforts with industry or expand present effects. 1. There must be good clear communications between key persons in industry and education. 2. Excellence in teaching is essential. 3. Institutional flexibility is required to meet the needs of industry. 4. Programs offered must be of high quality. 5. Appropriate, active advisory committees are important. 6. The educational institution should have a quick response time in meeting industrial needs. 7. There must be a recognition of mutual needs. 8. The support of administrators and faculty within the college is required to successfully serve industry. 9. Careful and thorough planning of each cooperative effort is essential. 10. A clearly written agreement or contract helps achieve successful completion of the joint endeavor. 11. The program should be evaluated on a continuing basis to update and improve it (Warmbrod, 1982).

In an intermediate draft document, "Economic Development Is Here to Stay," (1982) a project committee from Fox Valley Technical Institute in Wisconsin

stressed the partnership role of Vocational Technical and Adult Education (VTAE) districts. Economic development was defined as an organized effort by a local VTAE district to attract or develop new business and assist existing business to expand or become more productive, by providing retraining/upgrading/initial job training and technical services to meet the needs of business. "Partners" in the process were: local government, state development office, regional planners, Chamber of Commerce, federal employment and training programs, university, and private vendors. VTAE helps improve productivity and in job creation by: training for initial employment; training, retraining and upgrading already employed workers; training workers for new industries; helping new business develop; providing professional seminars; assessing skill levels; providing technical services; and employee needs assessment. An eight-step model for planning and implementation of economic development services was proposed.

A recent publication from the American Association of Community and Junior Colleges stressed cooperative arrangements with business and industry as a means of curing the nation's economic ills through improvement of the work force. Cooperative agreements most often include: plant-specific training under contract with a local employee; equipment use or donation; industry assistance in program development (providing materials, monitoring progress, financing, and giving skill requirements); faculty assignment in industry; publicity; personnel from industry as part-time instructors; sharing facilities; and on-the-job training. Benefits of cooperative agreements were said to be:

- For industry: low-cost, high-quality training specifically tailored to its needs; flexible, adaptable, reliable, and fixed human resource development from an institution with special interests in the firms' success; and a fecund source of future employees.
- For colleges: opportunity to meet their philosophical responsibilities; enhancement of programs; establishment of cooperative patterns (and a reputation) that can create long-term relationships with industry; and increase in revenues.
- For students: hands-on experience with state-of-the-art equipment and first-hand knowledge of workplace requirements.
- For already-employed workers: skills upgrading opportunities that can ensure employment and open new opportunities.
- For communities: the development of an education and training resource capable of attracting new business and maintaining current businesses, thereby ensuring their economic health; reduction of the need for industry to bring in workers from other locations; and enhancement of an objective, dependable information center for broad community use. (Jackman & Mahoney, 1982).

Elements of effective agreements and dangers inherent with cooperative agreements were listed. The North Carolina Economic Development Model was also discussed and 32 community college programs were reviewed, including Central Piedmont Community College, Mayland Technical College, and Robeson Technical College in North Carolina.

Although few items specific to the problem were identified, it was apparent that the area of college-industry relationships is an important, emerging topic of study, and that there is a need for research in the

specific subject of institutional responsiveness to the training needs of industry.

METHODOLOGY

1. A 12-person advisory committee for the project was organized and met quarterly to advise on the progress of the project.

2. A procedure consisting of a combinatiom of nomination and self-nomination by college presidents was devised and executed to identify institutions that demonstrated the ability to consistently and effectively respond to the personnel training needs of industry. The presidents of the 15 top-rated institutions so identified were invited to agree for their institutions to participate in the study. Participant institutions are depicted in Figure 1.

3. Two visits were made to each of the identified institutions for data collection purposes. Such data included factors, techniques, methods, policies and procedures essential to effective responsiveness to industry, along with the barriers inhibiting such responsiveness.

4. Two selected industries served by each institution were visited to collect data on industry perspectives to the items in 3 (above). Industry representatives were also asked to identify ways the institutions could improve responsiveness to their needs.

5. The data were analyzed by hand tabulation and by computer in order to generate a model with weighted elements to indicate the contribution of each element to success in responsiveness. Additional models were generated to explain the situation and aid institutions to improve their responsiveness.

6. These models were examined by a "jury" of selected institution and industry personnel to establish face validity.

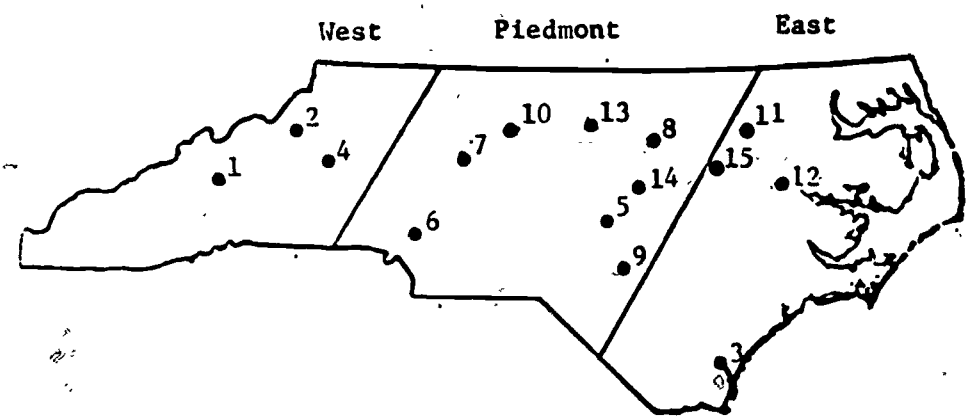
7. A series of researchable questions were also generated from the models for empirical testing.

8. A slide-tape presentation was developed to describe the project and its findings.

9. Three regional dissemination workshops were planned and conducted near the end of the project to disseminate the findings. These workshops also gave attention to needed professional development opportunities and policy considerations necessary to implement identified desired changes.

10. A draft of suggested articulated, mutually beneficial, and continuing relationships between the institutions and North Carolina State University was developed.

Figure 1. North Carolina community and technical colleges involved in the Responsiveness-to-Industry study.



Key:

1. Asheville-Buncombe Technical College, Asheville
2. Caldwell Community College and Technical Institute, Lenoir
3. Cape Fear Technical Institute, Wilmington
4. Catawba Valley Technical College, Hickory
5. Central Carolina Technical College, Sanford
6. Central Piedmont Community College, Charlotte
7. Davidson County Community College, Lexington
8. Durham Technical Institute, Durham
9. Fayetteville Technical Institute, Fayetteville
10. Guilford Technical Institute, Jamestown
11. Nash Technical College, Rocky Mount
12. Pitt Community College, Greenville
13. Technical College of Alamance, Haw River
14. Wake Technical College, Raleigh
15. Wilson County Technical College, Wilson

MAJOR FINDINGS

Description of Participants

The 15 institutions involved in the study served more than 4 of every 10 students enrolled in the Community College System in 1980-81. All of the institutions were actively engaged in training for industry, through a variety of means: five were participants in the Cooperative Skills Program funded by the Department; seven were recently involved in an update of high technology curricula; three were members of the National Postsecondary Alliance, which is dedicated to systematic efforts aimed at meeting the education and training needs of employers and employees; and five provided a special facility for industry training. The sample institutions had higher average enrollments than the state average, even when the three largest institutions were excluded (N. C. Department of Community Colleges, 1982). These data may be seen in Table 1.

College coordinators ranged in experience from less than a year to 17 years in their present positions, for an average of just under eight years. They averaged 11 years in total employment time at the institution. Industry contacts had served a mean of just under four years in their positions but had nearly 10 years of experience with the company and over 16 years in industry.

Types of Industry Training Provided

Twelve, or 40% of the 30 industries surveyed, provided on-the-job training and employee orientation without involvement of the colleges, while eleven (36.7%) of the industries conducted orientation and pre-employment training in cooperation with an institution. Ten industries reported conducting management and supervisory training without involvement of colleges; however,

Table 1

Unduplicated Head Count of Sample Institutions for 1980-81

Institutions	Enrollment		
	Grand Total	Curriculum	Extension
Asheville-Buncombe Technical College [F]	13,446	3,524	9,922
Caldwell Community College [A,T]	12,563	3,515	9,048
Cape Fear Technical Institute	15,965	3,082	12,883
Catawba Valley Technical College [C]	16,865	3,500	13,365
Central Carolina Technical College [T]	16,297	3,466	12,831
Central Piedmont Community College [T]	54,277	32,780	21,497
Davidson County Community College [C]	12,795	3,453	9,342
Durham Technical Institute [A,F,T]	16,429	6,016	10,413
Fayetteville Technical Institute	30,803	8,885	21,998
Guilford Technical Institute [A,C]	26,865	6,746	20,119
Nash Technical Institute [F,T]	7,991	2,315	5,676
Pitt Community College [C,F,T]	10,932	4,091	6,841
Technical College of Alamance [F]	11,950	2,592	9,348
Wake Technical College [C]	9,850	2,962	6,888
Wilson County Technical Institute [F,T]	7,828	2,316	5,512
TOTALS	264,936	86,797	178,139
Sample Mean	17,662	5,786	11,876
State Total	607,601	180,758	426,893
Percentage of State Total	43.6%	48%	41.7%
State Mean	10,476	3,117	7,360
Sample Mean, Excluding The Three Largest Colleges	12,749	3,198	9,544

Note: A = Member of National Postsecondary Alliance
C = Participant in the Cooperative Skills Program
F = Utilize a special facility for industry training
T = Involved in update of high technology curricula

nine industries conducted supervisory training and seven industries conducted management training in cooperation with a community college. One or more industries reported 29 other training topics conducted without involvement of colleges. Thirty-four other training topics conducted in cooperation with a community college were reported by at least one industry.

Utilization of local institutions for upgrading training was reported by 83.3% of the industries, new industry training by 66.7%, and training for expansion by 36.7%. The priority given to these training programs by institutional coordinators was consistent with the utilization by industries: upgrade training was utilized by an average of 51.9%; new industry training by 26.6%; and training for expansion by 21.6%.

When coordinators compared the emphasis given to industry training to other programs at their institutions, industry training was reported as receiving more emphasis than general/academic curriculum programs in 60% of the institutions, occupational curriculum programs received about the same emphasis as industry training in 73%; extension programs were viewed as receiving the same emphasis as industry training programs in under one-half of the institutions sampled.

Benefits of Joint Training

The benefits of joint training to industry were perceived differently by college and industry representatives. Eighty percent of the college personnel noted joint training provides better employees, while only 30% of the industry representatives said joint training improves the skill levels of employees. Sixty percent of the college personnel viewed joint training as economically efficient; 26.7% of industry representatives identified reduced need for

in-house staff and increased productivity as factors. Another 23.3% mentioned other financial elements. In addition, 26.7% of the college personnel mentioned public relations as a joint benefit.

College and industry contacts were consistent in their views of the contributions that joint training made to the institutions. Both groups recognized that joint programs aid recruitment and build positive public relations; 46.7% of the college personnel and 40% of the industry contacts indicated this point.

The benefits of joint training to the community were also addressed by respondents. Improving the local economy (improved standard of living and income) was indicated by 53.3% of college personnel and 46.6% of the industry representatives. Attracting/holding good new industry was cited by 36.6% of industry representatives, and providing jobs for local citizens was noted by 46.7% of college personnel.

Preferred Means of Contact

Concerning means of contact between college and industry personnel, two-thirds of the industry representatives preferred a personal visit and one-half preferred telephone contact; 53.3% of the college coordinators preferred contact by telephone, 33.3% an office visit, and 26.7% an on-site visit. Only 13.3% of college coordinators and 3.3% of the industry representatives had no preference.

Policies, Resources and Information Needed to Assure Effective Industry-College Relations

College coordinators noted the importance of the participation of all divisions in the college (33.3%), of awarding FTE Credit (26.7%), and giving

the coordinator the freedom to act on behalf of the college (20%) as policies most needed for successful college-industry relationships.

Resources to assure effective relationships as identified by the coordinators were: competent instructors (73.3%), up-to-date equipment (66.7%), adequate funding and facilities (46.7%), a skillful full-time coordinator (33.3%), and curriculum courses related to industry (26.7%).

Information required by coordinators to train workers for industry were: job market information (20%), training needs, training techniques and management systems (each 13.3%).

Professional Skills Required by Coordinators

Most (86.7%) of the college representatives recognized an industrial background as an essential professional requisite. Human relations skills (46.7%), communication skills (40%), educational leadership (33.3%), pedagogical skills (26.7%), and program planning skills (26.7%), knowledge of the role and functions of the community college (20.0%), and a broad formal education background/degree (20.0%) were also identified by college contacts.

Possibilities for Joint Research and Development with a Major University

Preparation of instructors was requested by 33.3% of the college contacts; designing high technology courses by 26.7%; and help in management training and articulation was asked by 20% when looking at possibilities for joint research and development with a major university. Twelve other joint research and development activities were also suggested by the coordinators.

Factors Affecting Responsiveness -- Present and Future

One-third of the college representatives identified personal contact with industry and commitment of the college president as key factors in successful industry relationships. The coordinators also listed responding

well to industry needs (26.7%) and flexibility (26.7%) as important for successful programs. A total of 18 other factors were also mentioned.

Industry representatives indicated that providing training help when needed (33.3%), willingness to cooperate (30%) and a strong commitment to the project (13.3%) were key factors in responsiveness. Eleven other factors were given.

College and industry representatives rated use of resource people from industry and loan/donation of equipment as major "other" elements. The two groups listed 12 and 18 other things, respectively, which affected responsiveness.

Potential barriers to responsiveness, as indicated by college personnel, included funding problems (53.3%), lack of FTE credit (46.7%), staffing problems (40%), and restrictions on enrollments (33.3%). In contrast, industry representatives indicated staffing (26.7%), technology (23.3%), and funding (23.3%). Fifteen other barriers were also identified.

Factors predicted to be most important during the next 10 years by college representatives were the securing of updated equipment and retraining (both 33.3%). Changes recommended by industry representatives were: intensify training in high technology (33.3%), provide a comprehensive course approach (20%), and update specialized equipment (16.7%).

Ratings of Elements: Weighted Responsiveness Model

College and industry representatives responded to the listing of elements on the data gathering instrument by rating each item on a scale of one to four, (of little, some, much and extreme importance) or zero ("does not apply"). College and industry personnel were in general agreement; they differed significantly in their ratings on only two items: regular contacts

by the institutional representatives, and institutional communications. All 19 items received ratings averaging in the "some" to "extreme" importance range. The closeness of the ratings were also shown through analysis by Spearman's Rho rank order correlations. The group mean ratings were moderately high in correlation ($r = .773$, $p = .0001$). This gave added evidence that the ratings of the two groups could be combined to form an overall mean rating of elements affecting responsiveness. Before this was done, however, a number of tests were made to determine if any other dependent variable would cause significant differences to occur. Using the General Linear Models procedure, the ratings based on age, sex, location, years in position/organization/industry, type of position, size of organization, age of industry and industrial product were reviewed. Among all variables, only nine items were significantly different. In only one variable, length of time the industry had been in operation, were there more than two significant items. Since a number of the items tested were not statistically independent, the likelihood of a type I error due to multiple effects was quite high (Oliver and Hinkle, 1981). Therefore, those few items which appeared to be statistically significant were disregarded and the combined evaluations of items were accepted as appropriate for the model.

A frequency distribution of responses and mean ratings for all 45 respondents on the 19 items revealed that most items were rated "of much" or "of extreme" importance. Only seven elements received "of little" importance, and only then by a minority of respondents. The overall weighted model, which consists of 19 items rated to be of "some" to "much" importance follows in Figure 2.

Figure 2. Weighted model* of elements affecting institutional responsiveness to industry.

1. Reliability of the institution (to do what was promised)
2. Strong personal commitment of the president to industry training
3. High quality of the instruction provided
4. Quick response and follow through by the institution
5. Tailoring of courses to meet specific industry needs
6. Flexibility of the institution (to meet the unusual needs of industry)
7. Special funding through the New and Expanding Industry Program, Department of Community Colleges
8. One or more staff members working full-time coordinating industry training
9. Continuing close and cordial relationships with industry representatives
10. A major purpose/focus of the institution (to serve industry)
11. Regular institutional funding for industry training
12. Regular, persistent, personal contacts with industry by the institutional coordinator
13. Regular faculty members with knowledge of and commitment to industry training needs
14. Industrial experience of key personnel (coordinator and instructors) in the institution
15. Active institutional advisory committees having representatives from industry
16. The amount of industrial activity in the area
17. Regular campus facilities made available to area industry
18. A special training facility (on or off campus) designated for exclusive use by industry
19. Institutional communications to industry (direct mailings, newsletter, brochure, newspaper, etc.)

*NOTE: Elements were rated by 15 college representatives and 30 industry respondents during the summer of 1982; all elements received at least a 2.73 on a four-point scale of 1 = little importance; 2 = some importance; 3 = much importance; 4 = extreme/critical importance; the elements are listed in descending order of importance.

ADDITIONAL MODELS FOR UNDERSTANDING AND ENHANCING INSTITUTIONAL RESPONSIVENESS TO INDUSTRY

Additional models relating to community and technical colleges' efforts to serve the needs of industry were developed using a variety of means: data generated through interviews with college and industry personnel; review of economic development and manpower retraining studies being conducted in other states; deductive reasoning; and suggestions from members of the Project Advisory Committee.

Counterbalanced Element/Barrier Model

The countering effect of certain barriers to the positive elements is illustrated in Figure 3. Not all barriers are opposites of the elements, nor can it be assumed that absence of a particular element is necessarily a barrier to serving industry. However, representatives from colleges and industry generally believed that positive elements promoted responsiveness, while existence of barriers tended to reduce an institution's ability to respond.

Factored Model for Responsiveness

When the weighted elements are placed logically in similar categories, a factored model such as can be seen in Figure 4 results. Added items from the college/industry respondents and suggestions from the Project Advisory Committee provided a comprehensive listing of 33 items or elements within the six major factors of institutional commitment, coordination, industrial relationships, curriculum/instruction, facilities/equipment, and funding. Each factor is an essential component in building an institution's industrial training effort.

Figure 3. Effects of elements and barriers on institutional responses.

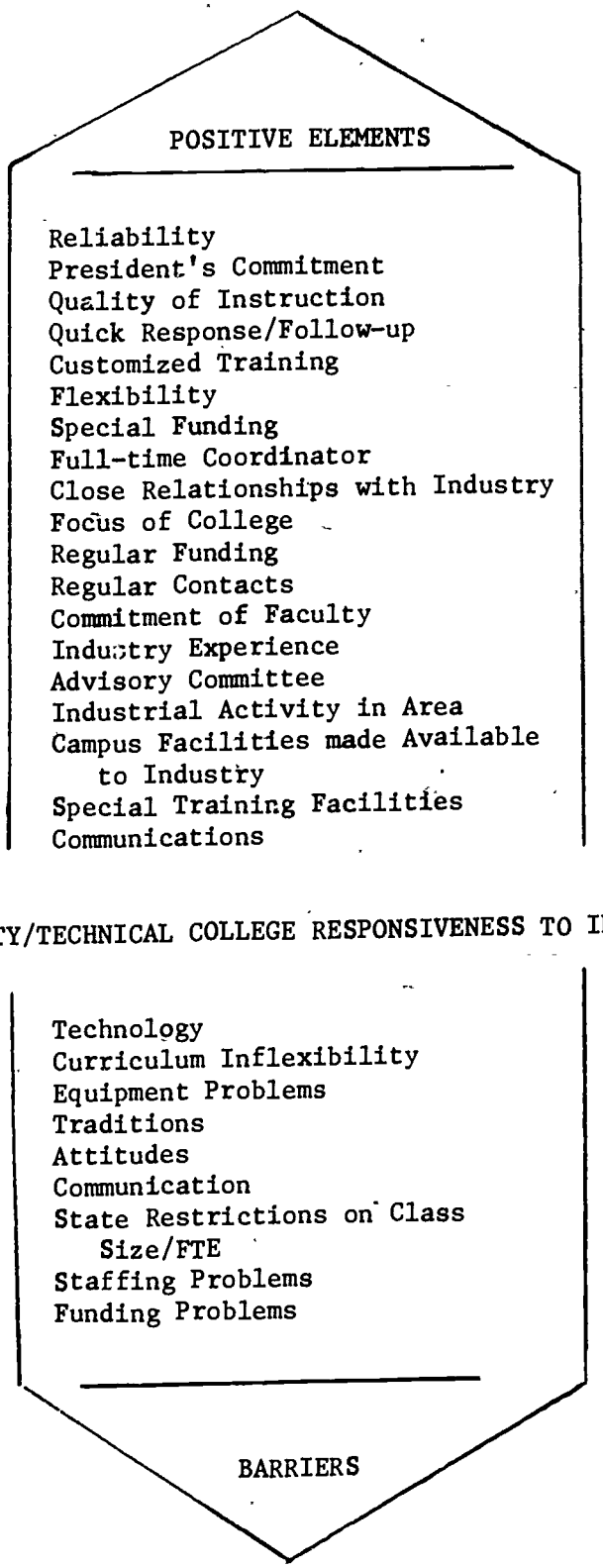


Figure 4. Factors* in the model for responsiveness of community/technical colleges to the training needs of industry.

INSTITUTIONAL COMMITMENT

12. Flexibility of the institution (to meet the unusual needs of industry)
13. Reliability of the institution (to do what was promised)
14. Quick response and follow through by the institution
16. A major purpose/focus of the institution (to serve industry)
- Commitment of the Board of Trustees
- Mutual understanding of institution's mission and limitations
- Thoroughness in planning, evaluation and follow-up

INSTITUTIONAL COORDINATION

5. One or more staff members working full-time coordinating industry training
9. Regular, persistent, personal contacts with industry by the institutional coordinator
- Provision for released time (of coordinator)
- Administrative level of institutional coordinator: should report directly to the Dean of Instruction
- "Quality" of institutional coordinator

INDUSTRIAL RELATIONSHIPS

10. Institutional communications to industry (direct mailings, newsletter, brochure, newspaper, etc.)
11. Active institutional advisory committees having representatives from industry
15. Continuing close and cordial relationships with industry representatives
17 The amount of industrial activity in the area
- Community support of institution (industrial development)
- Use of resource personnel from industry
- Involvement in recruitment of industry to the area

CURRICULUM AND INSTRUCTION

7. Industrial experience of key personnel (coordinator and instructors) in the institution
8. Regular faculty members with knowledge of commitment to industry training needs
18. High quality of the instruction provided
19. Tailoring of courses to meet specific industry needs
- Internal communications/cooperation
- Concentrating on fundamentals in curriculum (training programs)
- Up-to-date, competency based curriculum

FACILITIES/EQUIPMENT

3. A special training facility (on or off campus) designated for exclusive use by industry
4. Regular campus facilities made available to area industry
- Campus resources available to industry
- "Hi tech" equipment (loaned/donated by industry)

FUNDING

1. Special funding through the New and Expanding Industry Program and/or Cooperative Skills Program, Department of Community Colleges
2. Regular institutional funding for industry training

*NOTE: Factors were derived logically, using the 19 items rated by the 45 respondents, plus additions suggested by the Project Advisory Committee. The additions are not numbered.

Three-level Model of Responsiveness to Factored Elements

Next, community and technical colleges were analyzed in terms of the extent to which they possessed the six factors. It was determined that there were three levels of responsiveness--basic, intermediate, and advanced--for each of the factors, as indicated in Figure 5. At the basic level an institution is seen to be willing, but may not--for a variety of reasons--be extensively involved in cooperative training with industry. One reason for this could well be the relative lack of industry in the service area. The emphasis placed by the leadership on joint training and the resources allotted are other reasons for a college remaining at the basic level.

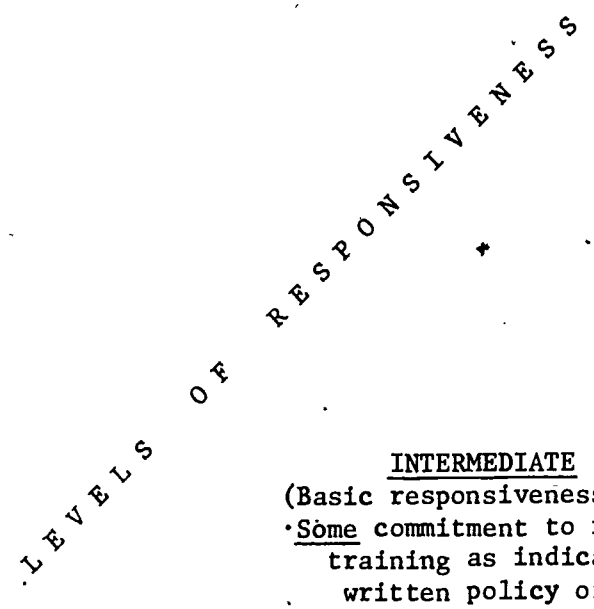
Institutions which are more assertive and active in cooperative training programs with area industry fall into the intermediate level of responsiveness. Greater priority is given to serving industry by the leadership and staff alike. Some special funds are utilized to accomplish the goals of the institution in the industry training area.

The most active institutions, and certainly those most aggressive in finding resources to serve the training needs of industry, would be categorized as at the advanced level of responsiveness. Major emphasis and resource allocation to serving industry are hallmarks of these bellwether institutions.

Three-level Model of Responsiveness Based on Services Provided

When reviewing the kinds of services provided by institutions at the three levels of responsiveness, definite variations can be seen, as listed in Figure 6. The basic level provides strong curriculum programs, but only complies with certain requests for special training. The intermediate level provides a more assertive stance, giving preference to industry for services and actively working with industry to meet at least some training needs. Advanced

Figure 5. Three levels of responsiveness to industry based on the factored elements list.



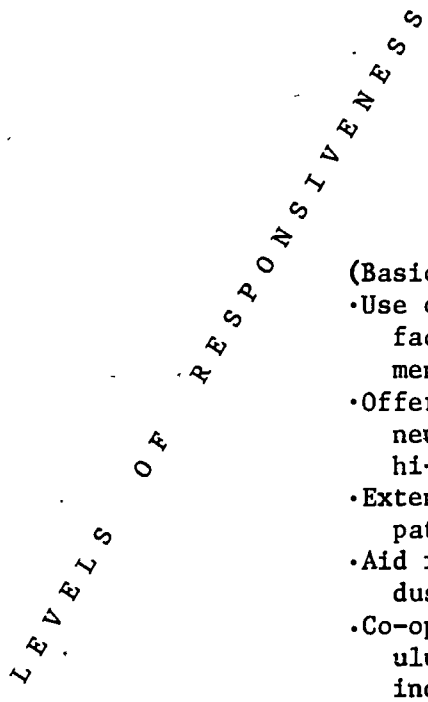
ADVANCED
(Basic and Intermediate responsiveness plus)
- Major commitment to serving industry -- spelled out in school goals and objectives
- Coordination by one or more full-time personnel
- Close Relationship with area industry through personal visits, communications, social contacts, etc.
- Instruction aimed primarily at serving industry with highest quality tailored courses
- Regular and Special Facilities designated for industry training; hi tech equipment
- Utilize Regular and all available special funds

INTERMEDIATE
(Basic responsiveness plus)
- Some commitment to industrial training as indicated in the written policy of institution
- Coordination by personnel part-time for industrial relations
- Active Relationships with area industry through advisory committees, recruitment, co-op, equipment loan
- Curriculum & continuing education programs geared to industry needs
- Industry given priority for use of campus facilities
- Use regular funding plus some special funds to train for industry

BASIC
- Concern for industry as part of the community
- Coordination by existing personnel
- Industrial Relations a part of community/public relations
- Curriculum Programs keyed to community/industry needs
- Facilities open to community use, including area industry
- Utilize regular FTE-generating funding

NOTE: Any institution in the State may find itself at different levels with respect to each factor, or in a transition stage between levels.

Figure 6. Three levels of responsiveness to industry based on services provided.



ADVANCED
(Basic & Intermediate services plus)
- Initiates new and expanding industry program
- Co-op skills training program
- In-plant, upgrade training courses (non-credit)
- Extensive communications with area industry

INTERMEDIATE
(Basic services plus)
- Use of college teaching facilities & equipment
- Offers special programs: new & expanding industry, hi-tech, consulting, etc
- Extension classes in occupational subjects
- Aid in recruitment of industry to the area
- Co-op positions for curriculum students in area industry
- Miscellaneous services/ programs for/with industry

BASIC
- Regular curriculum programs in Occupational Education
- Continuing education on-campus classes in occupational subjects
- Use of general college facilities by community/industry
- Job placement service for graduates
- Complies with requests for new and expanding industry training programs

NOTE: An institution desiring to analyze itself in relation to this model may find itself at different levels with respect to each service, or in a transition stage between levels.

level provision of services is characterized by an aggressive effort to utilize a repertoire of training programs to provide for felt and unfelt training needs of area industry. Continuity and initiative are bywords of these leaders in responsiveness.

Benefit-relationship Model

The specific activities in which a community/technical college engages have value and a cost. In Figure 7 the relative value to industry, institution and the community are graphically portrayed. It can be seen that programs of highest benefit to industry (new and expanding industry programs and help in recruitment of industry to the area) are not perceived as highly beneficial to the institution, at least in the short term. Conversely, programs which aid the institution the most (especially FTE generating programs) are not perceived as the most helpful to industry. This dilemma is softened somewhat by the overall benefit accruing to the community regardless of relative value to college or industry. Value to community may be derived from the combined benefits to college and industry for each service.

Sequential-development/Maintenance Model

Finally, a sequential model for development and maintenance of a responsive institutional program for training in industry was synthesized. The model is based on the principles of sound program planning. Assessing the need, developing and implementing a plan, evaluating and recycling are the major components, as outlined in Figure 8. The listing of activities under each step tends to be altruistic, but the utilization of these or some similar organized strategy, would appear to be vital to optimum operation of an institutional training program for industry.

Figure 7. Benefit relationships of specific training activities for industry by North Carolina community colleges.

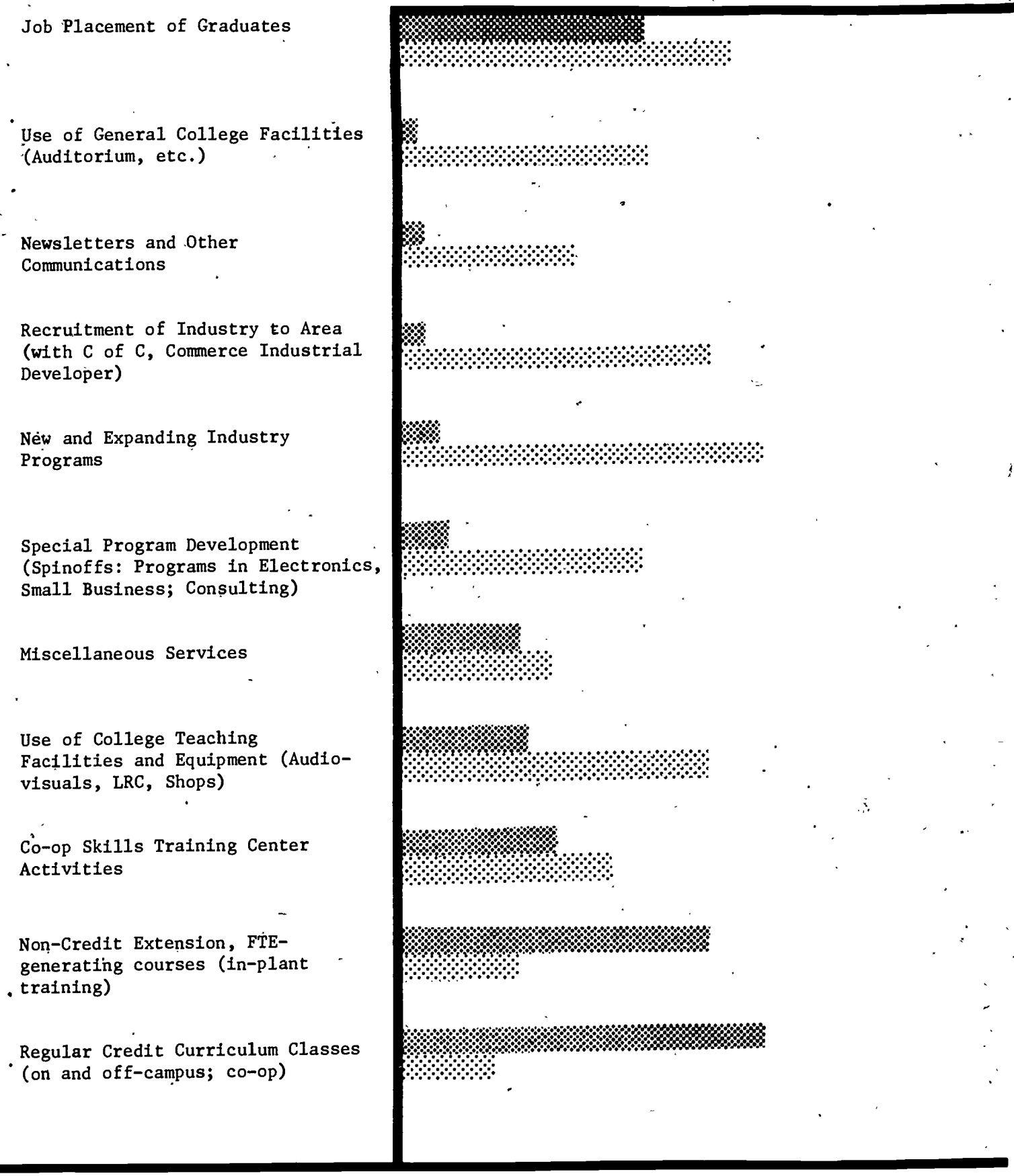


Figure 8. Sequential model for development and maintenance of a responsive industry training program in a community college.

Step 1. ASSESS THE SITUATION

ANALYZE STATE COMMITMENT TO INDUSTRY
DETERMINE INSTITUTIONAL COMMITMENT
REVIEW EXISTING PROGRAMS (CURRICULUM & CONTINUING EDUCATION/EXTENSION)
DETERMINE EXTENT OF AREA INDUSTRY
ASCERTAIN NEEDS OF INDUSTRY FOR TRAINING
REVIEW SUPPORT SERVICES AVAILABLE AT COLLEGE
DETERMINE OTHER RESOURCES AVAILABLE

Step 2. DEVELOP A PLAN

INVOLVE ALL PERTINENT PARTIES
SET GOALS TO MAXIMIZE BENEFITS TO INDUSTRY, COLLEGE AND COMMUNITY
IDENTIFY STRATEGIES
DESIGNATE PERSONNEL
PLAN AWARENESS STRATEGIES (PR)
ANTICIPATE DATA NEEDS FOR EVALUATION
IDENTIFY QUALITY CONTROL MEASURES

Step 3. IMPLEMENT THE PLAN

SECURE BOARD/ADMINISTRATION APPROVAL
SET UP INTERNAL COMMUNICATIONS
IDENTIFY/HIRE STAFF
INSERVICE ALL INVOLVED PERSONNEL
IDENTIFY KEY PERSONNEL IN AREA INDUSTRY
SECURE/ALLOCATE SUPPLIES AND EQUIPMENT
DEVELOP AND DISTRIBUTE WRITTEN POLICIES/PROCEDURES
IMPLEMENT AWARENESS STRATEGIES
MAKE A COMMITMENT TO QUALITY
DELIVER SERVICES

Step 4. EVALUATE AND RECYCLE

PROVIDE FOR FREQUENT EVALUATION
ALLOW FEEDBACK
EVALUATE PROCESS AND PRODUCTS
DETERMINE ADJUSTMENTS NEEDED BASED ON RESULTS

Combined Responsiveness Model

Figure 9 discloses a conceptual framework wherein the three levels of responsiveness--basic, advanced, and intermediate--are combined with the sequential model. It can be seen that institutions engage in all of the major functions, whether in terms of the elements or in terms of services, but to different extents. Movement to a higher level corresponds to greater and/or more concentrated activity on the part of the institution. The process is continuous (cyclical) and self-correcting.

Professional Development Model
for College Coordinators

Using input from the interviews with college coordinators and information obtained from The American Society for Training and Development (ASTD), the model for the professional development of coordinators, shown in Figure 10, was devised. The proposed model offers three ways for coordinators to gain/improve skills--by individual means, by informal group activities, and through formal programs such as graduate course work/degrees.

Cooperative Model for Relationships
between a Community/Technical College
and a Major University

Figure 11 portrays a number of cooperative endeavors institutions in the North Carolina Community College system could undertake with an institution such as North Carolina State University. Successful involvement in one activity is likely to result in more involvement; thus, getting started may be as important as the choice or level of activities undertaken.

Figure 9. Combined responsiveness model

Step 1.

ASSESS THE SITUATION

ANALYZE STATE COMMITMENT TO INDUSTRY
DETERMINE INSTITUTIONAL COMMITMENT
REVIEW EXISTING PROGRAMS (CURRICULUM & CONTINUING EDUCATION/EXTENSION)
DETERMINE EXTENT OF AREA INDUSTRY
ASCERTAIN NEEDS OF INDUSTRY FOR TRAINING
REVIEW SUPPORT SERVICES AVAILABLE AT COLLEGE
DETERMINE OTHER RESOURCES AVAILABLE

Step 2.

DEVELOP A PLAN

INVOLVE ALL PERTINENT PARTIES
SET GOALS TO MAXIMIZE BENEFITS TO INDUSTRY, COLLEGE AND COMMUNITY
IDENTIFY STRATEGIES
DESIGNATE PERSONNEL
PLAN AWARENESS STRATEGIES (PR)
ANTICIPATE DATA NEEDS FOR EVALUATION
IDENTIFY QUALITY CONTROL MEASURES

Step 3.

IMPLEMENT THE PLAN

SECURE BOARD/ADMINISTRATION APPROVAL
SET UP INTERNAL COMMUNICATIONS
IDENTIFY/HIRE STAFF
INSERVICE ALL INVOLVED PERSONNEL
IDENTIFY KEY PERSONNEL IN AREA INDUSTRY
SECURE/ALLOCATE SUPPLIES AND EQUIPMENT
DEVELOP AND DISTRIBUTE WRITTEN POLICIES/PROCEDURES
IMPLEMENT AWARENESS STRATEGIES
MAKE A COMMITMENT TO QUALITY
DELIVER SERVICES

Step 4.

EVALUATE AND RECYCLE/MODIFY

PROVIDE FOR FREQUENT EVALUATION
ALLOW FEEDBACK
EVALUATE PROCESS AND PRODUCTS
DETERMINE ADJUSTMENTS NEEDED BASED ON RESULTS

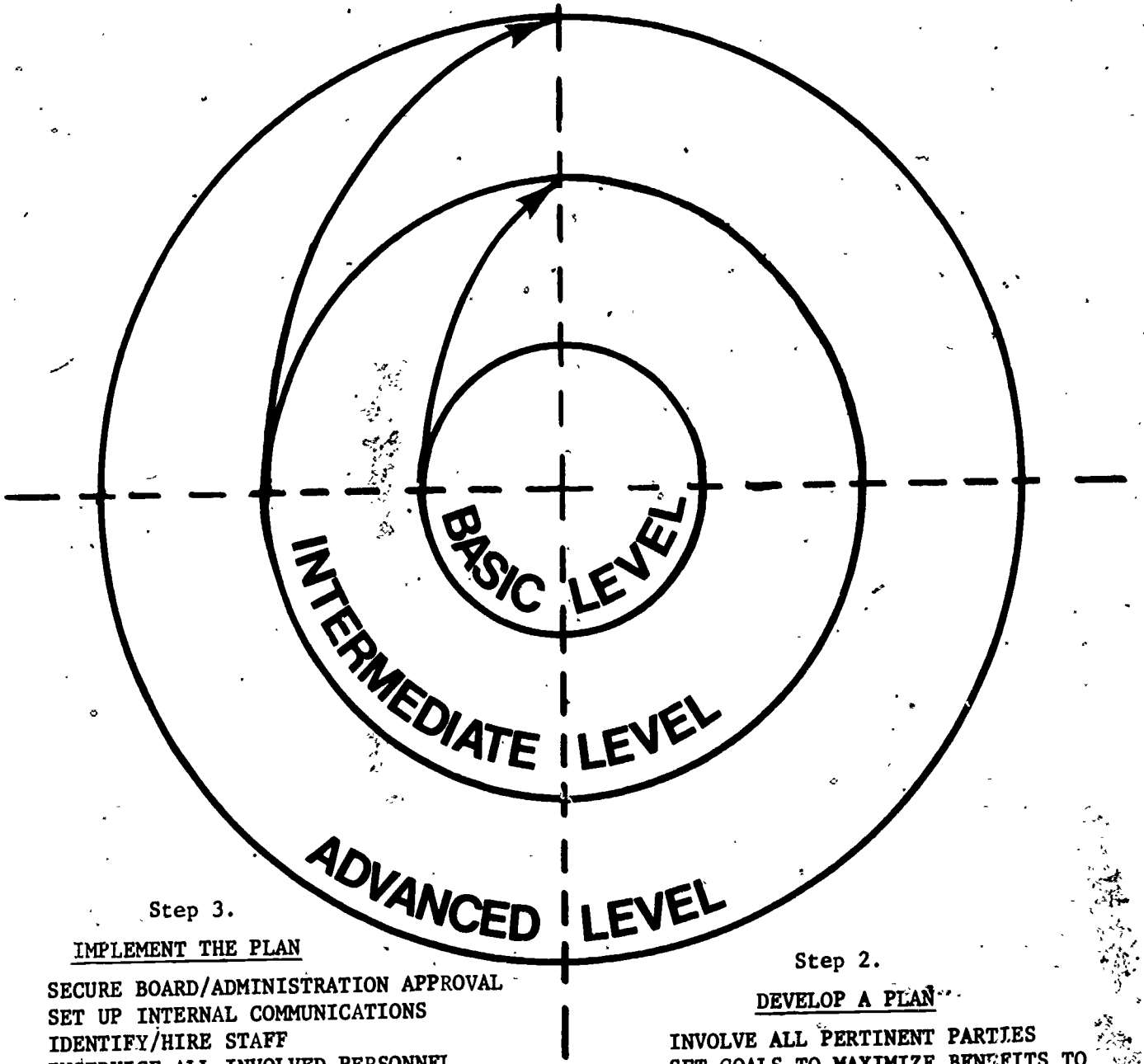


Figure 10. A self-directed professional development model for coordinators of industry training at North Carolina technical and community colleges.

Individual Activities

·Professional/Industrial Literature

·Association Membership
  ASTD
  AACJC
  Others

·On-job Training

·Travel

Informal Group Activities

·Workshops

·Seminars

·Internships

·"Back to Industry" Leave Program

Formal Group Activities

·College/university Course Work

·Graduate Degree

Figure 11. Cooperative model for partnership of community colleges and a university

Provided by Community Colleges	Provided by the University
Pool of potential students	Undergraduate programs
Source of research problems	Graduate programs for industry training personnel
Source for funded R & D projects	Upgrade courses for instructors
Consultant aid	Consultant aid
Current literature	Research expertise for solving pressing problems
Ties with AACJC	Advanced computer capability (access to TUCC)
Community access/contacts	Extensive library holdings
Current knowledge of technology, business and industry	Source of instructors

CONCLUSIONS

Based on analyses of the major findings reported in the previous section, the following conclusions have been drawn:

1. Sample colleges had over 40 percent of enrollment and represented the major categories of size, region, urban or rural community, curricular offerings, administrative organization, and age; therefore, the results of the study should be useful in other institutions in the North Carolina Community College system.

2. Coordinators of training in both the colleges and the industries surveyed were well prepared in terms of experience (averaging 11 and 10 years, respectively in the college/company), thus their responses may be considered valid and appropriate.

3. Industries in the study were involved in a wide variety of training topics, both alone and in cooperation with the local community colleges; where the sample industries were involved with the local community college, upgrade training took place in eight of ten cases and one-third reported training for start-up or expansion. It can reasonably be concluded that a similar pattern can occur in other locations and among other industrial firms in North Carolina.

4. Priority given to industry training by institutional coordinators was two to one for upgrade training over training for start-up or expansion; thus coordinators are seen to have a primary commitment to long-term, continuous training programs with existing local industry, not just new industry.

5. Within the colleges studied, emphasis on industry training was equally regarded with curriculum programs and other extension programs in all but a few cases. It can be concluded that the institutions surveyed typically had a strong, ongoing commitment to provide training for industry.

6. Although college and industry respondents were in general agreement as to the major benefits of joint training to industry, college representatives were more convinced of its effectiveness in providing trained employees and improving worker skills than were their counterparts in industry. In extolling the benefits of joint training to the community and the institution, responses of both groups were similar in emphasis. This leads the researchers to conclude that either the expectations or evaluative criteria of the two groups regarding direct effects of training are divergent, and therefore, in need of attention.

7. College and industry personnel prefer direct contact with each other, by telephone or personal visit--but industry respondents were twice as apt to request a personal visit as were college coordinators. This reflects a basic difference in communication style as well as a possible difference in pace of the workplace for the individuals involved.

8. No clear direction was detected when analyzing responses of college representatives to policies needed in an institution to assure effective industry-college relations. However, three policy areas appear worthy of mention here:

- Policies should encourage full participation of the entire faculty and staff in the industry training efforts.
- Policies are needed to provide FTE credit for industry training activities in order to indicate clearly its emphasis in the institution relative to other emphases and/or for budgetary support reasons.
- Policies to allow quick response time by the institution.

It is possible that institution representatives are saying through this that policy issues may not be "first" or prerequisite to other factors of success.

9. There were no "clear-cut" responses from college personnel to a question dealing with joint research and development activities between Community Colleges and NCSU. However, a large number of respondents thought such activity was important and should be done. The variation was more in terms of what should be done. Preparation of instructors, course development in high technology areas, and management/supervisory training appeared to be areas of most direct tie-in with the college faculty or staff. Student articulation problems were also seen as important. Further intensive research and analysis will be needed to formulate a viable joint research and development program focus.

10. Institutional representatives emphasized the need for the industry training coordinator in the college to have knowledge about and understanding of industry. An underlying assumption was that this could be attained through employment of someone with an industrial background and/or through provision of experience while on the job (e.g., through internships or other short-time employment opportunities in industry). The second and third areas of emphasis by college representatives appear to be closely related--human relations skills and communications skills. Putting the knowledge gained through the industrial background to work through an effective, interactive communications network appears to be needed and emphasis should be given to developing this in the industry training coordinator. Rounding out the package for effective industry training coordinators are a combination of management, planning, and pedagogical skills.

11. College and industry respondents alike identified cooperativeness, commitment, timeliness and involvement of industry in instruction as major elements accounting for past success in joint training programs. These

findings indicate a need for dedication and close working relationships among both parties to any joint training effort if success is to occur. Both groups saw staffing and funding problems as potential barriers, but disagreed on extent and the effects of FTE policy (college respondents' choice) and technology (choice of industry representatives), the latter due most likely to their different work environments. Both groups foresaw the effects of technology--especially in light of needs for updated equipment--as crucial elements in the next decade.

12. The 19 elements rated by the participants in the study represent a validated list of important factors in an institution's responsiveness to industry. The weighted listing has application to a wide range of institutional and industrial conditions.

13. The logically derived models, as proposed, can provide a basis for discussion among community college officials and others involved in cooperative training arrangements.

RECOMMENDATIONS

The following suggestions are offered as means to utilize and expand upon the findings from this study.

The Department of Community Colleges should:

1. Periodically review its policies toward college-industry cooperation, especially the FTE funding issue.
2. Explore means to give greater emphasis to industry training--earmarking of funds, giving FTE credit, increased support for extension (to 1.5/contact hour), funding on current enrollments, etc.
3. Improve pay levels for instructors involved in industry training.
4. Periodically review professional development activities of the industry relations personnel in order that adjustments can be made and programs initiated to improve this aspect of the community college situation.
5. Make a concerted effort to develop and validate a long-range research program to solve problems in the industrial training system.
6. Provide greater flexibility for in-plant training in terms of credit hour limits, number of enrollees, and costs.
7. Initiate further study of the effect of barriers on responsiveness.
8. Set up a coordinating committee to explore and initiate articulated relationships between the Department and UNC constituent institutions.
9. Set up a system to coordinate curricular offerings with the State's university system.
10. Widely disseminate findings from this study.

Individual colleges should:

1. Review the elements list to determine areas of weakness, areas for improvement and existence/nature of barriers to responsiveness.
2. Evaluate themselves annually based on levels in the responsiveness models.
3. Regularly inform industry of the institution's capabilities for training.
4. Secure increased support (equipment, personnel, etc.) from the industries served by training programs.
5. Utilize industrial leave policy provisions to get all college personnel back to industry.
6. Improve mechanisms for changing course/curriculum requirements to reflect changes in technology.

SUGGESTIONS FOR FURTHER STUDY

1. The applicability of the respon· veness model(s) to other institutions in the community college system.
2. Extensive investigation and refinement of competencies needed by coordinators of industry training and other key officials in North Carolina Community and Technical Colleges.
3. Opportunities for upgrade, start-up and expansion training by community colleges in North Carolina.
4. Definition of "effectiveness" of training programs--especially as perceived by college and industry personnel.
5. Effective means for determining the training needs of industries in North Carolina; especially techniques, practices and procedures for diagnosing the needs of a specific firm in order to prescribe the training program needed.
6. Cost effectiveness comparisons of new, expanding and upgrade training.
7. Optimum hours and class size for in-plant and campus-based industrial training.
8. The effects of a separate industry training facility operated by the community college on the response to the training needs of industry.
9. The relative influence of the positive elements and the negative barriers on an institution's responsiveness to industry.
10. Means utilized by institutions to overcome barriers to responsiveness.
11. Field testing the long-range research program suggested in the report.
12. Installation of the combined model in a community college on a case study basis.
13. A randomized survey of the other institutions in the System to determine variations from the sample schools, and thus the ability to generalize the findings of this study.

PROJECT CRITIQUE

Comments By Project Directors

1. Time allotted (10% and 3% respectively for the two Co-Directors) was inadequate for a project of this magnitude. About 50% should have been allotted, for an increase of about $20,000 in the budget.
2. Physically locating the project in the DCC where information was more readily available would have helped the conduct of the study.
3. Continuous graduate student assistance would have been helpful; two would have greatly eased the critical periods.
4. The project objectives were too global; they made the conclusions and recommendations difficult based on the data collected.
5. Weekly staff meetings would have improved the accomplishment of objectives by the deadlines set.
6. Task force synthesis of data would have been a more desirable method than the advisory committee reaction to staff work done in isolation.
7. Frequent reports to the faculty would have improved communication and morale regarding what the staff was doing on the project (and perhaps reduced animosity by those in the full-teaching-load category).
8. Accounting for materials used on a daily or weekly basis would have allowed charging accurately for supplies; some materials were inadvertently not charged to the project.
9. Occasional labor should have been used over a long period instead of just at critical times. Student labor was not well utilized.
10. Future projects should have one director and two graduate students assigned and responsible for the project.

11. Better fiscal accountability could have been secured by having one person handle the books on the project, and that should be the Director (or his/her secretary). This will avoid problems in paying bills at the end of the project and also give exact information on what was spent and what remains in the account.

12. A provision should be made for dissemination activities after the end of the project, either an escrow account for travel and other expenses or a continuation of the project to allow for legitimate expenses involved with dissemination. It is unfair to charge a department or individual for such activity when there is no way to recoup the money.

13. It would have helped to have the third party evaluator on hand prior to initiating the project to avoid taking on too much.

14. Some adjustment must be made between the DCC "easy reading style" recommended for reports and the formal research style expected at the university level. This must be resolved in future projects.

15. All project materials should have been put on the microcomputer early in the project to facilitate completion of the later reports.

16. An audio recorder might have improved the interview process and helped the writers reconstruct each data-gathering visit.

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