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Identifying Industrial Education and Training Needs: Developing a Community College Custom Program

Don H. Lovelace
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IDENTIFYING INDUSTRIAL EDUCATION AND TRAINING NEEDS:
DEVELOPING A COMMUNITY COLLEGE CUSTOM PROGRAM

A Dissertation
Presented to
the Faculty of the Department of
Educational Leadership and Policy Analysis
East Tennessee State University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

by
Don H. Lovelace

May 1997
APPROVAL

This is to certify that the Graduate Committee of

Don Hoyle Lovelace

met on the

day of January 22, 1997

The committee read and examined his dissertation, supervised his defense of in an oral examination, and decided to recommend that his study be submitted to the Graduate Council, in partial fulfillment of the requirements for the degree of Doctorate in Education.

[Signatures]

Signed on behalf of the Graduate Council

Interim Dean, School of Graduate Studies
ABSTRACT

IDENTIFYING INDUSTRIAL EDUCATION AND TRAINING NEEDS:
DEVELOPING A COMMUNITY COLLEGE CUSTOM PROGRAM

by

Don H. Lovelace

This study examined manufacturing firms' characteristics and environmental factors and their relationships to the perceived importance of basic workplace skills and the preferences of employers toward customized training partnerships with community colleges. Key individuals in the human resource departments responsible for planning and decision making of employing companies were surveyed. The Workplace Education Survey was used to collect data on the employers' perceptions about the importance of basic skills groups, about workplace-based customized training as the preferred means of delivering training in each of seven basic skills groups to their employees, and to determine their preferences for providers of the training. The survey also included customized training partnerships with community colleges. The study analyzed the relationships that exist in comparing the size of the firm and other characteristics identified in the literature with the respondents' perceptions regarding the importance of the seven basic skills groups, workplace-based customized training, and partnerships with community colleges.

Adaptability Skills, Communication Skills, and Group Effectiveness skills emerge as the most important workplace skills groups, and community colleges as the preferred providers according to the respondents to this study. Findings also revealed that changes in the nature of work and workplace skills are being dictated by the application of computers.
DEDICATION

Shirley C. Lovelace has provided relentless encouragement and inspiration for this study and many other projects. This study is dedicated to my wife.
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CHAPTER 1
INTRODUCTION

Skills Necessary For The Workforce

Growing global competition has led the majority of U. S. companies to search aggressively for ways to dramatically improve their organizational productivity and product quality. During the past decade, business leaders have scoured the world over looking for ways to increase their competitive edge. They have toured Japanese plants, attended business improvement seminars, and read many business success stories. The common theme in most improvement stories has been empowering employees to become more involved in daily operational decisions (Palmer, 1996).

Employee involvement uses the creative ideas of all employees rather than relying on the past practice of expecting only a few engineers or managers to have all the right answers. Today, problem-solving and decision making teams are being used to reduce cost and improve quality. Teams composed of employees from different functions such as marketing, engineering, and manufacturing, work together regularly to resolve problems and evaluate new business opportunities (King, 1996).

To gain a competitive edge, employers need employees to be capable of leading problem-solving meetings, be able to develop more productive work procedures, and write quality work instructions. Creative minds rather than strong backs are what businesses need most to survive in today's marketplace. Present work environments are
more exciting than in the past, and the majority of employees who struggle the most are those who lack skills in creative thinking, problem solving, communications, and other basic areas (Palmer, 1996).

As companies hire new employees, they are looking for applicants who demonstrate leadership characteristics, as well as basic math, reading and writing skills. Today it is desirable for employees to have:

- strong verbal and written communication skills
- ability to work in a team environment
- creative thinking and problem-solving capabilities
- computer skills
- basic knowledge in statistics for problem analysis

Companies are not looking for rocket scientists, but be assured that the industrial world is looking more critically than ever for personal characteristics that can help a business to survive in the future. Industry wants employees who can display the initiative and drive to tackle any problem presented to them. Education systems must gear themselves to develop custom training programs to meet this ever increasing need Levine, (1996).

How Are We Going To Get There?

Customized training programs must be job specific. Curriculum must include higher levels of skills including thinking skills and transferable skills. Content of courses must not be external to industrial employers but custom designed to meet the requirements
for an employee to be successful. Congress created a National Skill Standards Board as a part of the Goals 2000: Educate America Act. This occurred through the United States Department of Labor.

The national skill standards system is intended to do the following:

- Promote the growth of high performance work organizations in the private and public sectors that operate on the basis of productivity, quality and innovation, and in the private sector, profitability.
- Raise the standard of living and economic security of American workers by improving access to high skill, high wage employment and career opportunities for those currently in, entering, or re-entering the workforce.
- Encourage the use of world-class academic, occupational and employability standards to guide continuous education and training for current and future workers (Gray, 1995).

The Provider

In a nation with a moral commitment to access and opportunity, community colleges are among the most accessible educational institutions, according to Parnell, (1995). In a nation with a tremendous need for skilled workers, community colleges are helping a host of our citizens develop marketable skills; the inescapable beginning of human liberation. In a nation committed to human resource development, community colleges are the institutions that are triggering economic revitalization by matching employee skills to the needs of the employers. In a nation that emphasizes accountability,
community colleges are the most cost-effective institutions in higher education. In a nation asking urgently if there is life after work, community colleges are leading the way by providing liberal and fine arts experiences for the working men and women. The community college is where the action is in higher education. Community colleges are providing opportunity with excellence (Parnell, 1995)

Community colleges describe themselves as extensively involved in the American workforce training. Ninety-six percent of the nearly 700 colleges responding to a recent study of community workforce training indicated that they provided this service to business and industry. Two-thirds of the training was provided to small and medium-sized companies through customized training. These firms had fewer than 500 employees. Larger companies were more likely to provide their own training. Nearly 52% of such training was provided to the manufacturing industry. Sixty-nine percent of the community colleges responding indicated they were involved in industrial training (Doucette, 1993).

Johnson and Packer's (1987) report, Workforce 2000, Work and Workers for the Twenty-First Century, forecast an American workplace in which only skilled workers will be able to earn enough to support their families. Of all the new jobs projected to be created between 1984 and 2000, most were estimated to require education beyond high school. Jobs available for those with a high school education or less were predicted to shrink from 18% of the jobs in 1987 to a 14% share by the year 2000. In contrast, only 22% of all jobs were expected to require four-year college degrees.

The workplace will probably become less stable. Today's high school graduate is expected to change jobs four to six times and change careers two to three times
throughout his or her work life. These changes will not be the result of job hopping or personal choice, but of technological and economic changes that displace employees from one career field while opportunities expand in other fields. In order to remain employed, the worker of the future must be highly skilled, flexible, and capable of learning and using "soft skills" (Brock, 1991). The job demands for skilled workers, projected in Workforce 2000, are greatly influencing educational planners.

In a study analyzing occupational trends and projections in four industry sectors, Bailey (1990) found that both "skilling" and "de-skilling" had occurred. Nevertheless, he argued that, overall, jobs were becoming more complex and thus more highly skilled rather than less so. As technological advancements and economic trends reshape the workplace, displacement and retraining of workers are widespread. Over the next decade, 1.2 million blue-collar workers and 800,000 white collar and service workers annually can expect to be displaced from their current jobs (Rose, Fink, & Robinson, 1992).

Community colleges must become highly responsive to the training needs of workers in their communities, and must integrate worker retraining into their course offerings both on and off campus (Clark, 1984; Portland Community College, 1987; Thor, 1992; Trachtenberg, 1991; United States General Accounting Office, 1987). More blue-collar and service workers enroll in training courses at community colleges than any other types of schools (Office of Technology Assessment, 1986), however, little is known about how workers in retraining fare in the two-year environment.

The rising concern over America's loss of productivity leadership is defining a critical role for community colleges, which now find themselves in a situation where they
must be actively engaged in the process of attracting and retaining new industry while simultaneously expanding quality education and training services to existing industry (Kalamas & Warmbrod, 1987). Within the context of sweeping economic change, the organizations that help existing industry adapt to these changes and that can foster or facilitate the development of new industries will become extremely important in national, regional, and community efforts in economic development (Powers et al., 1988).

Increasingly, the economic development role is becoming the framework within which community colleges are formulating their mission strategies for the decade of 1990 and beyond. The board of directors of the American Association of Community and Junior Colleges (1990, p. 45) proposed, "a national human resource development strategy and providing the training to create a world-class workforce," as one of its six public policy goals for 1990. Parnell (1990) also proposed a "new paradigm" in which community colleges, working with local and regional business, industry, and labor groups and in cooperation with research universities may "become the new extension service, helping to transfer new technology and work skills into jobs and the marketplace of the future" (p. 123).

The merging of economic and educational concerns has given rise to a new and now a wide, spreading form of occupational education in community colleges. This is in the form of customized training (Grubb, 1990). The demand for customized training relationships between community colleges and industry of all kinds has experienced "spectacular growth" and is now the principal form of new linkages between community colleges and industrial organizations (Deegan, 1992). Customized training programs

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appear to be surfacing as a major force and influence in a large number of community colleges (Deegan & Drisko 1985).

This growth appears to be because that decisions by many states to establish programs that lower the training costs of industries relocating to the area and of those seeking to increase the quality of their existing workforce as a major strategy for economic development (Grubb, 1989). Customized training is attractive as a broad educational strategy for economic development because it "seems to have something for everyone. Students get appropriate training and then are placed, presumably at higher rates than in conventional vocational programs; firms get part of their training costs subsidized; educational institutions increase their enrollments, enhance their services to their communities, and strengthen their connections to employers; and communities benefit from economic development (Grubb, 1989, p. 34)."

Statement Of The Problem

If customized training classes undertaken by community colleges are to have the desired effect of stimulating economic development, then they will need to focus on those occupations and firms that have the greatest potential for expanding employment and production (Grubb, 1989). Small employers, those employing fewer than 500 workers, are especially critical to workforce training because they create so many new jobs and bring into their workforce employees from populations that are the most in need of employer-provided training (Carnevale, Gainer, & Villet, 1990). Small employers choose workforces that tend to be younger, less educated, and contain a higher percentage of
ethnic minorities than those of larger firms (U. S. Small Business Administration, 1988). These firms have distinctive training needs for an increasingly multi-skilled workforce requiring technical training that is both generalized and firm-specific in nature. Their greatest need is to upgrade their present workforce to remain competitive, yet, because of small profit margins, they cannot easily generate needed training internally. Despite the fact that community colleges are well positioned to help small employers meet their training needs, these firms are less aware of what community colleges have to offer than they are of the offerings of other potential providers (Grubb, Jacobs, & Lynch, 1990). Community colleges need to better understand those factors that influence the training needs of small and medium-sized firms, their preferred strategy for meeting those needs, their preference for the local community college as the principal source of training among other possible providers, and factors that are perceived to be the most important in the selection of a training provider (Duncan, 1993).

A growing body of evidence points to the conclusion that employers now need and demand, "a new kind of worker with a broad set of workplace skills," which exceed the three R's and provide a foundation for adaptability and learning on the job (Carnevale, Grainer, & Meltzer, 1990, p. 2). The advent of a "new economy", in which U. S. business and industry must compete in a truly global marketplace and under a new and very different set of rules and competitive standards requires companies and their employees to adapt rapidly to changes in the market, changing technology, and special skills in the workplace (Carnevale, 1990).

The elements of a workplace curriculum for employee training in the seven basic
skill groups have been identified in a joint study of employer training needs undertaken by the society for Training and Development and the U. S. Department of Labor (Carnevale, Gainer, & Meltzer, 1989, 1990). The skills groups are as follows:

1. Knowing how to learn
2. Basic competency skills
3. Communication skills
4. Adaptability skills
5. Developmental skills
6. Group effectiveness skills
7. Influencing skills

These seven skills groups have been accepted by the U. S. Small Business Administration as the framework for the adoption of a broader definition of workplace literacy (Vencill et al., 1991). Designed to address the "upskilling" of the U. S. workforce to improve the competitiveness of U. S. firms in a global economy (Carnevale, Gainer, & Meltzer, 1990, p. 4), these seven skills groups also appear well suited to the economic development mission of community colleges. These skills are compatible with the community colleges' strengths as training providers in terms of working with adults, generalist training, and their proximity to firms most in need of training assistance (Grubb, Jacobs, & Lynch, 1990). Community colleges need to better understand those factors that are related to the priorities employers place on each of the seven basic skills groups and which of those factors are most strongly related to the preference of employers for the local community college as the preferred provider of training in the seven skills groups.
There is considerable justification for suggesting that community colleges engaged in customized training. This training, as represented by the seven basic skills groups, should include more than specific technical training; but the appeal of this strategy to employers has not been the subject of any known empirical study. Since small- and medium-sized employers are so critical to economic development and job creation, their perceptions of the importance of the seven basic skills groups and the role of customized training partnerships with community colleges in delivering instruction in the workplace need to be examined. The problem facing the community college is how to identify the particular firms with the greatest need for the community colleges' services. These firms are the most receptive to education and training partnerships with the institution, and they promise to return the maximum benefit to employers, and their employees. The community college also needs to develop an approach to analyzing the training needs of employers and their employees, that is consistent with both the college's mission in the community and those educative functions that it is best able to provide in the workplace. This analysis should provide the information relative to the needs of the employers and their employees, which firms have the greatest need, and which strategies are most appropriate for the college to connect with the firm. Finally, the community college needs to use what it has learned about the education and training needs of employers and their employees into a strategy for developing training partnerships with receptive employers for the implementation of effective education and customized training both in the workplace and traditional institutional settings.
Purpose of the Study

The purpose of this study is to examine the North Carolina firms' characteristics and environmental factors and their relationships to the perceived importance of basic workplace skills and the preferences of employers toward customized training partnerships with community colleges compared to other providers for the delivery of basic workplace skills training. Key individuals in the human resource departments responsible for planning and decision making of employing companies were surveyed. An instrument, the Workplace Education Survey, used in a similar, but smaller, study, (Duncan, 1993), was modified to collect data on the employers' perceptions about the importance of the seven basic skills groups, workplace-based customized training as the preferred means of delivering training in each of these seven basics skills groups to their employees, and their preferences for providers of the training. The survey also included customized training partnerships with community colleges. The study analyzed the relationships that exist in comparing the size of the firm and other characteristics identified in the literature with the perceptions about the importance of the seven basic skills groups, workplace-based customized training, and partnerships with community colleges.

The Workplace Education Survey (WES), with Duncan's permission, was modified to include questions regarding the importance of computer literacy, level of automation, and the products manufactured by each industry. A panel of experts examined the modifications and found the instrument to retain its validity. Twelve education leaders and 12 industrial leaders were asked to determine the meaning of each question. Each
individual concurred as to what data would be collected.

Cronbach's alpha (Cronbach, 1951) also was used to test the reliability of the instrument. This test was used to test each individual item and to determine how each item affected the reliability of the scale. Alpha was .9085 and was reduced with each item removed. Therefore, all questions were used in the instrument.

The study implemented recommendations made in an earlier study (Duncan, 1993) to survey the skills groups preferences related to the products produced using the Standard Industrial Codes (SIC). Duncan recommended that the sizes of the firms be broken down into more categories; especially for firms with fewer than 500 employees. Duncan also suggested that any replicated study should choose a geographically larger area.

The major research questions to be addressed in this study are:

1. What is the level of importance that employers assign to each of the seven basic workplace skills groups identified in the Department of Labor/American Society for Training and Development study as the focus of workplace-based training for their industries's employees?

2. What is the level of importance industrial leaders place on computer literacy?

3. Do employers prefer customized training partnerships with community colleges over other available alternatives for the delivery of the seven basic skills groups?

4. What are the relationships among the size of an organization, the
application of advanced technology in the workplace, and the presence of international competition and its preference for establishing customized training relationships with community colleges over other available alternatives for delivery of training in the seven basic workplace skills groups?

The study includes sampling leaders from employing organizations whose roles are closely tied to the training and development functions of their respective organizations. The Workplace Education Survey (WES) was used to collect data on the perceptions and preferences of these key individuals regarding the research questions. These data were analyzed to test research hypotheses developed from a review of the literature and from the major research questions.

**Significance of the Study**

This study is expected to be most beneficial for the community colleges in the western counties of North Carolina that are attempting to use customized training partnerships as a strategy for fulfilling their economic development mission. For colleges that are most concerned about transferability of skills acquired through customized training, knowledge about the priority that employers assign to each of the basic skills groups will assist them in making decisions concerning the direction of program development, the selection of training partnerships the community colleges would prefer to enter the identification of industries and industrial organizations with the greatest need, the recruitment and development of faculty and the marketing of the colleges' services. These colleges should be better able to focus their efforts where they are likely to have the
most beneficial impact on economic development.

As the role of community colleges in regional and local economic development becomes more crucial, policy makers will need a better knowledge of how training partnerships between the colleges and industries can work to improve the competitiveness and expand or preserve employment.

Assumptions

The assumptions include the validity of the ASTD/DOL study (Carnevale, Gainer, & Meltzer, 1989, 1990). It is assumed that the seven basic workplace skills groups identified in that study accurately reflect the workforce training needs of western North Carolina businesses and that those workforce training needs are shared by the organizations surveyed in this study. It is assumed that the respondents accurately represent the actual training needs of their industries and that their perceptions also represent the direction of decision making approved by management for training.

It is further assumed that certain characteristics of industrial firms' influence the level of employee skills and training required to compete successfully in the workplace. The nature of the principal activity and the size of the establishment are assumed to be directly related to the level and range of basic workplace skills needed by the employees of these industries.

Limitations

The study is limited by the fact that the perceptions of a single individual at each company represented in the sample may result in a narrow interpretation of the training
needs and planning for workplace development in that organization. Another limitation is that the survey-questionnaire method of collecting data can affect the findings. Mailed surveys do not provide the opportunity to follow up and clarify questions (Patton 1989).

**Definitions**

**Applied Learning**: An approach to formalized training in the workplace including five stages: "analysis of training needs, design of the training curriculum, development of the training curriculum, implementation, and evaluation (Carnevale, Gainer, & Meltzer, 1990, p. 41)."

**Basic Workplace Skills Groups**: Sixteen fundamental workplace skills organized into seven skills groups that address basic skills deficiencies identified by employers:

1. **Knowing How to Learn**: "a set of learnable (therefore trainable) skills that enable employees to understand and manipulate new information quickly and confidently (Carnevale, Gainer, & Meltzer, 1990, p. 41)."

2. **Basic Competency Skills**: Reading, Writing, and Computation—the ability to use these basic skills analytically and apply them in a workplace context (Carnevale, Gainer, & Meltzer, 1989, 1990).

3. **Communication Skills**: Speaking and Listening Effectively—the use of effective listening and oral communication techniques in order to better interact with co-workers, customers and supervisors in the workplace (Carnevale, Gainer, & Meltzer, 1989, 1990).

4. **Adaptability Skills**: Solving Problems and Thinking Creatively—the use of
individual, group, and combination problem-solving skills to bring about innovative solutions to problems encountered in the workplace and to foster the creation of new ideas and new ways of doing things that result in practical applications that demonstrate a productive outcome (Carnevale, Gainer, & Meltzer, 1990).

5. **Developmental Skills**: Managing Personal and Professional Growth—personal management skills related to the enhancement of self-esteem, the setting and achievement of well defined goals and objectives, and the improvement of employability through purposeful career development that result in employees who are more valuable to their employers and more successful in their work careers (Carnevale, Gainer, & Meltzer, 1989, 1990).

6. **Group Effectiveness Skills**: Working with Others—the ability to perform work roles effectively through the, "application of good group effectiveness techniques such as interpersonal, teamwork, and negotiation skills," that enable employees to work together as a team and focus on common goals (Carnevale, Gainer, & Meltzer, 1990, p. 287).

7. **Influencing Skills**: Making a Difference—organizational effectiveness skills that give employees a, "sense of the workings of the organization and how their actions affect organizational and strategic objectives", and leadership skills that enable each employee to "influence his or her work group and to provide a vision of what the organization as a whole or the specific task at hand requires (Carnevale, Gainer, & Meltzer, 1989, pp. 15-16)."

*Customized Training*: A linkage between employers and training providers for the
specific purpose of addressing an identified training need. Training agreements with colleges are designed to be flexible and efficient and should be "aligned with organizational objectives and tailored to meet current industrial needs. Instruction is provided by regular or part-time faculty or by local experts and trainers recruited from other school, industries, or the local training market. Needs assessment and job/task analysis techniques are applied in order to create a course that can deliver the particular competencies and skills the client requests (Carnevale, Gainer, & Shultz, 1990, p. 66)."

**Employer-Based Training:** Learning systems used in the workplace that serve the employers goal to provide learning opportunities for employees that will ultimately give the company a competitive advantage. Employer-based learning systems exercise approaches that are tied to the day to day functions and activities of the workplace and are directly linked to the employees' job. Training is tailored to be job-specific so that learning is rapidly integrated with actual job requirements (Carnevale, Gainer, & Villet, 1990, pp. 28-29).

**Small and Medium-Sized Industries:** Firms employing fewer than 500 employees.

**Task Analysis:** A procedure to identify the tasks needed to perform a particular job and to determine the skills and knowledge required for this achievement.
CHAPTER 2
REVIEW OF THE LITERATURE

History of the Community College

The junior college, conceptualized as providing the first two years of university education, was one of the predecessors of the modern community college. Many states created their community college systems to serve as feeder institutions to stratified college and university systems. The four-year colleges and universities benefited from having locally based institutions expand educational access and sort students in terms of their academic potential (Barry & Barry, 1992).

The first junior colleges, established in the late 1800s, were privately supported and operated. By 1900, there were eight known junior colleges—all private—with a combined enrollment total of about 100 students (American Association of Junior Colleges, 1967).

According to some historians of the two-year college movement, the oldest publicly supported junior college still in existence was established in 1901 at Joliet, Illinois. Within 30 years, there were 400 junior colleges in existence, and by 1952 there were 579 (American Association of Junior Colleges, 1967).

The community college has evolved from the junior college, an innovation usually credited to William Rainey Harper, the founding president of the University of Chicago. In 1900 Harper envisioned the junior college as providing preparation for the last two years of university study. Harper's idea was to expand the public high schools to include
small liberal arts and denominational colleges in the Midwest. Harper admired the high schools of his day for their success in training students to take their place in an increasingly mechanized industrial workforce and an increasingly technological agrarian society. He recommended that the high schools operate for six years, bringing students up to the junior year of college. His idea was to keep the university as free as possible for original scholarship by temporarily consigning to the subordinate institutions those students who needed instruction in the more rudimentary areas of higher education. He contended that the university should be preserved for the highest intellectual activities and that the first two years should be preparatory. He indicated that the teaching of basic preparatory courses was best left to a separate type of institution. As the 20th century progressed, other forces combined with the movement inspired by Harper's ideas to create a hybrid institution that gradually separated from the universities. Evening high school, the YMCA, and other religiously affiliated reading or study groups that were of interest primarily to adults who were not necessarily going to transfer to universities created a demand for a special type of institution. Still another demand was for a workforce that could become better trained because it was more literate and numerate. The goal was aided by the federal government's encouragement of locally available postsecondary practical educational training at low cost (Salzman, 1992).

By the 1940s the public two-year college had evolved into an institution with two purposes. The college offered academic courses as preparation for the young people in a particular locality who planned to attend a university and vocational training for those who did not (Salzman, 1992).
The decade of the 1980s produced federal and state mandates for public colleges and universities to be more accountable by demonstrating measurable increases in student skills and knowledge attainment between college entry and exit. External bodies have been increasingly setting the agenda for defining institutional accountability criteria (Henry & Smith, 1994).

The community colleges and their faculty members grew increasingly responsive to the needs and interests of adult learners, who required different teaching techniques and more flexible scheduling. In addition, they rapidly added remedial and non-collegiate courses and became the "second-chance" institutions for students either denied access to or unable to succeed at four-year institutions. In the process, the community college faculty experimented with and reportedly improved innovative teaching techniques (Mellander, 1992).

Community colleges have been forced to distinguish between transfer university-parallel programs, which were postsecondary by design, and programs that were developmental or career-oriented in intent. To accomplish this task, they developed new teaching methods and organizational patterns that allowed them to cope with this diversity of programs and levels, yet interfaced effectively with colleges and universities, high schools, the local employment market, and community interest (Mellander, 1992).

History of the North Carolina Community College System

In 1950 the North Carolina State Superintendent of Public Instruction appointed Allan S. Hurlburt as director of the North Carolina Survey of Public Education to assess
the need for state-supported community colleges and to develop a plan for their implementation. Hulburt's study, published in 1952, made several recommendations. Among them were the following:

1. Low cost to pupils—we recommend that in no case should the tuition represent a significant charge—one that would be a barrier to college attendance—nor be in excess of fifty dollars per student per year.

2. Location—The community college should be located within commuting distance of the students. Approximately located within a radius of 25 miles.

3. Curriculum offerings—the purpose of the community college will be to offer education services to the entire community, and this requires of it a variety of functions and purposes. It will provide education for the youth of the community, and it will provide an active center for adult education.

4. Local initiative, responsibility, and control—local control is essential to the maintenance of local interest and the shaping of the curriculum to local needs.

5. State responsibility—it should offer leadership, enough supervision to guarantee a program of quality, and should assume approximately half the cost (Hurlburt, 1952. pp. 7-9).

In addition to the foregoing, a comprehensive curriculum was recommended. This curriculum should include two-year academic programs, general education, vocational and technical education, in-service education, leisure-time education, and education for dropouts (Hurlburt, 1952).

The fact that Hurlburt's study was not enacted into law by the North Carolina
General Assembly was due to the lack of support and leadership by the governor and the untimely death of Clyde Ervin, then Superintendent of Public Instruction in North Carolina (Segner, 1974).

The Hurlburt study served to make many people of North Carolina aware of an unmet need for special kinds of training beyond the high school level. Subsequently, a system of area vocational schools was approved in 1958 (Segner, 1974).

In 1961 Governor Terry Sanford appointed the Commission on Education beyond the High School, known as the "Carlyle Commission" in honor of its chairman, Senator Irving E. Carlyle. Its 1962 report recommended that postsecondary education be made available to all residents of North Carolina who could benefit from it (Hamilton, 1962). A major recommendation of this commission was to establish a system of state-supported community colleges and technical institutes (Hamilton, 1962). The commission further recommended that:

1. The institutions should be located no more than 25 to 30 miles from the majority of its students.
2. Students should be allowed to choose the school they wished to attend.
3. Most community colleges should be established with an enrollment potential of 400 students during the first two years.
4. These schools should generally be located near large and growing population centers.
5. State support should be adequate to allow youth from poor families to attend.
6. A legitimate function of state government is to provide education at all levels.
7. Tuition and fees should be low to remove the economic barriers to postsecondary education.

8. The system should be open to all students.

9. A comprehensive curriculum should be provided.

(Hamilton, 1962, pp. 1-29).

The close resemblance of the final recommendations of the Carlyle Commission to those of the 1952 Community College Study indicate that the commission was greatly influenced by Hurlburt's earlier study.

The political courage of Governor Terry Sanford and his sincere belief in the value of education were instrumental in, if not integral to, the formation of the North Carolina Community College System. As a result of Governor Sanford's untiring efforts for the improvement of education, the Carlyle Commission report was accepted by the North Carolina General Assembly and enacted into law in 1963.

The Community College Act of 1963 stated that:

... the establishment, organization, and administration of a system of educational institutions throughout the state offering courses of instruction in one or more of the general areas of two-year college-parallel, technical, vocational, and adult education programs; to serve as a legislative charter for such institution; and to authorize the levying of local taxes and the issuing of school bonds for support. (North Carolina General Statutes, 1963, Chap. 115A-1)

By adding the following statement in 1969, the North Carolina General Assembly
clarified the purpose of each of the institutions in the Community College System:

The major purpose of each and every institution operating under the provisions of the chapter shall be and shall continue to be the offering of vocational and technical education and training, and of basic high school level, academic education needed in order to profit from vocational and technical education, for students who are beyond the compulsory age limit of the public school system and who have left the public schools. (North Carolina General Statutes, 1969, Chap. 115A-1)

The overall community college philosophy adopted by the State Board of Education is described as one of "total education." Concepts in this are:

(a) The fundamental concept of the Community College System of North Carolina is based on the philosophy that all institutions shall have an "open door" admissions policy.

(b) The institutions of the Community College System should provide comprehensive learning opportunities for the people of their communities. This education takes place in the normal environment of people living in their communities and throughout the different ages and conditions of life of the people of the community.

(c) The Community College System in North Carolina shall serve primarily those persons beyond the normal high school age, 18 years or older, whether they are high school graduates or not, by offering appropriate, economical and convenient learning opportunities.
These opportunities range, depending on individual needs and previous educational achievement, from the first-grade level through the second year of college, including occupational and general adult training to all of suitable age who wish to learn and can profit from the instruction provided. (North Carolina Administrative Code, 1976, 4B.0101)

General goals, related to the philosophy of the State Board of Education, were adopted. These goals are:

1. To provide expanded educational opportunities from the first grade through high school and beyond high school for thousands of young people and adults who would not otherwise continue their education.

These general objectives are as follows:

(a) To provide relatively inexpensive, nearby educational opportunities for high school graduates, non-high school graduates and adults;

(b) To provide college-transfer programs, consisting of the first two years of regular college studies;

(c) To provide technical programs preparing students for jobs in industry, agriculture, business, government, and service occupations;

(d) To provide vocational programs preparing students for jobs requiring varying levels of ability and skill;

(e) To provide occupational education programs for employed adults
who need training or retraining, or who can otherwise profit from
the program;

[and]

(f) To provide courses that will meet the general adult and community
service needs of the people of the community. (North Carolina
General Administrative Code, 1976, 4B.0102)

At the request of Governor James Hunt, the State Board of Community
Colleges adopted a new plan for economic development. The board adopted
guidelines governing North Carolina's training program for new and expanding
industry, and the department was authorized to allot funds to the institutions in
accordance with those guidelines (Wiggs, 1989). The guidelines were:

(1) To encourage new industries to locate in North Carolina and to
courage industries to expand;

(2) To offer to the people of North Carolina specific training
necessary to qualify for those new production jobs; and

(3) To help each new or expanding industry to create a productive
workforce as expeditiously and as efficiently as possible.

(North Carolina General Statutes, 1981, Chapter 115D)

The training service was to be made available to any new or expanding
manufacturing industry that created a minimum of 12 new production jobs that
did not previously exist in North Carolina. Any new or prospective employee
referred by the participating company was eligible for enrollment in the program if
his job was directly related to the identified production operations (North Carolina State Board of Community Colleges, minutes, 1981).

Former Governor Robert Scott, the new state president of the North Carolina Community College System, addressed the North Carolina General Assembly, urging legislators not to forget training for the state's illiterate adults and to upgrade their skills for employment (Wiggs, 1989).

We have a large group of North Carolinians who are unskilled and not prepared and uneducated, and therefore unemployed. These are the adults who lack skills for routine tasks you and I take for granted. The sheer size of this group is almost overwhelming. (Scott, 1983, N&O 4/13/83), p 85.

In February of 1985, the State Board of Community Colleges, along with Governor James B. Hunt, adopted a resolution and named February 10th through February 16th as North Carolina Vocational-Technical Week. It stated in part:

(1) Vocational-technical education is the segment of education charged with preparing people for work, and is the backbone of our nation's employment-related education and training programs.

(2) Vocational-technical education's strength is drawn from the fact that it is an integral part of this nation's public educational system, representing a joint federal, state, and local partnership effort to meet our nation's need for a competent workforce. These agencies respond to this charge through a variety of programs that offer instruction and related basic education, career development, family living, basic skills, and occupational specific preparation
The minutes of the State Board on Community Colleges from its March 1986 meeting stated:

The North Carolina General Assembly created the North Carolina Community College System in 1963 for the primary purpose of providing the state's citizens with a variety of educational and skills training opportunities to enable them to find jobs or take better jobs in an expanding and changing job market.

The North Carolina State Board of Community Colleges met in regular session on February 11, 1988 and adopted an updated master plan for vocational education. The original master plan had been approved in 1979 by the State Board of Education, but that one was limited to secondary vocational education only. The State Board of Community Colleges, formed in 1981, had subsequently received its authority over the plan as a subjugated commitment from the State Board of Education. This updated version encompassed sections for both secondary and post-secondary vocational education (Wiggs, 1989, p. 353). The executive summary concluded with this statement:

Vocational education programs, services, and activities of the Community Colleges will continue to focus on economic development. Some areas for emphasis will include the following: (1) retraining workers, (2) preparing an adequately trained workforce, and (3) meeting labor needs of new businesses and industries (North Carolina State Board of Community Colleges minutes, 1988), p. 8.
The Role of Community Colleges in Economic Development

According to Katsinas and Lacey (1990), the role of community colleges in supporting economic development is not new, but is a historic one that shaped their development. Fulfilling the needs of developing an industrial nation by training a highly skilled workforce has always been a major purpose of community colleges throughout their development and is the element of continuity that links all of the stages of the development of community colleges together. The years of most rapid growth in the number of community colleges can be attributed to the phenomena of the desire of local community leaders and officials to improve the conditions for local economic development, a critical shortage of well-trained technicians in the workforce, and the need to educate and train generations (Katsinas & Lacey, 1990, p. 9).

Economic development activity in the form of providing education and training for the "upskilling" of the U.S. labor force, to improve competitiveness in a global economic market place and to assist adaptation to advance technology, is central to the mission of community colleges. The rising concern over America's productivity leadership is defining a critical role for community colleges, who now find themselves in a situation to actively engage in the process of attracting and retaining new industry while simultaneously expanding quality education and training services to existing industry (Kalamas & Warmbrod, 1987, p. xi). While the environment of postsecondary education has entered a period in which change is the most constant element commonly shared among diverse institutions, the role of higher education in economic development has emerged as a
dominant theme in the thinking of leaders of two-year and four-year colleges (Katsinas & Lacey, 1990, p. 6). A pervasive sense of urgency underlies this mission because what is at stake is nothing less than the survival of America's current standard of living into the next century.

Economic development provides a crucial framework within which community colleges should be formulating their mission priorities for the decade of the 1990s and beyond. The long-term forces that reshape the workplace for most Americans are already at work in the back yards of community colleges and even now provide experience for their communities in ways which are new and innovative (Katsinas & Lacey, 1990).

Parnell (1990) has proposed a "New Economic Paradigm" in order to address human resource development as the fundamental strategy for maintaining the nation's economic strength. Indeed, many community colleges leaders now recognize the stake that their institutions have in long term economic development of their communities and regions, and that economic development activities will play a major role in defining the community service component of their colleges' mission. Working closely with local and regional industry, labor groups, and in cooperation with research universities, community colleges may "become the new extension service, helping to transfer new technology into jobs and the marketplaces of the future (Parnell, 1990, p.9)." The American Association of Community and Junior Colleges Board of Directors (1990) selected the development of, "a national human resource development strategy and providing the training to create a world-class workforce," as one of its six public policy agenda goals for 1990-2000 decade. Clearly, economic development activities in the form of education and
training of the current, as well as the future, workforce has emerged as a priority in the mission of the nation's community colleges. In a period of sweeping economic change, the services of those organizations that help existing industry to successfully adapt to these changes and which can foster or facilitate the development of new industries will become extremely important in national, regional, and community efforts at economic development (Powers et al., 1988).

**Community College Critics**

Community college critics acknowledge that vocational education benefits the business community, but they reject the argument that these programs benefit low-income and minority students (Pincus, 1986). Critics argue that while community colleges are the lowest track in a stratified system of higher education, terminal vocational programs are the lowest track in the two-year colleges. Since students at the bottom of the economic ladder are over-represented in terminal vocational programs, critics argue, they are deprived of the greater intellectual and economic benefits that come from getting bachelor's degrees. Consequently, community colleges help to reproduce the racial and economic inequalities that exist in the larger society.

Several voices were raised to question the traditional academic emphasis of community college programs. Gleazer (1980), former president of the American Association of Community and Junior Colleges, suggested that the very term "college" may be a barrier to community colleges reaching out to establish linkages with groups and organizations to improve their communities through education. A Brookings Institution
study of community colleges finance (Breneman, 1981) proposed that community
colleges consider the de-emphasis on the collegiate transfer function in order to better
finance the occupational education and community service functions.

Eaton (1994) examines two arguments that are put forward against a strong
collegiate role generally including the following points: (1) a strong collegiate function
conflicts with the access mission of the community college and (2) the community college
could not sustain an effective collegiate function even if it wanted to. Community college
educators arguing for the first point maintain that strengthening the college function will
produce negative consequences for community college access. Others who maintain that
the community college is ineffective as a collegiate institution believe that it should leave
this work to others. They cite several reasons for collegiate ineffectiveness. Some
maintain that student attendance patterns work against a successful collegiate function:
the use of the community college as a stop-in and stop-out, part-time, nondegree
educational site does not contribute to collegiate effectiveness.

Cross (1985) characterized this debate as one over whether the colleges should
have a "vertical" or a "horizontal" mission focus. Cross defined the vertical focus as,
"emphasizing the transfer function of the comprehensive mission, while the horizontal
focus, reaches out to develop linkage with the community rather than build linkages within
the formal educational establishment" (p. 76). Cross further predicted that the horizontal
focus would,

"challenge the vertical for predominance before the end of the decade, because
community colleges were ahead of four year colleges and universities in serving
the part-time adult learner and because the rising interest of business and industry in human resource development makes corporate education the most actively growing educational activity in the nation" (p. 94).

Shearon and Tollefson (1989) relate to a divergence of opinion regarding stages, periods, or generations of community college development in various American states and in the nation as a whole. Those periods were labeled as (1) the evolution of the junior college, 1850-1920, (2) the expansion of occupational programs, 1920-1945, and (3) the community college concept, 1945 to the present.


The Role of the North Carolina Community College System

Thirty years ago, North Carolina was in the midst of a great transition as the state evolved from an economy based primarily on agriculture to one centered around manufacturing. As a result of this transition, North Carolina produced a new educational entity—one different from any other in the country. It was a system that would fulfill
industry's demand for trained employees, and at the same time, would make higher education available to community residents over the age of 18—those who might otherwise never progress beyond high school.

Today, North Carolina leads many neighboring states in measures of prosperity, such as median family income, number of years of formal education, and the relative incidence of poverty. Much of the credit rests with the visions of community college leaders, who, 25 years ago, convinced many corporations to invest in North Carolina's people and its economy (Smith, 1990).

Moreover, the North Carolina Community College System has served as a model for other states and is frequently visited by educators from countries around the world, who seem to admire what it has accomplished in a relatively short period of time. North Carolina's community college system serves a higher percentage of the state's population than any other system in the country. The system has served as both catalyst for economic development and as models for vocational and technical education (Parnell, 1990).

The principal goal of community colleges 30 years ago in North Carolina was to give its residents a competitive edge within the regional, national, and international arenas in which the state competed economically. Thus, the community college system was created to serve as the vehicle for occupational opportunity for thousands of North Carolinians. Its mission was to transform high school dropouts into high school graduates, turn high school graduates into skilled technicians, and even to provide community residents with an economically feasible alternative to pursue college classes before transferring to four-year institutions. The Tollefson (1975) dissertation found
broad support for the comprehensive mission within the North Carolina Community
College System and by such appointed and elected state officials as state legislators, state
board of education members, and community college presidents.

The emphasis on economic development has never been in doubt for community
colleges in North Carolina (Parnell, 1990). The final report of the Commission on the
Future of the North Carolina Community College System (MDC, 1989) acknowledges the
indebtedness of the system to an historic focus on state and local economic development
which actually predates the current institutions. In the 1950s regional Industrial Education
Centers (IECs), were created to provide training in the skills needed in industry. These
centers began the pairing of private industry and public supported education in a mutually
beneficial relationship that today's community colleges have inherited (North Carolina
System Turns 25, 1988). The commission emphasizes that this relationship must be
strengthened and expanded:

The emergence of a global economy demands that the community colleges
intensify their efforts to assist the business and industries within their service areas
in adapting cost cutting and efficiency producing technologies. Equally important
will be efforts to expand services to small business owners and entrepreneurs who
will create many of the new jobs in the future. (MDC, 1989, p. 26)

In addition, the commission makes the specific recommendation that the system expand
the capacity of colleges to provide customized training. North Carolina Governor James
B. Hunt, Jr. (1983) formalized the economic development mission of the state's
community colleges when he officially declared them to the, "presumptive deliverers of
post-secondary training designed to meet the needs of individuals, business, and state development" (p 8).

The commitment continues as expressed during an interview with the new president of the North Carolina Community System. As 1995 began, former Fayetteville State University Chancellor Lloyd Hackley moved into the office of state president. When asked to share his vision for the role of the North Carolina community colleges; Hackley responded:

(1) The role of the North Carolina community colleges has always been to develop the workforce. It has always been part of the community college movement to make education available to people who may not be able to avail themselves of a four-year college education or who may be more interested in education below the baccalaureate level but who nevertheless want to prepare themselves for the employment opportunities that may be available. It's even written in the North Carolina statutes that workforce preparedness is the Number 1 priority. Of course, there are three other pieces of the mission: to improve the literacy of the citizens of North Carolina, to develop the communities through economic development, and to offer curriculum programs.

(1) Looking to the future, there will likely be an increasing demand for the kinds of services that are made available by community colleges. Increasingly, I think people are beginning to realize what community colleges have done for America and for North Carolina and to appreciate how necessary that it is if
we're going to have a workforce equal to the task of meeting the needs of the 21st century. (Hackley, 1995, p.5)

**Customized Training and Economic Development**

The economic mission will require that community colleges adopt a framework that will better facilitate their understanding of, and response to, the long-term economic, demographic, political, and social forces that are changing the nature of business and the world of work (Katsinas & Lacey, 1990). The traditional delivery system has an internal focus, located on campus with self-directed participants attending non-compulsory programs leading to, "an associate's degree or certificate of completion denoting mastery of generalized skills and work methods (Katsinas & Lacey, 1990, p. 11)." In contrast, the non-traditional delivery system has an external focus, located off-campus and frequently at the workplace with participation often a condition of employment and the learning objective being the mastery of a specific set of skills and work methods over a relatively shorter period of time (Katsinas & Lacey, 1990).

By the early 1980s, there existed no single accepted way to structure or organize the programmatic activities of a community college to offer training to business and industry in the most effective manner (Kopecek & Clarke, 1984). Industry was already expending huge sums to train and retrain an aging workforce in an effort to remain competitive and profitable. While most of this training used in-house trainers and consultants, many companies are now turning to their community colleges as sources of high-quality and low-priced training services. Community colleges see this activity as
complementary to their educational mission and important to the economic vitality of their service to business and industry (Kopecek, 1984).

According to Kopecek (1984, pp. 4-5), community college programs that offer training services to business and industry share a number of characteristics in common:

1. The training is customized or tailored to such a degree that it "is designed to meet the specific and unique task of skill needs of a particular industry."

2. Instruction must often have a narrow focus on specific job skills of a technical nature and often relies on a task analysis of existing jobs within the firm.

3. Those enrolled as students in these programs are new hires needing entry-level skills or training in the firms' specific processes and techniques, or they may be current employees needing training or upgrading in order to qualify for promotion, to learn a new technology, or to adapt to changes in the firms' operation.

4. The training may occur at the college, at the workplace, or some combination of the two, but the actual instruction is designed and administered by personnel of the college working in close cooperation with personnel from the industries.

5. A wide variety of people may be utilized for instruction including full-time faculty, or specialists recruited for their technical expertise and knowledge of the industry and its corporate goals and objectives.

6. In order to prevent a drain on the colleges' resources, the training is often designed to be self supporting with the industries paying part or all of the cost.
of administration, development, and instruction in a contractual arrangement with the colleges.

Kopecek (1984, pp. 12-13) also enumerates benefits that are most often cited as accompanying these customized training partnerships with local industry:

1. They express the comprehensive mission of the college as serving their broader community.
2. They contribute to the local community's economic revitalization.
3. They help to foster and build a relationship between the colleges and their local communities.
4. They provide built-in professional development opportunities for the colleges' staff to keep up to date.
5. They often foster a desire for continuing learning as trainees.
6. They can be sources of income for the college.
7. In helping employees of the industries become more productive, they strengthen the colleges' contribution to the economic vitality of their communities.
8. Participation in training partnerships may make the colleges and participating industries eligible for additional government funding.

Employed adults, seeking to upgrade their employment skills or to enhance their career development and future employment opportunities through continuing education, have become a major new market for community colleges (Clarke, 1984). In fact, research data collected by Day and Rajesekhara (1988) as part of the American
Association of Community and Junior Colleges' Keeping America Working project, revealed that community colleges no longer primarily served the 18-20 year old, but had become the "educational institution of choice for the 22-40 year old" (p. 84). Day & Rajesekhara pointed out that these "new" students now constituted a majority of community college enrollees and also happened to be the backbone of the labor force, the economy, and the tax base of their communities combining the destinies of the community college with that of the American worker in a manner that paralleled land-grant colleges. In urban community colleges, the number of students who were employed full time (61 to 70%) matched very closely the number of part-time students enrolled (Day & Rajesekhara). Day and Rajesekhara concluded that the level of participation of adults who were the, "most upwardly mobile," age group in the U. S. labor force in continuing education at community colleges, meant that the linkage between higher education and the nation's economic needs was the strongest since the adoption of the Morrill Acts.

In contrast to degree and certificate programs marketed to individuals, customized training programs are marketed to, and often initiated by, the management of companies and organizations. Clarke (1984) found that, in addition to the factors cited above, most customized training programs used adjunct faculty with current industry experience because of the requirement by clients that instruction be oriented toward application and relevance to the job, as opposed to a more theoretical orientation. Many full-time faculty lack current industrial experience with a particular process or technology, and often their teaching schedules do not allow them to participate in customized training programs.

Warford (1990), summarized the unique characteristics of customized training:
1. They are taught for the members of one group, e.g., employees of a company or members of an organization.

2. The content of the courses is normally geared specifically to the needs of the client group.

3. The services of the community college are priced according to the length of the time needed to design, conduct, and follow-up the course work. Unlike traditional tuition payments, the course costs are paid by the employer or organization making minimum class size less of a concern of the college.

4. Courses are marketed in an extremely aggressive manner (p.14).

In his study of customized training programs at community colleges which are members of the League for Innovation in Community Colleges, Warford (1990) concluded that these programs represented a change in the "environmental niche" for community colleges. The concept of an "environmental niche" is defined by Zammuto, Whetten, & Cameron (1983, p. 94) as, "the intersection of available resources and demands for services in the environment that creates the potential for an organization to exist," and employed by Warford (1990) to explain how community colleges, faced with a decline in their traditional sources of student enrollment and financial support, have turned to training partnerships with industry in order to resolve the tension between their commitment to a comprehensive mission and reduced resources with which to achieve that mission. Warford (1990) found that leaders at the League for Innovation colleges agreed that, while the monetary income from customized training partnerships was a motivating
factor, "the major reason community colleges are becoming increasingly involved in customized training is the belief that these programs help fulfill the mission of the community college (p. 124)."

Grubb (1989) and also Grubb, Jacobs, and Lynch (1990) examined a national sample of community colleges and concluded that customized training had emerged as a significant new form of postsecondary vocational education. This sample was comprised of applications from 121 community colleges that had applied for the American Association of Community and Junior Colleges' Keep America Working award and was assumed by the researchers to represent the, "best of customized training." Researchers were stunned to find that 95% of the institutions that had applied for the award claimed to be offering some form of customized education. Researchers concluded that the practice of reaching out to industries and customizing their offerings were mostly to private firms (Grubb, Jacobs, & Lynch, 1990). In spite of the need for basic skills, only 8% of the training was in basic skills, with 70% categorized as job-specific. In addition, the research revealed that:

(1) The institutions examined reported an average of 1,800 students per year in each college enrolled in customized training.

(2) Forty percent of the institutions received an average of $100,000 worth of equipment.

(3) In general, there is clearly a financial partnership involved, with an average of 40% of the cost paid for by the employers. This agrees with the recommendation of Brenneman and Nelson, (1980)
(4) Remedying skill shortages appeared to be the most important purpose of these partnerships, while training to adapt to technological change and retraining to avoid potential layoffs were also reasons given for the collaboration.

(5) In about two-thirds of the cases examined, the client was an individual firm while, in the remainder of cases, the client was comprised of a group of firms or government agencies.

(6) Approximately two-thirds of the individual client firms were national or international companies, while only about a third were local regional firms.

(7) Customized training emerged as the dominant economic development effort of the institutions examined (p 108).

Customized training has emerged as yet another elaboration of an increasingly complex system of work-related training (Grubb, 1989). Customized training undertaken by public institutions for a particular employer constitutes a partnership with a specific purpose (Grubb, 1989), "which is what makes this activity unique for community colleges" (p.76). It is the partnership element that overcomes the traditional disconnection with employers that has haunted public vocational education and, "presents a very different image of these institutions: they appear flexible, responsive, creative in devising alternative formats for vocational courses, and willing to work with employers in customizing training rather than teaching courses in the same way to all students" (Grubb, 1989, p.14).

Customized training partnerships between community colleges and employers hold

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promise as both an economically and socially efficient approach to local economic
development when targeted toward small and medium-sized firms, when there is a balance
between firm-specific and generalized training that is applicable to other jobs and
employers, and where the costs of training are shared between the employer and the
college. Jacobs (1990) maintains that, compared with all the possible providers of work-
related training systems, community colleges emerge as the strongest choice when rated
on the most important variables. Among the colleges' greatest strengths are their
background in general training, education, and an established record of working effectively
with adult learners. Community colleges also possess the inherently powerful advantage
of being located in relative proximity to the firms most in need of their services. From the
perspective of social and economic efficiency, small and medium-sized firms located
within the colleges' service areas appear to be the best targets for customized training
partnerships.

As a vehicle for achieving the economic development mission, community colleges
will likely have their greatest impact by focusing training activities on small and medium-
sized firms with fewer than 500 employees. These small and medium-sized firms form the
foundation of all business enterprise in the U. S. (Jacobs, 1990), employ an increasing
majority of the U. S. labor force (Brock & Evans, 1986), and generates more innovative
products and services per employee than larger firms (Kent, Saxton, & Vesper, 1982). In
a world economy that rewards flexibility, quality, and innovation; small and medium-sized
firms have emerged to become the primary engine of economic growth.

Small and medium-sized firms present community colleges with both an
opportunity and a challenge to participate in the long-term economic development process in their communities. Because community colleges are well positioned geographically, they are almost by default the educational institution of choice for small and medium-sized industries seeking assistance with the training and education needs of their workforce. Because community colleges can no longer depend on steady increase in the level of financial support from public sources, the very scope and nature of the education and training needs they are being asked to address will require a delivery system that is as non traditional in its method of finance as it is in the method of service delivery.

Training Needs

While specific technical skills training for the employees of small, medium-sized, and large industries is an important ingredient in their success, development of a flexible and adaptable workforce with a good grounding in the educational and workplace skills that promotes long-term career development and maximizes the employee's ability to exploit the rich informal learning environment of small, innovative companies holds an even greater promise. These firms are the key to economic development within the jurisdictions of most of the community colleges in the U. S. (Grubb, 1990).

Community colleges are well positioned to offer workplace-based education and training to these industries through customized training partnerships. Community colleges are already the most aggressive and progressive of all educational institutions in forming partnerships with industry for customized training (Carnevale, Gainer, & Villet, 1990). Small and medium-sized firms may be more responsive to these efforts if they are rounded.
out with workplace-based training in the critical seven basic workplace skills.

Several recent studies of workplace education programs in small industries reveal that small firms need and want help with the development and implementation of workplace education programs for their employees in the workplace skills identified in the ASTC/DOL study (Vencill, Causeen, & Drury, 1991, Bassi 1992). In a study of workplace education programs in small industries conducted for the U. S. Small Business Administration, the major obstacle proved not to be cost, but lack of expertise and management time to set up and deliver such programs to employees (Vencill et al).

Bassi (1992) surveyed a national sample of 11,000 small and medium-sized businesses including 4,317 manufacturing firms. Bassi found that manufacturing firms had significantly higher level of workplace education programs in place than did non-manufacturing firms. Manufacturing firms also placed a greater emphasis on basic skills such as math, reading, and writing. Bassi found little philosophical opposition to the implementation of workplace education programs, rather the greatest obstacle was the lack of expertise and staff necessary to set up a program. Bassi concluded that non-financial assistance appears to be as important as financial assistance in the form of free or subsidized programs.

Vasu and Frazier (1989) surveyed 2,434 North Carolina employers, including 959 manufacturing firms, to determine the employers' perceptions of the skills possessed by graduates of the state's educational institutions and to develop a profile of the problems these employers were experiencing in finding qualified job applicants. The writing, math, thinking and problem-solving, and speaking-listening skills of a majority of applicants for
positions requiring a high school diploma were perceived by the respondents to be inadequate. A large majority of respondents (71%) either disagreed with or were uncertain about a statement indicating that they were satisfied with the preparation of North Carolina high school graduates for entry into the workplace. Significantly more firms with 100 or less employees indicated that they always or frequently experienced problems finding qualified applicants for entry level positions. In addition, the respondents on average, reported that 20% of currently employed workers possess an inadequate level of basic skills.

With regard to perceptions that this skills gap may be widening, Vasu & Frazier found that significantly more firms with more than 100 employees agreed that the skills gap was widening because of the pace of technological change in the workplace. Other disturbing evidence was that the current workforce was unprepared to meet the requirements of the new workplace. The U. S. Department of Education (United Way of America, 1988) estimated that 23 million adults in the U. S. are functionally illiterate, and that another 35 to 45 million possessed only marginal reading ability. These numbers were decreasing by 2.3 million a year and if these trends persist, U. S. business firms will find themselves hiring as many as one million new workers every year who cannot read, write, or compute. By the year 2000, as much as 59% of the workforce will be required to read technical journals and manuals and to write reports and business letters; but only 16% of the current workforce possesses the degree of literacy required by these tasks (Wolman, 1990). The changing nature of work presents America with a human capital crisis. By the end of this century, as many as 30 million current workers will have to be retrained in
addition to the training of 21 million new workers (Davenport, 1989).

In North Carolina, community colleges have historically been the "principal vehicle for bringing technical services to business" (MDC, 1989, p.11). Because the state is facing a "serious mismatch between the available workers and needed skills" for employment, by the end of the century, the commission on the Future of the North Carolina Community College System has identified the improvement of the technical skills of the state's workforce to world-class standards as one of the basic strategies for the system's blueprint for the future (MDC, 1989, pp. 10-11).

Commitment to this improvement constitutes a formidable challenge to North Carolina Community Colleges. North Carolina ranks forty-fifth in adult literacy in the U. S., with as many as 830,000 adults possessing less than an eighth grade education and 1.8 million lacking the basic skills required to reach their full potential on the job. If these trends continue to the year 2000, the U. S. Department of Labor projects that more than 16% of the population and 12% of the state's workforce will be so limited by the lack of education and training that they will not qualify to be promoted into or fill most jobs that will have been created or still exist (MDC, 1989). These statistics and trends only serve to underscore the need for innovative approaches to building a world-class workforce.

Customized industrial training programs have assisted the state's industrial firms to modernize their operations and become more competitive, but they are still too limited to address the skills gap created by the world economy and the changing nature of work (MDC, 1989, p. 11). If community colleges are to have a leading role in shaping North Carolina's place in the new world economy and the workforce it requires, customized
training programs will have to play a significant part.

**Basic Skills**

Employers have learned that their employees' basic skills will be tested at every stage of the competitive cycle, influencing cycle time to produce products. Good basic skills can mean a shorter production cycle, improved products, and higher quality. Deficiencies in such skills can undermine the cycle and cause delays, defects, and customer rejections.

To adapt quickly to the new workplace demands, employees must know how to learn. They need problem-solving skills to overcome barriers that arise in new situations. In addition to feeling comfortable with innovation, they must be able to think creatively as they cope with new challenges (Travis, 1995).

Workplace basics are important throughout the life cycle of a product and the process of service delivery. With good solid basics, the workforce can meet the challenge of change because employees continue to build on the knowledge and skills they need to adapt to innovations. Solid basic skills are critical for all employees, not just white-collar and technical elites, such as engineers. Production and service delivery personnel with high levels of basic skills allow employers to decentralize production and delivery. Such decentralization improves the institution's ability to customize its product or service and respond more effectively to customers (Travis, 1995).

Decentralization also allows employees to avail themselves of the skills of all employees in finding new cost-effective methods for providing production or
service delivery, generating quality improvements, and finding new applications for existing products and services (Carnevale, Gainer, & Meltzer, 1990, pp. 6-8).

The American Society for Training and Development and the U. S. Department of Labor Employment and Training Administration (ASTD/DOL) research findings revealed sixteen discrete workplace skills which employers describe as essential to their ability to remain competitive (Carnevale, Gainer, & Meltzer, 1990). The researchers then collapsed these sixteen discrete skills into seven basic skills groups: Knowing how to learn, basic academic skills, communication skills, adaptability, personal management, group effectiveness, and organizational influence (Carnevale, Gainer, & Meltzer, 1989).

Knowing how to learn is a set of skills that the researchers describe as the foundation of all the basic workplace skills because, "it is the key that unlocks future success (Carnevale, Gainer, & Meltzer, 1989, p. 8)." Because even the simplest of jobs are changing and evolving into more complex jobs, continuous learning is increasingly required in the workplace. Employers are placing an ever-increasing value on their employees' ability to, "absorb, process, and apply new information quickly and effectively (Carneval, Gainer, & Meltzer, 1989, p. 9)."

According to Smith (1987), "learning to learn involves possessing, or acquiring the knowledge and skill to learn effectively in whatever learning situation one encounters."

Building proficiency in knowing how to learn requires, "(1) increased understanding of self as learner; (2) increased capacity for reflection and self-monitoring of the process as one goes about the tasks and activities directed toward learning (such as note taking, meeting with a mentor, studying, locating community resources); (3) more realistic
understanding of the nature of knowledge (such as its structure, assumptions, limitations, and validation processes") (Smith, 1987, p. 45). Research and practical experience reveal that when the skills that enhance the capability of a person to learn-how-to-learn and to think critically are explicitly identified and taught, learning achievement increases (Carneval, Gainer, & Meltzer, 1990), and the learning is transferable across subject matter areas and retained over time (Resnick, 1987; Heiman & Slomianko, 1987).

Competence in the basic academic skills of reading, writing and computation comprise the second skill group identified by the ASTD/DOL study. While employers generally found the fewest deficiencies in reading, this most fundamental vocational skill is lacking in large numbers of new entrants into the U. S. workforce (Carnevale, Gainer, & Meltzer, 1990). A large population of marginally literate people exists in the U. S. These function between fourth-and-eighth grade reading ability which is below the level of employability (Kirsch & Jungeblut, 1986). Those same individuals make up as much as 65% of the projected entry-level workforce by the end of this century (Semarad, 1987). Employees with reading deficiencies present significant operational problems for their employers. Time is lost when written instructions to workers have to be verbalized orally, when employees with reading deficiencies do not understand written correspondence and orders from customers, when employees cannot read training manuals or understand the directions for filling out applications, and when they are unable to enroll in courses that would upgrade their technical skills. Workers with reading deficiencies require closer supervision and direction to avoid potential safety problems and to perform many other tasks (Center for Public Resources, 1983, p. 18).
Reading tasks on the job were predicted to require workers to analyze and summarize information, as well as to monitor their own comprehension of their reading tasks. Reading for the job will need to focus on location of information and use of this information to perform complex tasks and to solve problems (Carnevale, Gainer, & Meltzer, 1989).

Writing skills in the workplace focus less upon description and more on writing requiring analysis, conceptualization, and synthesis of ideas and information. The ability to make written proposals that are clear and concise are more valued by employers than writing which simply articulates facts and events (Carnevale, Gainer, & Meltzer, 1989).

Basic computational skills in the workplace are essential as the foundation for the application of quantitative techniques and methods necessary to reason through and solve many problems (Carnevale, Gainer, & Meltzer, 1989). As the application of advanced technology brings a higher level of sophistication to the workplace, employers are expecting employees to carry out tasks that require increasing levels of computational skill. Just as the application of sophisticated management systems and quality improvement techniques, such as statistical process control, bring a requirement for higher levels of computational skill to the workplace (Carneval, Gainer, & Meltzer, 1990), the computational skill deficiencies of the workforce appear to be increasing (Kirsch & Jungeblut, 1986; Semerad, 1987).

The third basic workplace skill group is communication skills, composed of the discrete skills of oral communication and listening. By the mid-1970s speaking and listening skills came to be recognized as important elements in functional literacy.
(Camevale, Gainer, & Meltzer, 1990), in spite of the fact that American formal education has given relatively little attention to oral communication and virtually none to listening skills (Werner, 1975).

Workplace training in effective oral communication and listening skills should simulate, as much as possible, the actual circumstances and situations employees encounter in their day-to-day work environment. Instruction in oral communication should provide workers with an understanding of dominant communication styles including voice inflection and body language. Listening skills instruction should be centered on the five critical listening skills for the workplace: "listening for content; listening to conversations; listening for long-term contexts; listening for emotional meaning; and listening to follow directions" (Camevale, Gainer, & Meltzer, 1989, pp.11-12).

Smooth operation of competitive organizations requires good communication skills that are essential ingredients for good customer service, promoting innovation, quality improvement processes, conflict resolution, and to provide the kind of feedback necessary for responsive management systems (Camevale, Gainer, & Meltzer, 1989).

Creative thinking and good problem solving are two discrete skills making up the fourth skills group, adaptability. Employers need workers who can identify problems, develop and implement solutions, and follow through with and evaluate their solutions (Camevale, Gainer, & Meltzer, 1989). Workers not only need to understand logical problem-solving procedures, but also be able to exhibit the capacity for thinking creatively in order to make those innovative leaps that enable organizations to "generate options
which are unique and relevant (Miller, 1987, p. 167)." As employers look increasingly to work teams to improve quality and productivity, the creative problem-solving skills of individual workers add up to increased productivity for the teams (Carnevale, Gainer, & Meltzer, 1990).

The personal management skills of employees are the psychological foundation for their individual training and development. Employees with poor self esteem, limited motivation at work, and whose career plans are without a clear direction or focus are much less likely to benefit from the enhancement of their workplace skills through training than are other employees (Carnevale, Gainer, & Meltzer, 1990). Training that enhances employees' self esteem should focus upon the employees' ability to recognize current skills; this awareness of how they impact others; their understanding of their own emotions; this awareness of how well they are able to cope with stress, criticism, and change in the workplace; their ability to recognize their own limits; and their ability to expand those limits by seeking out new information with which to solve problems (Carnevale, Gainer, & Meltzer, 1989). Training in motivation/goal setting and career development skills should help employees define career goals and identify the training and education that will help them achieve these goals and have a focus on personal awareness, self direction, and an understanding of organizations (Carneval, Gainer, & Meltzer, 1990).

The sixth skills group recognizes that productive interactions between workers requires that individuals be skilled in group effectiveness. Effective interpersonal skills, the ability to negotiate with peers, and the development of a sense of group purpose are necessary if individual employees are to work together in work teams that focus on
problem solving, quality, and productivity improvement (Carnevale, Gainer, & Meltzer, 1990). Work teams have become central to the improvement of productivity because the body of research on human productivity performance dating to 1929 points to the fact that the ability of workers to work and learn together in teams is the most significant of the human factors in the growth of productivity (Carnevale, 1993).

Training in interpersonal skills focuses upon helping workers to recognize and employ appropriate behavior, deal with inappropriate behavior in co-workers, deal with stress and uncertainty in the work environment, listen and respond to others, share responsibility, and interact easily with others in social situations. Training to enhance negotiation skills centers on assisting employees in employing objective criteria, which allows them to separate people from problems and to focus on solutions to problems that are mutually beneficial. Training in teamwork should provide an understanding of group dynamics, the ability to recognize and use the differing skills of co-workers, and to apply these skills in work teams which successfully solve problems and achieve significant goals (Carnevale, Gainer, and Meltzer, 1989).

Influence in the form of organizational effectiveness and leadership is the seventh and last workplace skills group. Training in organizational effectiveness should be designed to provide employees with an understanding of the basic framework of socially complex organizations and how to recognize, work within, and influence the goals, values, and culture of their employing organization (Carnevale, Gainer, & Meltzer, 1990).

These organizational effectiveness skills are the foundation for the expression of leadership within both the explicit and absolute structures of the organization (Carnevale,
Employees who express leadership need to be trained to recognize the strategies and tactics that their organizations use to achieve goals; how leadership functions as an exchange process between those who assume the roles of leaders and those who assume the role of followers; how to apply a task-centered approach to situational leadership; how to make sound decisions; how leaders develop and communicate a vision to followers; how to positively influence the behavior of co-workers; and how to use personal strengths and stability in a leadership role (Carnevale, Gainer, & Meltzer, 1989).

**Expanding The Role of the Community College**

One aspect of expanding the community college role involves re-defining the education process within the college itself. According to Vair (1992), the overall comprehensive mission of the community college will remain a vital feature. Workforce training and retraining will, necessarily, be paramount considerations (Commission on the Future of Community Colleges, 1988). Hankins (1992) contends that community colleges will need to become centers for lifelong learning, if they have not yet done so. To expand the focus on community needs, Boyer (1986) advocated the creation of a "community service term" as an essential component of the associate's degree. Thus, students will be able to develop the all-important connections that make applications of learning possible (Mittelset, 1994).

The curriculum itself is another area needing review. While Cohen and Brawer (1994) listed a number of possible directions, they indicated a rather narrow viewpoint...
that still shows a preference for the "collegiate function". Certainly, given the urgency of
our social and educational situation, a more comprehensive and open-minded approach to
curriculum is needed. The community college must look beyond its role in higher
education and accept a more expansive role "as the hub of an operation" (Boone, 1992,
p.10). Many courses previously criticized for being less than academically sound for a
college-level program will require re-examination. Higher quality courses, for example
should be regarded with more respect (Griffith & Connor, 1994).

To facilitate the necessary curriculum changes, the community college will need to
dispense with academic procedures that have become outmoded (McDowell, 1991;
Owens, 1991; Phelps, 1994). Because the formal education system does, in fact, seem to
show preference for middle class or "mainstream" values and attitudes (Boyd, 1977;
Heany, 1983; Ross-Gordon, Martin, & Briscoe, 1990), demonstrable alterations will be
essential. For example, many programs at all levels of education tend to neglect the basics
for learners (Ross-Gordon, Martin, & Briscoe) and continue to use traditional forms of
instruction (Cafferty & Spangenberg, 1983; Svinicki, 1990). Institutional barriers, such
as inconvenient schedules, restrictive locations, inflexible fee structures, and other policies
that may confuse, frustrate, or inconvenience firms that are not used to the traditional
education system need to be simplified or abandoned (Cross & McCartan, 1984;
Darkenwald & Larson, 1980).

This needed restructuring will include reassessing where courses and programs are
offered. Community colleges also will need to reconsider their own particular conception
of the "customer," shifting their focus from individuals to groups, especially industries in
general (Lorenzo, 1991). Although funding such changes within the colleges will be problematic, particularly in light of reduced emphasis on higher education by both national and state leaders, the community college is in an important position to help reverse the funding slide (Perkins, Powell, Seyler, Trachtenberg, & Tyree, 1984). The key, Boone (1992) indicated, is for community colleges to emphasize their potential for addressing many current social problems and special training needs.

Therefore, community colleges will need to redefine their role outside their own institutional environment. Lorenzo (1991) emphasized comprehensive community college development as a fundamental element in the new college's mission. One suggested major characteristics of future community colleges is that of proponent and conveyor of various alliances with business and industry, other schools, social service organizations, and government agencies (Boone, 1992; Elsner, 1991; Griffith & Connor, 1994; Hankin, 1992; Harlacher & Gollattscheck, 1992; Lorenzo, 1992; Mawby, 1992; Mittelstet, 1994).

Summary

The review of the literature suggests that several factors influence the range of workplace skills required in the employees of manufacturing firms. First, there is the size of the organization in terms of the number of employees. Second, there is the impact of new technology on the processes of the workplace. Third, there are the requirements to produce quality products at competitive prices in global markets. Fourth, there is competitive pressure from imports in domestic markets. The review of the literature
suggests that, in addition to the size of the firm, the degree of which advanced technology applications are being used by the firms, or will be used in the future, has a profound impact on the level and range of workplace skills required of employees and that could significantly influence the importance that employers attach to the seven basic workplace skills groups. Current or anticipated competition from foreign firms in domestic markets, as well as current or anticipated participation of the firm in international markets, could significantly increase the perception of the importance of quality improvement training and the basic workplace skills necessary to benefit from it. Finally, the employing organization's perception of the levels of basic workplace skills in its current workforce is an obvious factor to be taken into consideration.
CHAPTER 3
RESEARCH DESIGN AND METHODOLOGY

Introduction

The following variables are the basis for collecting data to be used in testing the research hypotheses. The research questions were addressed to manufacturing firms using Duncan's Workplace Education Survey, with modifications approved by Duncan. Key leaders within each firm were asked to respond to the survey questionnaire.

There are six independent variables in the study. The first is the number of employees in each firm. The second is the introduction of advanced technology or the planned introduction of advanced technology. The third is competition from imports. The fourth is participation of surveyed firms in export markets. The fifth independent variable is the perceived level of current employees basic workplace skills and the sixth includes characteristics of the firm such as age, ownership, and subsidiary relationships.

Four dependent variables are considered in the study. The first is the level of importance attached to the seven basic workplace skills groups. The second dependent variable is the importance placed on computer skills. The third dependent variable is the level of importance attached to factors that may influence the choice of a provider for training employees in the seven basic workplace skills groups. Eight factors are related to this variable, including the cost of the program, previous experience with the provider, reputation of the provider, proximity of the provider to the industry, willingness and ability of the provider to assist with workplace needs assessment, opportunity for the industry to
participate in the design and development of the training, willingness and ability of the provider to customize a program specifically to the industry's need, and flexibility of the provider in the selection of the time and location of instruction. The fourth dependent variable is the preference for a source of training that will address the seven basic workplace skills groups. Preferences include sending employees to generic, non-customized courses; developing in-house programs using the firm's own staff; purchasing a packaged training program from a vendor of training services, and developing a training partnership with a community college to design and deliver instruction tailored to the needs of the firm and its employees.

Certain variables that are not part of the conceptual schema of this research study were measured to determine their possible effects on the dependent variables. The age of the firm, the nature of the ownership, products manufactured and subsidiary relationships with larger firms are the organizational characteristics that will be measured and analyzed for potential effects on the dependent variables. Personal characteristics of the respondents such as age, years of experience in the present position, education level, and educational experience at a two-year community college are measured and analyzed for their effects upon the dependent variables. This study examines the relationship between independent and dependent variables (Table one) whose measures were obtained at the same time; it is best described as a relationship study under the category of correlational research (Long, Convey, & Chwalek, 1985).
<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of employees</td>
<td>Level of importance</td>
</tr>
<tr>
<td></td>
<td>assigned to the seven basics skills groups</td>
</tr>
<tr>
<td>Competition from imports</td>
<td>Level of importance of factors</td>
</tr>
<tr>
<td></td>
<td>influencing the choice of a training provider for employee training in the seven basic workplace skills groups</td>
</tr>
<tr>
<td>Perceived level of current employees' basic workplace skills</td>
<td>Preferences for sources of employee training in the seven basic workplace skills groups</td>
</tr>
<tr>
<td>Other characteristics of the firm (age, ownership, and subsidiary relationships)</td>
<td>Level of importance of computers</td>
</tr>
</tbody>
</table>
Hypotheses

The following null hypotheses are designed as the conceptual basis to test the association between the identified independent and dependent variables:

Hypothesis 1. No relationship exists between the level of automation in a firm and the level of importance its decision makers assign to each of the seven workplace skills groups.

Hypothesis 2. No relationship exists between the number of employees of a company and the level of importance its decision makers assign to each of the seven workplace skills groups.

Hypothesis 3. No relationship exists between the firm's introduction or planned introduction of advanced technology in the workplace applications and the level of importance their decision makers assign to the seven basic workplace skills groups.

Hypothesis 4. No relationship exists between the importance of computer skills and the seven basic workplace skills groups.

Hypothesis 5. No relationship exists between the firm's experiencing international competition in domestic markets and the level of importance their decision makers place on the seven basic workplace skills groups.

Hypothesis 6. No relationship exists between the firm's participation in exporting to international markets and the level of importance its
decision makers assign to the seven workplace skills groups.

Hypothesis 7. No difference exists between the perceived level of basic workplace skills possessed by the employees of the firms and the level of importance their decision makers assign to each of the seven basic workplace skills groups.

Hypothesis 8. No difference exists between or among the level of importance assigned to each of the seven workplace skills groups by the firms' decision makers. (the means will be ranked)

Hypothesis 9. No relationship exists between or among the characteristics of the firms and the respondents' ratings of the importance of factors influencing the choice of a training provider for training employees in the seven workplace skills groups.

Hypothesis 10. No relationship exists between or among the characteristics of the firms and the respondents' preferences for sources of employee training in the seven basic workplace skills groups.

Hypothesis 11. No relationship exists between the type of products produced by a company and the level the firms' decision makers place on the importance of the seven basic workplace skills groups.

Hypothesis 12. No relationship exists between the age of the respondents and the importance placed on the importance of computers.
Survey sample

The survey sample included firms from 22 counties in Western North Carolina. These counties are members of Advantage West, an organization funded by state and local funds to promote economic development in Western North Carolina. Ten community colleges located in the service area of Advantage West are important factors in attracting new manufacturing firms. Their participation will be offering state funded training for new employees employed by the new industries locating in each of the supported counties.

All of the existing manufacturing firms in the 22 counties were surveyed. The firms were identified by use of a software package from Harris Information Resources. Firms are identified by county, products manufactured, the number of employees, and key personnel.

A similar study was conducted in Mecklenburg County, North Carolina (Duncan, 1993) surveying one county and 200 firms. Recommendations from the study suggested that a similar study should be conducted in a larger geographic area and include influences of products manufactured. Those recommendations are included in this study as well as importance of computer skills and the level of automation at each firm. Firms in this study were broken into more size categories than the Duncan study. The population surveyed represents a range of firm size between one employee and 100 employees. The following categories are used: fewer than 50; 51 to 100; 101 to 200; 201 to 500; 501 to 1000; and 1000 or more employees.
The Survey Instrument

A six-part survey instrument (See Appendix A) was chosen to collect data on the independent and dependent variables for the study. Permission was obtained to use the "Workplace Education Survey (WES)" and to modify the instrument to include recommendations made in the study for which the instrument was first designed. This document is also included in Appendix A.

The first part of the instrument was used to collect data on the number of employees, the application of computer-based technology in the workplace, the presence of international competitors in the domestic markets, participation in export markets, age of the firm, nature of the ownership, whether the company is a subsidiary of a larger company, and the perceived level of automation. The second part of the instrument was used to gather data on the respondents' perceptions of the current skills levels of their employees and the importance they assign to each of the seven basic workplace skills groups by using a semantic differential scale for each of the skills groups. Respondents answered a question if they considered computer literacy to be a necessary skill and the level of importance placed on this skill if the answer was yes. The third part of the instrument asked respondents to indicate their preference for potential sources of training for their firm's employees: training obtained by individual employees off-site, such as the traditional adult education service delivery method of colleges; prepackaged training programs purchased from an outside provider; customized training developed in-house; or a customized training partnership with the local community college. The fourth part of
the instrument asked respondents to indicate the importance of factors that may influence the choice of a training provider. The factors include the total cost of the training, previous experience with the provider, the reputation of the provider, proximity of the provider to the firm's location, willingness of the provider to assist with skills assessment, willingness of the provider to assist with a program specifically to the firms' needs, opportunity for the firm to participate in the design and development of the training, and the flexibility of the provider in the selection of the time and location of the training. Items in both parts three and four use a semantic differential scale for response to the questions. The fifth part of the instrument captured data on each respondent's characteristics. Personal data on age, length of employment in the current position, educational achievement level, and completion of any education at a community college was used to determine the potential for bias they may have had on responses. The sixth part of the survey provided an opportunity for each respondent to make additional comments.

Modifications of the instrument were studied and approved by the original designer and a panel of 12 experts from education and 12 from industry. The modified instrument was studied to confirm its construct validity. The panel of experts, from both education and industry, concurred on what data each question was seeking.

Method of Data Analysis

Due to the number of different independent and dependent variables and the differing levels of measurement, multiple statistical procedures were employed in the analysis of data. Independent variable data contained both interval and nominal
classifications. The dependent variable data included only interval scale measurements. Personal data on the respondents contained nominal, interval, and ordinal measures.

Mean scores were computed for the dependent variables measuring the current level of employee skills, importance of the skills groups, preferences for the selection of a training provider, and factors influencing the choice of a training provider. Mean scores were also computed for the number of employees, and the number of years the firms have been in operation. Mean scores for age, length of employment in current position, and level of educational achievement were computed for the personal characteristics of the respondent. The remainder of the independent variables are nominal measures.

Firms with fewer than 50 employees were given a value of one. Firms with 51 to 100 employees were assigned a value of two; firms with 101 to 200 employees were given a value of three; firms with 201 to 500 were given a value of four; firms with 501 to 1000 employees were given a value of five; and firms with 1001 and more employees were assigned a value of six. Data analysis was performed on both the interval and ordinal measures for this variable.

To statistically test the hypotheses of no relationship between independent and dependent variables, a correlation matrix using the Pearson Product Moment method of correlation analysis was developed. In this matrix, each variable measured was correlated with every other independent and dependent variable.

The mean for the current employee skill levels and perceived importance were ranked to see if they were related. To test the effects of respondents, personal characteristics of the respondents on the dependent variables, the correlation procedure
was used with the preference for a source of training in the seven basic workplace skills
groups as the dependent variable in the model. The organizational characteristics variable
for the years the firm has been in operation, nature of ownership, and subsidiary
relationship with a larger company was also included in the model with all other
independent and dependent variables.

Statistical analysis procedures were performed using Minitab, release 10, statistical
software designed to be used on the IBM or IBM-compatible PC computers. All charts
and graphics were transported from Minitab. Probability estimates chosen for statistical
significance was less than or equal to .05.

Cronbach's Alpha (Cronbach, 1951) was performed on the statistical program
SPSS for DOS.
CHAPTER 4
ANALYSIS OF DATA

Respondents' Characteristics

Characteristics of respondents and firms represented are summarized in Tables 2 and 3. The ages of respondents are between 22 and 68 (median = 29), and they have between 1 and 48 (median = 8) years of experience in their current positions. Most have four-year degrees and nearly half completed some of their formal education at a two-year postsecondary institution. The firms represented have between 3 and 998 (median = 75) employees, have been in business from 1 to 75 years (median = 44), and are about evenly divided in the use or planned introduction of advanced technology in the workplace. Most of the firms do not participate in exporting to global markets, and they are about evenly divided regarding whether they are experiencing competition from imports. Few firms are subsidiaries of larger companies.

Most of the firms participating in the survey are well established firms with relatively small numbers of employees (median = 75), and they are predominantly privately owned (80.7%). The relatively small number of employees of the majority of responding firms means that the data collected are heavily weighted toward the smaller firms. This phenomenon required collapsing the number of employees to fewer than 50, 51 to 100, 101 to 200, 201 to 500, 501 to 1000, and none above 1000 to introduce enough variance in the measurement of this variable for statistical analysis.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Range</th>
<th>Median</th>
<th>Mean</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>22-68</td>
<td>29</td>
<td>28.7</td>
<td>N/A</td>
</tr>
<tr>
<td>Years in current position</td>
<td>1-48</td>
<td>8</td>
<td>12.0</td>
<td>N/A</td>
</tr>
<tr>
<td>Educational achievement</td>
<td>19-23</td>
<td>22</td>
<td>N/A</td>
<td>49</td>
</tr>
<tr>
<td>19 = high school</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>20 = some college</td>
<td></td>
<td></td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>21 = two-year degree</td>
<td></td>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>22 = four-year degree</td>
<td></td>
<td></td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>23 = master’s degree</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>24 = doctorate</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Completion of any education at</td>
<td>25-26</td>
<td>26</td>
<td>N/A</td>
<td>49</td>
</tr>
<tr>
<td>a two-year institution</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 = yes</td>
<td></td>
<td></td>
<td></td>
<td>49</td>
</tr>
<tr>
<td>26 = no</td>
<td></td>
<td></td>
<td></td>
<td>51</td>
</tr>
</tbody>
</table>
### TABLE 3

**FIRMS' CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Range</th>
<th>Median</th>
<th>Mean</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of employees</td>
<td>3-998</td>
<td>75</td>
<td>80</td>
<td>N/A</td>
</tr>
<tr>
<td>Introduction of advanced technology</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>50</td>
</tr>
<tr>
<td>Export to markets</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>12</td>
</tr>
<tr>
<td>Experiencing competition from imports</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>51</td>
</tr>
<tr>
<td>Years firm has operated</td>
<td>1-75</td>
<td>43.9</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Ownership</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>81</td>
</tr>
<tr>
<td>Subsidiary of a larger firm</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>10</td>
</tr>
</tbody>
</table>
Descriptive Statistics

Descriptive statistics for the remaining variables measured in this study are presented in Tables 4, 5, 6, and 7. These tables present statistical analysis for the perceived current levels of employee skills and their importance as measured by the ratings scales for the basic workplace skills groups (Tables 4 and 5), and factors influencing the choice of a provider for the training of employees in the seven basic workplace skills groups (Table 6). Means along with ranks of all items are revealed for all observations.

Employers do not rate their employees as having high levels of skills for any of the seven skills groups or in computer skills (Table 4). Employers rate Communication Skills highest (mean=3.2) and Computer Skills as the lowest (mean=2.3) for their current employees. Since the median value for each skills group is approximately three on a five-point scale, and means appear to be clustered around this value, it is difficult to conclude that employers rate their employees' current skills levels as significantly higher or lower than average.

The employers' rating of the importance of the workplace skills groups and computers is more informative (Table 5). The sizable differences in the means for each of the corresponding workplace skills groups and computers are immediately evident. Communication Skills and adaptability skills rank the highest (rank=7) and equal in importance. If current employee skills and computer levels are viewed as a measure of satisfaction when compared to their importance to employers, then it would be difficult
### TABLE 4
CURRENT LEVEL OF SKILLS GROUPS AND COMPUTER SKILLS

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing how to learn</td>
<td>464</td>
<td>3.0690</td>
<td>4</td>
</tr>
<tr>
<td>Basic competency skills</td>
<td>464</td>
<td>3.1207</td>
<td>5</td>
</tr>
<tr>
<td>Communications skills</td>
<td>464</td>
<td>3.2069</td>
<td>8</td>
</tr>
<tr>
<td>Adaptability skills</td>
<td>464</td>
<td>3.1724</td>
<td>6</td>
</tr>
<tr>
<td>Developmental skills</td>
<td>464</td>
<td>2.6897</td>
<td>2</td>
</tr>
<tr>
<td>Group effectiveness skills</td>
<td>464</td>
<td>3.1724</td>
<td>6</td>
</tr>
<tr>
<td>Influencing skills</td>
<td>464</td>
<td>2.7759</td>
<td>3</td>
</tr>
<tr>
<td>Computer skills</td>
<td>464</td>
<td>2.310</td>
<td>1</td>
</tr>
</tbody>
</table>

NOTE: 8 = Highest rank, Scale 1.00 = Lowest and 5.00 = Highest
### TABLE 5

**IMPORTANCE of SKILLS GROUPS AND COMPUTER SKILLS**

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing how to learn</td>
<td>464</td>
<td>4.0862</td>
<td>5</td>
</tr>
<tr>
<td>Basic competency skills</td>
<td>464</td>
<td>4.0172</td>
<td>4</td>
</tr>
<tr>
<td>Communications skills</td>
<td>464</td>
<td>4.2241</td>
<td>7</td>
</tr>
<tr>
<td>Adaptability skills</td>
<td>464</td>
<td>4.2241</td>
<td>7</td>
</tr>
<tr>
<td>Developmental skills</td>
<td>464</td>
<td>3.5172</td>
<td>2</td>
</tr>
<tr>
<td>Group effectiveness skills</td>
<td>464</td>
<td>4.1897</td>
<td>6</td>
</tr>
<tr>
<td>Influencing skills</td>
<td>464</td>
<td>3.7414</td>
<td>3</td>
</tr>
<tr>
<td>Computer skills</td>
<td>464</td>
<td>3.1552</td>
<td>1</td>
</tr>
</tbody>
</table>

**NOTE:** 7 = Highest rank, Scale of 100 = Lowest and 5.00 = Highest
not to conclude that the employers perceive their employees as having a less than desirable proficiency in each of the seven basic workplace skills groups. This skills gap between current and desired level is consistent with the pattern described in the research literature.

Table 6 presents means and ranks for the eight factors that respondents rated for their importance in influencing the choice of a training provider to train their employees in the seven basic workplace skills groups and computers. The willingness of the provider to customize a program to the specific needs of the firm and the reputation of the provider rank as the most important to the respondents.

Perhaps the most noteworthy feature of employers' ratings of these eight factors is that cost (rank = 4) does not rank as high as the customization of a program and reputation of the provider. Previous findings from research into the training needs of small firms (Lo, 1983; Vencill, Clausen, & Drury, 1991; Bassi, 1992) did not find cost to be a major obstacle to workplace education programs in these firms. Rather, it was the firms' lack of expertise, time, and staffing that were reported as the major obstacles. Chisman (1992) found that most small firms turned to local two-year institutions for assistance with workplace educational programs but that often those institutions were limited in resources and experience with workplace education programs. Many firms in Chisman's study reported that the two-year institutions offered only standard programs that did not meet the firms' needs. The employers' ratings of the importance of these eight factors influencing their choice of a training provider for their employees is consistent with the findings reported in the literature on workplace education in small firms.
### TABLE 6
MEANS AND RANKS FOR IMPORTANCE OF FACTORS INFLUENCING THE CHOICE OF A TRAINING PROVIDER

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cost to the firm</td>
<td>464</td>
<td>3.5172</td>
<td>4</td>
</tr>
<tr>
<td>Previous experience</td>
<td>464</td>
<td>3.3448</td>
<td>2</td>
</tr>
<tr>
<td>Reputation of provider</td>
<td>464</td>
<td>3.9138</td>
<td>7</td>
</tr>
<tr>
<td>Proximity to firm</td>
<td>464</td>
<td>3.2759</td>
<td>1</td>
</tr>
<tr>
<td>Needs assessment</td>
<td>464</td>
<td>3.3966</td>
<td>3</td>
</tr>
<tr>
<td>Design and development</td>
<td>464</td>
<td>3.6724</td>
<td>5</td>
</tr>
<tr>
<td>Customize a program</td>
<td>464</td>
<td>3.9310</td>
<td>8</td>
</tr>
<tr>
<td>Flexibility in time</td>
<td>464</td>
<td>3.6034</td>
<td>6</td>
</tr>
</tbody>
</table>

NOTE: 8 = Highest rank, Scale 1 = Lowest and 5.00 = Highest
Table 7 displays means and ranks for the employers' preferences for sources of training for their employees in the seven basic workplace skills groups and computers. The ratings of the items on this scale are nicely framed by the sources that rank the highest and lowest. The employers most prefer to have their training provided by a community college and least prefer to purchase an existing program.

TABLE 7
MEANS AND RANKS OF PREFERRED SOURCES OF TRAINING

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses offered off site</td>
<td>464</td>
<td>2.5345</td>
<td>2</td>
</tr>
<tr>
<td>Purchase existing programs</td>
<td>464</td>
<td>2.5172</td>
<td>1</td>
</tr>
<tr>
<td>Develop in-house programs</td>
<td>464</td>
<td>3.3793</td>
<td>3</td>
</tr>
<tr>
<td>Training with a com. coll.</td>
<td>464</td>
<td>3.3966</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: 4 = Highest rank, Scale 1.00 = Lowest and 5.00 = Highest
Test of Hypotheses

Twelve research hypotheses were tested in this study. Each hypothesis was tested for a null relationship between the independent and dependent variables. The results of the correlation analysis are summarized in Tables 8, 9, and 10. An alpha level of .05 was used for all tests.

Hypothesis 1 states that no relationship exists between the level of automation in a firm and the level of importance its decision makers assign to each of the seven workplace skills groups. Table 8 reveals that correlation coefficients are significant (-.04 to -.19), therefore the null hypothesis is rejected.

Hypothesis 2 states that no relationship exists between the number of employees of a company and the level of importance its decision makers assign to each of the seven workplace skills groups. Table 8 reveals that correlation coefficients are so small (-.05 to .156) and not significant for the number of employees variable, and the null hypothesis is not rejected.

Vasu and Frazier (1989) found broad consensus across firms of all sizes on a measure of satisfaction with North Carolina high school graduates and adequacy of a similar set of skills for entry-level job applicants. That study found no significant variation for these measures across firms with 100 or fewer employees, 101 to 250 employees or more than 251 employees. Findings in this study appear consistent with those of Vasu and Frazier in that firm size by itself is not a factor in employers' evaluation of basic workplace skills.
Hypothesis 3 states that no relationship exists between the firms introduction or planned introduction of advanced technology in the workplace applications and the level of importance their decision makers assign to the seven basic workplace skills groups. Table 8 presents the results of a correlational analysis of this hypothesized relationship. One item from the skills groups, group effectiveness, is significantly correlated ($r = .38$) with the introduction of advanced technology.

The correlation coefficients for the remaining skills groups were not statistically significant. The hypothesis is rejected for each of the 6 other skills groups.

Vasu and Frazier (1989) found that North Carolina employers who anticipated sizable investments in new equipment and technology reported that they expected skill requirements for their workers would increase. Lund and Hansen's (1986) study for the Environmental Scanning Association revealed that a growing complexity of work in a technologically advanced manufacturing workplace would require workers to possess not only the basic skills in reading, writing, and computation, but that they also would demand that workers work more effectively with each other, with management, and with customers. However, the relationship revealed is consistent with findings of previous research.

Hypothesis 4 states that there is no relationship between the importance of computer skills and the seven basic workplace skills groups. This null hypothesis is rejected, as Table 8 shows high and significant correlations ($r = .38$ to .56).

Hypothesis 5 states that no relationship exists between the firms experiencing international competition in domestic markets and the level of importance their decision
makers place on the seven basic workplace skills groups. Table 8 reveals that only one skills group, Adaptability Skills correlates significantly \((r=.24)\) with firms experiencing competition from imports. The null hypothesis is rejected for each of the other skills groups. The literature stresses that the ability of employees to adapt to change is the key ingredient in competing successfully in a global marketplace (Jasinowki, J. 1996).

Hypothesis 6 states that no relationship exists between the firm's participation in exporting to international markets and the level of importance their decision makers assign to the seven workplace skills groups. The null hypothesis cannot be rejected because, none of the correlation coefficients in Table 8 is statistically significant \((where \ r=-.01 \ to \ - .12)\). While the literature on global competitiveness (Carnevale, 1990) emphasizes the importance of improving the basic workplace skills of existing workers in order to remain competitive, such a perception on the part of employers was not found in this study.

Hypothesis 7 states that no difference exists between the perceived level of basic workplace skills possessed by the employees of a firm and the level of importance their decision makers assign to each of the seven basic workplace skills groups. Tables 4 and 5 (pages 74 & 75) reveal significant differences between the means of the current levels of the basic skills groups for employees and the means of the importance placed on the skills groups by employers. The means for the current level of skills ranged from 2.30 to 3.21 with the means of importance of skills ranging from 3.16 to 4.22. This is a variance of 19%. The differences were significant and the null hypothesis is rejected.
<table>
<thead>
<tr>
<th>Skills Groups</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firms' Characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbers of employees</td>
<td>.06</td>
<td>.005</td>
<td>.10</td>
<td>.13</td>
<td>-.05</td>
<td>.21</td>
<td>.16</td>
</tr>
<tr>
<td>Introduction of advanced technology</td>
<td>-.20</td>
<td>-.11</td>
<td>-.01</td>
<td>-.14</td>
<td>-.09</td>
<td>-.38*</td>
<td>-.13</td>
</tr>
<tr>
<td>Export to markets outside U.S.</td>
<td>-.06</td>
<td>-.11</td>
<td>-.01</td>
<td>-.04</td>
<td>-.04</td>
<td>-.07</td>
<td>-.12</td>
</tr>
<tr>
<td>Experiencing competition from imports</td>
<td>.22</td>
<td>.13</td>
<td>.24</td>
<td>.24</td>
<td>.19</td>
<td>.05</td>
<td>.02</td>
</tr>
<tr>
<td>Computer literacy</td>
<td>.54*</td>
<td>.56*</td>
<td>.38*</td>
<td>.44*</td>
<td>.50*</td>
<td>.38*</td>
<td>.43*</td>
</tr>
</tbody>
</table>

Notes: 1=Knowing how to learn, 2=Basic competency skills, 3=communication skills, 4=Adaptability skills, 5=Development skills, 6=Group effectiveness skills, 7=Influencing skills

* Significant at .05 level
Hypothesis 8 states that there is no difference among the level of importance assigned to each of the seven workplace skills groups by the firm's decision makers. Table 5 (page 75) reveals statistically significant differences between the means of the respondents' rating of the importance of the seven basic workplace skills groups; thus the null hypothesis is rejected. Differences in the ranking of the means range from 3.16 to 4.22. However, communication skills and adaptability skills have identical means of 4.22.

Vasu and Fraizer (1989) defined the basic skills in their study as reading, writing, math, thinking (problem solving), and communication (speaking and listening). The skills group identified as knowing how to learn, which is the ability to understand and manipulate new information quickly and confidently, is not usually found in other lists of "basic" skills for current or entry-level workers.

Hypothesis 9 states that no relationship exists between or among the characteristics of firms and the importance assigned to factors influencing their choices of a training providers. Correlation analysis presented in Table 9 reveals significant relationships between introduction of advanced technology and previous experiences with the provider ($r=.39$), the opportunity for the firm to participate in design ($r=.28$), the development of a program, and the willingness and ability of provider to customize a program specifically to the firms' needs ($r=.31$), and the flexibility of providers in regarding times and locations of instruction ($r=.40$).

Based upon the statistically significant correlation coefficients for the introduction of advanced technology, the null hypothesis is rejected.
### TABLE 9
CORRELATIONS BETWEEN FIRMS' CHARACTERISTICS AND FACTORS INFLUENCING CHOICE OF TRAINING PROVIDER

<table>
<thead>
<tr>
<th>Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firms' Characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of employees</td>
<td>.13</td>
<td>.20</td>
<td>-.06</td>
<td>.06</td>
<td>-.06</td>
<td>.11</td>
<td>.10</td>
<td>.19</td>
</tr>
<tr>
<td>Introduction of advanced technology</td>
<td>-.10</td>
<td>.39</td>
<td>-.19</td>
<td>-.20</td>
<td>-.14</td>
<td>-.25</td>
<td>.31</td>
<td>-.40</td>
</tr>
<tr>
<td>Export to markets outside U. S.</td>
<td>.02</td>
<td>-.16</td>
<td>-.06</td>
<td>-.06</td>
<td>-.03</td>
<td>-.10</td>
<td>-.19</td>
<td>-.22</td>
</tr>
<tr>
<td>Competition from imports</td>
<td>-.01</td>
<td>-.19</td>
<td>.05</td>
<td>.04</td>
<td>-.11</td>
<td>-.15</td>
<td>-.10</td>
<td>.08</td>
</tr>
</tbody>
</table>

Notes: 1= Total cost of program, 2= Previous experience with provider, 3= Reputation of the provider, 4= Proximity of provider to firm, 5= Willingness and ability of provider to conduct or assist with workplace skills needs assessment, 6= Opportunity for firm to participate in design and development of program, 7= Willingness and ability of provider to customize program specifically to firm's needs, 8= Flexibility of provider.
Chisman (1992) found that the firms in the Southport Institute study preferred to create their own customized workplace education programs because that level of involvement gave the firms a sense of ownership and commitment. Chisman noted that the firms in his study did not "buy" workplace education programs as if they were standardized like other industrial commodities.

Hypothesis 10 states that no relationship exists between or among the characteristics of the firms and the respondents' preferences for sources of employee training in the seven basic workplace skills groups. Table 10 reveals that statistically significant relationships exist between the number of employees, introduction of advanced technology, and export markets outside the United States and developing a training program partnership with a community college. The null hypothesis is rejected.

Jacobs (1990) proposed that community colleges were the best situated educational institutions to offer customized training to industry. Their proximity to the firms, their experience with adult learners, and their expertise with technical and vocational training sources of choice for customized training in industrial firms over consults and four-year colleges and universities. For those firms with a higher level of technology and, therefore, a need for a higher level of basic skills in their employees, contract training partnerships with a nearby community college may be the best or only option available for the improvement of the skills of current employees.

Hypothesis 11 assumes no relationship exists between the type of products produced by an industry and levels the firms' decision makers place on the importance of the seven basic workplace skills groups. Table 11 reveals statistically significant
TABLE 10

CORRELATIONS BETWEEN FIRMS' CHARACTERISTICS AND PREFERENCE FOR SOURCES OF TRAINING

<table>
<thead>
<tr>
<th>Sources of Training</th>
<th>Firms' Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Number of employees</td>
<td>.02</td>
</tr>
<tr>
<td>Introduction</td>
<td>-.05</td>
</tr>
<tr>
<td>Export to U.S.</td>
<td>-.08</td>
</tr>
<tr>
<td>Competition</td>
<td>.04</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Send employees to courses offered off-site to the general public by an educational institution, 2=Purchase an existing program from consultant or other vendor, 3=Develop your own in-house program using your staff exclusively, 4=Develop a contract training partnership with a community college to jointly develop a customized program.
differences between means of the respondents' ratings of the importance of the seven basic workplace skills groups. The null hypothesis is rejected.

Adaptability skills such as solving problems and thinking creatively reveals a great variance in means for firms with stone and concrete products at 3.80 and chemical products at 4.00. Knowing how to learn varied form one industry to another from stone and concrete manufacturers at 3.50 to chemical producers at 5.00. Overall, producers of chemical products rated the seven workplace skills groups the most important.

Hypothesis 12 states that no differences exist between the age of respondents and the importance they assigned to computer literacy. The average age of the respondents and the perceived importance of computers varies greatly, the differences are significant. The null hypothesis is rejected.

Respondents up to age 45, place the greatest value on computer skills.

Ninety-four percent of respondents said that computer literacy should be added to the basic workplace skills groups.

Respondents' Comments

The last item on the Workplace Education Survey asked respondents to add any comments or suggestions they may have about the topics mentioned in the survey. Most comments were centered around the community college as a training provider.

Many comments concerned the community colleges as providers of customized training. Several respondents said that they did not realize that specific custom training was
## TABLE 11

RESPONDENT FIRMS BY PRODUCTS PRODUCED AND THE IMPORTANCE ASSIGNED TO WORKPLACE SKILLS GROUPS

<table>
<thead>
<tr>
<th>Skills Groups</th>
<th>Products Produced</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastics</td>
<td></td>
<td>4.67</td>
<td>4.33</td>
<td>4.10</td>
<td>4.33</td>
<td>4.50</td>
<td>4.33</td>
<td>4.00</td>
</tr>
<tr>
<td>Leather</td>
<td></td>
<td>4.00</td>
<td>4.10</td>
<td>4.09</td>
<td>4.10</td>
<td>3.55</td>
<td>3.82</td>
<td>3.18</td>
</tr>
<tr>
<td>Electrical</td>
<td></td>
<td>4.20</td>
<td>4.20</td>
<td>4.00</td>
<td>3.80</td>
<td>2.80</td>
<td>4.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Machining</td>
<td></td>
<td>4.10</td>
<td>3.90</td>
<td>3.80</td>
<td>4.20</td>
<td>3.10</td>
<td>4.30</td>
<td>3.60</td>
</tr>
<tr>
<td>Stone/Concrete</td>
<td></td>
<td>3.50</td>
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<tr>
<td>Chemicals</td>
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<td>4.00</td>
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<tr>
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<td>4.83</td>
<td>4.83</td>
<td>4.33</td>
<td>4.83</td>
<td>4.33</td>
</tr>
<tr>
<td>Wood Products</td>
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<td>3.80</td>
<td>3.60</td>
<td>4.40</td>
<td>4.00</td>
<td>3.20</td>
<td>4.00</td>
<td>3.80</td>
</tr>
<tr>
<td>Textiles</td>
<td></td>
<td>4.30</td>
<td>4.10</td>
<td>4.40</td>
<td>4.50</td>
<td>4.00</td>
<td>4.40</td>
<td>4.40</td>
</tr>
</tbody>
</table>

Notes: 1=Knowing how to learn, 2=Basic competency skills, 3= communication skills, 4=Adaptability skills, 5=Development skills, 6=Group effectiveness skills, 7=Influencing skills. For importance assigned, 1.00 = lowest and 5.00 = highest

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provided. A few comments revealed surprise that community colleges had the personnel to develop customized training. Several respondents did not realize that community colleges provided assessment to determine training needs.

Some respondents did not know who the contact persons were at their local community college or had never been contacted by the local institution. Others had unpleasant experiences with training provided by their local college. Some indicated their company was too small to be considered for customized training. Numerous preferred courses that would give their employees college credit.

Many respondents made comments about issues raised in the literature, especially the emphasis on on-site customized training, but they had problems releasing employees for training. A sense of urgency exists for community colleges to become better partners with firms in local business communities. This speaks volumes about how community colleges will need to change in order to become actively engaged with business and industry as training partners.

**Summary**

Respondents rated the levels of importance of the seven skills groups significantly higher than they rated the current level of their employees' skills. Significant differences were also found to exist regarding the importance the respondents assigned to each of the seven basic workplace skills groups.

The ranked means of the perceived importance of the seven basic workplace skills groups and computers were as follows:
. Computer skills ranked number 1 (lowest)
. Developmental skills ranked number 2
. Influencing skills ranked number 3
. Basic competency skills ranked number 4
. Knowing how to learn ranked 5
. Group effectiveness skills ranked 6
. Adaptability Skills and Communications skills tied both, ranked 7 (highest)
CHAPTER 5
CONCLUSIONS AND SUGGESTIONS FOR
FURTHER RESEARCH

Conclusions

Four research questions are addressed in this study. The first question is, "What is the level of importance that employers assign to each of the seven basic workplace skills groups identified in the Department of Labor/American Society for Training and Development study as the focus of workplace-based training for their industries' employees?" The question addresses the relative importance that firms' decision makers attached to each of the seven basic workplace skills groups identified in the original American Society for Training and Development and U. S. Department of Labor Study. The research findings suggest that the firms' decision makers perceive all seven of the skills groups to be important and support the conclusion of the original study and that of other research (Lund & Hansen, 1986; Hudson Institute, 1987; Naisbett, 1988; United Way of America, 1988) that a sizable and growing "skills gap" has emerged between the skills demanded of workers in technologically advanced workplaces and the skill levels achieved by those workers.

Adaptability Skills, Communication Skills, and Group Effectiveness Skills emerge as the most important workplace skills groups according to the respondents to this study. Firm size in terms of the number of employees did not correlate with the importance assigned to workplace skills groups. The introduction of advanced technology in the
workplace is weakly related to the importance of the basic competency, communication, and adaptability skills. This finding is consistent with Lund and Hansen's (1986) description of the changing nature of work and workplace skills being dictated by the application of computer and modern telecommunications technology to the manufacturing plant floor. Manufacturing firms are now operating 'dark plants' with no employees in the operations areas. Control and monitoring are implemented from distant places. Traveling maintenance crews are dispatched when monitoring systems detect trouble.

The second research question is, "What is the level of importance industrial leaders place on computer literacy?" The question deals with the importance industrial leaders place on computer literacy. Ninety-four percent of the respondents indicated that computer literacy should be added to the basic workplace skills groups. Correlations of the perceived importance of computers with the seven workplace skills groups are the the highest in this study r ranging from .56 to .79. This finding supports the prediction of Lund and Hansen (1986) that computers would change the nature of work in the workplace.

The third research question is, "Do employers prefer customized training partnerships with community colleges over other available alternatives for the delivery of the seven basic skills groups?" This question asks if employers prefer customized training to be provided by community colleges over other available alternatives for the delivery of training in the seven basic workplace skills groups. The capacity of the community colleges in the western part of North Carolina to be able to design and deliver customized basic skills training in the workplace appears to be in doubt. Questions are raised. How
widespread is this practice? What are the necessary professional competencies and what kind of training and experience are necessary to achieve them? What are the best organizational models? Finally, how will customized training delivery systems impact upon the colleges' missions? What are implications for public sources of funding? How does customized training impact upon the typical faculty teaching schedule, workweek, compensation, and performance evaluation? Is customized training central to the colleges' mission and purpose or yet another sideline in the attempt to be, "all things to all people."

The fourth research question is, "What are the relationships among the size of an organization, the application of advanced technology in the workplace, and the presence of international competition and its preference for establishing customized training relationships with community colleges over other available alternatives for delivery of training in the seven basic workplace skills groups?" This opens an argument about the relationships among the size of an organization, the application of advanced technology in the workplace, and the presence of international competition and its preference for establishing customized training relationships with community colleges over other available alternatives for delivery of training in the seven basic workplace skills groups. This study defines the preference of most firms. Customized training by the community college is the most desired. This study also reveals that many firms in identified areas do not have good relationships with their local community colleges.

In today's global economy, the knowledgable worker is essential to U. S. competitiveness. From the factory floor to the board room, there is a new sense of urgency to have a skilled work force that responds to today's challenge for quality goods.
Cutting-edge technology, customization, and new manufacturing processes have brought about even more pressure to create learning opportunities that continuously upgrade the knowledge and skills of all workers.

According to Jasinowski (1996), president of The National Association of Manufacturers, the belief is that the competitive advantage of U. S. manufacturers lies in the application of technological advances in combination with an increasingly skilled and adaptable workforce. To that end, U. S. manufacturers reportedly are spending over $60 billion in educating and training the nation's work force (Jasinowski, 1996). As more and more manufacturers adopt the principles of high-performance workplaces, that training increasingly is being provided to front-line workers.

To facilitate this process, according to Jasinowski (1996), a growing number of manufacturers, both large and small, are turning to their local community colleges for help. Often, in cooperation with local employers' groups, community colleges have responded with vigor, designing customized workforce development programs and highly focused course work for a range of employee needs. A surprising number of small and medium-sized companies, often suppliers to larger firms, are realizing that they, too, must have the kinds of workers who can deliver to their customers the highest quality products. These smaller companies, whose needs are significant but whose resources are thin, are particularly eager to work with their local community colleges.

The current corporate-community college relationship is neither strong nor well developed. Yet these two-year institutions are ideally suited to meet many of the employee education and training needs of the manufacture. U. S. corporations should
seriously consider building their relationships with community colleges through establishing community college investment programs. Such programs would have six key elements:

- Corporate identification of their education and training needs;
- Corporate leadership to coordinate philanthropic and fee-for-service outlays to meet these needs;
- Community college commitment to invest in developing the education and training capacity to meet corporate educational and training needs;
- Development of corporate-community college plans of action;
- Additional corporate investment to ensure strengthening the overall educational capacity of the community colleges through general support; and
- Periodic evaluation of the "returns on investment" by both the corporations and the community colleges.

Corporations risk little and stand to gain a great deal through building investment exchange programs. Corporate gain will also be society's gain: a better educated workforce building a stronger future for all.

**Suggestions for Further Study**

What is the level of firms' satisfaction with graduates and trainees from the technical programs of North Carolina's community colleges? Further study, including all 59 institutions, should be conducted by surveying firms from each college's service area. A special instrument should be developed to obtain accurate data from each respondent.
A special study should be designed to determine the involvement of each North Carolina community college in industrial customized training. Data should be collected to ascertain the school's commitment, funds available for training instructors, and the technology level of the training equipment used.

A new term has emerged in the last several years, specifically tailored for the community college, that reflects the goals and purposes of the learning revolution in action. The term "learning college", rather than "teaching college", is much more useful in describing the comprehensive nature of a community college committed to placing learning first. An extensive study should be conducted to find the advantages, if any, of the learning college for industrial training.

North Carolina's community colleges will be converting from the quarter system to the semester system in the Summer of 1997 (minutes of North Carolina State Board of Community Colleges, January 1996). A study should be made to determine the effects this change will have on industrial training. Will this force the community colleges to design more short-term customized training rather than using the longer semester curriculum courses?

Only curriculum courses award college credit. Customized courses in North Carolina community colleges are offered under the system wide Occupational Extension Program with only a locally issued certificate and Continuing Education Units being awarded at completion. Curriculum courses are too generic to meet the requirements for customized training.
Summary

According to respondents' comments, community colleges' current ability to design and deliver customized basic skills training in the workplace appears to be in doubt. How widespread is this practice? What are the factors related to successful programs? What are the necessary professional competencies and what kind of training and experience is necessary to achieve them? What are the best organizational models?

The North Carolina Community College System is the primary deliverer of workforce training including job training, literacy, and adult education in the state. The community colleges are responsible for providing lifelong educational programs that lead to degrees, certificates, and diplomas, as well as offering vital training and retaining opportunities that prepare a competent and competitive workforce. The North Carolina Community College System's goal is to develop the best workforce education and training system in the world. This vision when met, will provide opportunities for all citizens to be fully functional and productive in the economic and social framework of the state's communities. A better educated citizenry provides for a healthier economy and quality of life. Increasingly, the quantity and quality of education are linked directly to North Carolina's stability and growth. The bottom line is that increased investments in the state's education systems improve North Carolina's economic prospects for the 21st Century.
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APPENDICES
APPENDIX A

WORKPLACE EDUCATION SURVEY
WORKPLACE EDUCATION
SURVEY

INSTRUCTIONS:

1. RETURN THE ENCLOSED POST CARD INDICATING THAT YOU HAVE RECEIVED THE SURVEY.

2. PLEASE RESPOND TO ALL ITEMS IN THE SURVEY.

3. RETURN THE COMPLETED SURVEY IN THE ENCLOSED ENVELOPE.

PART I: CHARACTERISTICS OF YOUR FIRM - Please answer all of the following questions regarding the characteristics of your firm.

1. Please indicate the total number of people currently employed by your firm. _____

2. Has your firm recently introduced, or is your firm planning to introduce, advanced manufacturing technology systems, such as CNC machines, computer-aided design, computer-aided manufacturing, or computer-integrated manufacturing, in the workplace?
   Yes _____  No_____

3. Does your firm currently export its products to markets outside the United States?
   Yes_____  No_____

4. Does your firm face competition in the domestic U. S. markets from products manufactured outside the U. S. ?
   Yes_____  No_____

5. How many years has your firm been in business? _____ years. If less than one year, how many months? _____ months.

6. Please indicate the nature of the ownership of your firm.
   Privately held _____
   Publicly owned _____

7. Is your firm a subsidiary of a larger company?
   Yes_____  No_____
8. Your firm's level of automation. 

LOW 1 2 3 4 5 HIGH

PART II: CURRENT EMPLOYEE SKILL LEVELS AND THEIR IMPORTANCE: Please rate the current skill level of your employees on each of the seven workplace skills groups described below. You are asked to rate your employees on a scale if 1 - low to 5- high under the column heading CURRENT LEVEL. Please circle the number which you believe best represents the skill levels of your employees. Please indicate the skill level for all of the skill groups. Under the column heading IMPORTANCE, please indicate the importance of these skills for your workforce. Rate what you believe to be the importance for the job performance of your employees for each skills group on a scale of 1 - low to 5- high importance. Circle the number for each skills group that best represents the level of importance you assign to each group.

<table>
<thead>
<tr>
<th>SKILLS GROUP</th>
<th>CURRENT LEVEL</th>
<th>IMPORTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOW 1 2 3 4 5</td>
<td>LOW 1 2 3 4 5</td>
</tr>
<tr>
<td>KNOWING HOW TO LEARN - the ability to understand and manipulate new information quickly and confidently</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>BASIC COMPETENCY SKILLS - the ability to use reading, writing, and computation analytically and to apply them in the workplace</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>COMMUNICATION SKILLS - the ability to use effective listening and oral communication techniques in order to better interact with co-workers, customers and supervisors</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>ADAPTABILITY SKILLS - the ability to use individual and group problem solving skills to bring about practical and innovative solutions to problems encountered in the workplace</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>DEVELOPMENTAL SKILLS - the ability to manage personal and professional growth through the setting of well-defined goals and objectives and participation in purposeful career development activities</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>GROUP EFFECTIVENESS SKILLS - the ability to work effectively with others through the application of interpersonal, teamwork, and</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SKILLS GROUP                      CURRENT LEVEL                      IMPORTANCE
                                   LOW           HIGH           LOW           HIGH

INFLUENCING SKILLS - the ability of employees to make a difference through a knowledge of the organization and how their actions effect the achievement of the objectives of the organization, and the ability to influence others in the work group to understand what importance the task at hand has for the organization as a whole. ------------ 1 2 3 4 5 1 2 3 4 5

PART III: COMPUTER SKILLS

Do you believe that computer skills should be included in skills groups? Yes _____ No _____

IF YES, PLEASE RATE THE CURRENT LEVEL OF YOUR EMPLOYEES AND THE IMPORTANCE

COMPUTER SKILLS - the ability to operate a computer at a work station or to use software such as word processing, spreadsheet, data-base, and graphics. ------------ 1 2 3 4 5 1 2 3 4 5

PART IV: SOURCES OF TRAINING - Please specify your preference for addressing the training needs of your employees in the seven workplace skills groups described on page —. Please indicate your level of preference using a scale 1 (least preferred to 5 (most preferred). Please circle the number which indicates your preference for each of the possible training sources.

SOURCES OF TRAINING                      LEAST PREFERRED                      MOST PREFERRED

Send your employees to courses offered off-site to the general public by an educational institution 1 2 3 4 5

Purchase an existing program for your employees from a consultant or other vendor of education and training services 1 2 3 4 5

Develop your own in-house program using your staff 1 2 3 4 5

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Develop a training partnership with a community college to jointly develop a program customized to the needs of your firm and employees and for which your firm would pay a fee to cover the cost of development and the delivery of instruction.

PART V: FACTORS INFLUENCING THE CHOICE OF A PROVIDER FOR THE TRAINING OF YOUR EMPLOYEES IN THE SEVEN WORKPLACE SKILLS GROUPS - Please rate the importance of the following factors in influencing your selection of a provider for the seven workplace skill groups. Please circle the number on a scale of 1 (least important) to 5 (most important) which best represents the importance each factor would have in your firm's decision.

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>LEAST IMPORTANT</th>
<th>MOST IMPORTANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cost of the program to your firm</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Previous experience with the provider</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Reputation of the provider</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Proximity of the provider to your firm</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Willingness and ability of the provider to conduct or assist with workplace skills needs assessment</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Opportunity for your firm to participate in the design and development of the program</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Willingness and ability of the provider to customize a program specifically to your firm's needs</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Flexibility of the provider in the selection of the time and location of instruction</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

PART VI: CHARACTERISTICS OF THE PERSON COMPLETING THIS SURVEY - Please provide some information about yourself.

1. What is your age? _____

2. How many years have you been in your current position? _____ years. If less than one year, how many months? _____ months.

3. Please indicate your highest level of formal educational achievement.
High School _____  
Some college _____  
Two-year college degree _____  
Four-year college or university degree _____  
Master's degree _____  
Doctorate _____  

4. Did you complete any of your education at a public two-year post-secondary institution such as a community college, technical college, or technical institute in the U. S.?  
   Yes _____  No _____  

PART VII: Please indicate in the spaces provided any comments or suggestions you may have about the topics mentioned in this survey.  
__________________________________________________________________________  
__________________________________________________________________________  
__________________________________________________________________________  
__________________________________________________________________________  
__________________________________________________________________________  
__________________________________________________________________________  
__________________________________________________________________________  
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__________________________________________________________________________  
__________________________________________________________________________  
__________________________________________________________________________  

Thank you for spending your valuable time to assist in this project.  
Please remember to return your completed survey in the self-addressed envelope.
RETURN TO: DON H. LOVELACE
P. O. BOX 766
SPRUCE PINE, NC 28777-0766

YOUR FIRM’S PRODUCTS ____________________________

YOUR FIRM’S SIC CODE ________
January 29, 1996

Mr. Don Lovelace
Dean of Business & Industry Services
Asheville-Buncombe Technical College
340 Victoria Road
Asheville, NC  28801

Dear Don:

I am pleased that you have decided to focus your dissertation study on recommendations I made in my 1993 research at North Carolina State University.

I am happy to grant permission for you to use the "Workplace Education Survey" with the revisions you have suggested by adding a skills group for computer literacy and measuring the participating firms' level of automation.

Please feel free to call upon me for assistance if needed.

I look forward to reading the results of your completed research and greeting you as Dr. Lovelace!

Sincerely,

John M. Duncan, Ed.D.
Director for Business and Industry Services
APPENDIX B

LETTER ENDORSING RESEARCH SURVEY
May 1, 1996

Dear Industry Leader,

Don Lovelace, our Dean of Business and Industry Services, is completing his doctoral degree at East Tennessee State University. The enclosed survey is a very important part of his work to be completed. It is also important to other North Carolina community colleges in helping them to accomplish their mission of community service in workplace training.

The data collected will be kept in confidence with the tabulated results being shared with other community colleges. The coding on the return label is for follow-up purposes only. Those not responding will be contacted with a second request for participation.

Thank you for taking the time to participate in this important industry survey.

Sincerely,

K. Ray Bailey
President
VITA

DON H. LOVELACE

Personal Data: Date of Birth: March 15, 1934
Place of Birth: Cliffside, North Carolina
Martial Status: Married

Education: Cool Springs High School, Forest City, NC 1952
Wake Forest University, Wake Forest, North Carolina
B. S., Science and Math

Western Carolina University, Cullowhee, North Carolina
Masters, Industrial Education 1989

Isothermal Community College, Spindale, North Carolina
Associate, Electronic Engineering Technology 1989

Western Carolina University, Cullowhee, North Carolina
Education Specialist (EdS) 1994

Professional Experience: Department Chair: Electronic Engineering Technology
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Department Chair: Electronics Engineering Technology,
Electronics Servicing, and Industrial Electrical/Electronics
Asheville-Buncombe Technical Community College,
Asheville, NC 1990

Dean of Business and Industry Services, Asheville-
Buncombe Technical Community College 1994
Asheville, NC