EDUCATOR-INDUSTRY ON-SITE COLLABORATIVE-OBSERVATION
PROGRAM: A DESCRIPTIVE CASE STUDY

by

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has been approved

December, 1991

APPROVED:

Chairperson

Supervisory Committee

ACCEPTED:

Director of Graduate Studies
DEDICATION

TO MY WIFE
who through her love, patience and support shares in my accomplishment

TO MY CHILDREN
who through their sacrifices, allowed me to achieve this goal

TO MY PARENTS AND GRANDPARENTS
who through their unique circumstances created my desire to excel
ACKNOWLEDGEMENTS

This writer wishes to express his sincere appreciation to the many people whose cooperation and assistance have made this study possible.

A special thank you is extended to the Unified School District's Sixteen Educators who participated in this study, and who willingly gave their support and time during the five week phase of this program. Each one a true professional and committed Educator.

Deep appreciation is extended to the Electronic Company's Training and Development Department, particularly Dr. Jeremie-Hill Grey and Ms. Stephanie Connor for their expert management of this program and their personal assistance and guidance to me throughout the program.

I also want to thank Mr. Tim Niesz and Mr. Jayvee Tence from the Electronics Company Human Resource Department and Ms. Virginia Guy, Ms. Sandra Nagy and Dr. James De Gracie, members of the Unified School District's Administration, for their support and endorsement of this study.

Appreciation is extended to members of my research committee: Dr. Mark Rossman, Chairman, Dr. Sherwin L. Snyder and Dr. Linda Smith for their continuous guidance, support and trust throughout my graduate program.

Finally, love and gratitude to my wife, Michelle, for her assistance, critique of the manuscript, patience, understanding and advice while sharing in all the trials and tribulations accompanying this research study.
This study was designed to describe changes that may occur in various educators' perceptions about industry and, those changes that may be planned for in the educators' curriculum, classroom behavior or instructional strategy as a result of being a participant in a educator-industry on-site observation and collaboration program. The educators represented various Elementary, Secondary, Special Education, Science, Non-Science and Counselor Education content area specialities. This "Program" was designed as a five week summer orientation to a High Technology Electronics Company, placing educators with various specialities, in critical business facilities throughout a particular company, and supplementing exposure with technical training. The program consisted of three phases.

The first phase involved General Orientation to the Industry, wherein the educators were introduced to the industry's goals, philosophy, and culture. The educators learned about the manufacturing environment, the selection and hiring process, and current and future skill requirements for entry-level positions. Company provided speakers provided an overview of the company's training and educational function. In addition, the educators received basic technical training, classes on Electronic Technology and Continuous Improvement Methodology. During the second phase, Job Shadowing, the educators spent time in individual departments, including engineering, manufacturing, information systems and facilities. During this time they met employees at a variety of levels in their assigned departments. They were provided with hands-on opportunities to observe and participate in evaluating minimal levels of education and training required of the entry-level employee to adequately perform his or her job duties and responsibilities at the work site. The third phase of the program involved results. The educators summarized their experiences and made a series of recommendations to two Management groups regarding how each could most effectively aid rapid improvement of student's academic skills prior to entering the workforce.

Recommendation to the unified school district included adopting Continuous
Improvement Methodology and Total Customer Satisfaction philosophies. Adopting these would better enable the schools to assess needs and plan for specific, measurable changes, by providing a common terminology and a format for implementing change.

This program has been nominated for the National Alliance of Business to be recognized as partnership program of the year. A video documentary has been created for the program so it can be adopted in other areas of the company. The program may serve as a model for school projects within other divisions throughout the company.
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CHAPTER 1
THE PROBLEM

Introduction to the Study

This chapter is concerned with the problem of the study. Specifically, the chapter will present the background of the problem, the statement of the problem, purpose of the study, rationale and theoretical bases for the study, definition of terms, assumptions and limitations of the study, and the general organization of the remainder of the study.

Background of the Study

The ability of public education to adequately prepare students to acquire and succeed in high-tech occupations continues to be one of the most serious concerns of the 1990's. For the most part, entry level workers must rely on the public education system to teach them the basic communication and critical thinking skills they need to keep up with a rapidly changing workplace. Unfortunately, the public education system has not been successful in fulfilling this task as documented in numerous national and state reports on the topic of "workforce readiness" published during the 1980's. Some of these reports include: Workforce 2000 (1987), the Hudson Institute; Building a Quality Workforce (1988), published as a joint initiative by the U.S. Departments of Labor, Education and Commerce; and Labor Force 2000 (1989), the Allstate Forum.

As a result of the criticism of public school system performance, schools and businesses have begun to develop "partnerships" to find ways and means to reverse this negative trend and improve the quality and skills of the student entering the workforce. The need for partnerships is further documented by industry in its need to provide remedial instruction to entry-level workers, as a result of a decrease in the number of qualified high school graduates. Most reports conclude that greater cooperation between schools and industry is essential if significant improvement is to be made in the qualifications of entry-level workers. Collaborations and partnerships must be formed in greater numbers. With attitudinal "buy-in", potent education-industry partnerships and collaborations are possible. With such partnerships, there is hope for a shared vision and a common solution.
The alternative is the status quo: a continued decrease in America's competitive edge.

What can business offer education? Clearly it can identify the changing requirements in the workplace as well as reasonable expectations. It can provide input on skill-building for educators and students alike, without attempting to impose a specific curriculum. It will not be a matter of simply submitting a list calling for computer literacy to this level or that. Rather it will be: Here's what we need. What can you give these kids to suit our requirements? And how can we help? (Labor Force 2000 1989, 61).

One such collaborative partnership was developed between a High-Technology Electronics Company in the Phoenix, Arizona metropolitan area, and a large unified public school district, also located in the Phoenix, Arizona metropolitan area. This collaborative partnership was in response to the above listed concerns about the quality of entry-level workers newly hired by this high-technology electronics company during the past five years. The Company human resource department statistics indicate that greater than 40% of entry-level job applicants do not score favorably on the Company's internally developed Basic Adult Testing Battery (B. A.T. B.). This test consists of basic reading, mathematics, and object association skills administered to perspective new employees entering the workforce. This means that almost one-half of all new hires require remedial training in the basic skills (e.g. math, reading, writing, communication, and interpersonal skills) in order to successfully perform their job duties and responsibilities.

Statement of the Problem

The public school system has been largely unsuccessful in adequately preparing students with the basic skills required by a high technology electronic industry, located in the Phoenix, Arizona metropolitan area. Potential employees must possess these basic skills to successfully compete in the workforce, and are to effectively perform diverse job duties and responsibilities that are required in this highly technical and continually changing work environment. As a result of the lack of proficiency of many students regarding basic skills performance, this high technology industry must provide remedial training in the basic skills (e.g. math, reading, and communication) to more than one-half of all new employees in order for the employees to successfully perform their job duties and responsibilities.
Purpose of the Study

The purpose of the study was to describe changes that may occur in various Educators' perceptions about industry and, those changes may be planned for in the Educators' curriculum, classroom behavior or instructional strategy as a result of being a participant in the educator-industry on-site observation and collaboration program. More Specifically, Educators from various content area specialities (See Appendix A), that is, Elementary, Secondary, Special Education, Science, Non-Science and Counseling Education were provided with hands-on opportunities to observe and participate in evaluating what minimal levels of education and training are required of the entry-level employee to adequately perform his or her job duties and responsibilities at the real life work site. In addition, the educators had an opportunity to interface with industry supervisor/trainers, whereby both educators and supervisor/trainers collaboratively worked side-by-side to become better informed and aware of the education and training issues of mutual concern.

As stated previously, there exists a emerging need to adequately prepare students for entry into the workforce with skills required to successfully perform their job responsibilities. It is the purpose of this educator-industry on-site collaboration program to provide Educators with the insight and awareness needed to make a difference in the classroom, as they "spread the word" regarding their industry experiences with other educators and schools within the Unified School District. However, the primary purpose of the educator-industry on-site program is that through collaboration and observation at a high-technology electronics company, Educators change their perceptions, behaviors, curriculum or instructional strategies in such a way that a measurable impact is made on preparing entry-level employees for jobs in industry.

Rationale and Theoretical Bases for the Study

Most Educators continually strive to improve their ability to provide current and relevant curriculum to their students. This type of professional development may take various forms, such as: formal education, professional and speciality journal review, workshops, seminars and other forms of in-service education. Regardless of the means for professional development or in-service education, the following goals remain clear: (1) to provide educators with knowledge, skills, and techniques related to
teaching and learning; (2) create an environment conducive to teaching and learning; (3) improve student learning by preparing motivating lessons, redesigning courses, and making instruction systematic and effective.

One form of professional development utilized by educators to achieve these goals is a school-industry partnership. It has been estimated that business-industry spends $60 billion per year on employee education programs (Justiz & Kameen 1986, 103). Because the competitive environment in which it operates is constantly changing, and because it has the resources to do so, business-industry is on constant "alert status" to improve effectiveness and efficiency. As a result, its training practices frequently vary significantly from those found in traditional classrooms.

Business/industry frequently trains its employees to improve or update current skills, teach new or existing customs, and foster better communications. Secondly, business-industry believes that all employees in its classes are capable of learning, and are therefore able to increase company productivity.

The education system has a different perspective. Students in the classroom are not motivated by monetary rewards as are employees in business and industry. Additionally, public education has the much broader responsibility to provide the best education possible to all students regardless of who the student is or their level of motivation. Therefore, education and business-industry must work together toward a common goal: the future employability to today's students. To this end, a state-of-the-art labor force can be taught only by state-of-the-art teachers who are prepared by state-of-the-art education. By sharing knowledge and experiences, business and industry can be a resourceful partner in the professional development of teachers.

As potential mentors, business/industry people must center their dialogue with educators on both curriculum and instructional methods...many teachers spend most of their lives either learning or teaching within the education community. Their view is, to a large degree, limited by what they see in a classroom. Broadening their perspectives and the skills of teachers is essential to success of our society (Labor Force 2000 1989, 63).
Operational Definition of Terms

Case Study-the study is an intensive descriptive and detailed analysis of a phenomenon or social unit such as an individual, group, institution, or community. In contrast to surveying a few variables across a large number of units, a case study tends to be concerned with investigating many, if not all, variables in a single unit. By concentrating upon a single phenomenon or entity ("the case"), this approach seeks to uncover the interplay of factors that is characteristic of the phenomenon (Merriam & Simpson, 1989).

Educators-individuals who are full time employees of the unified school district, and have responsibilities as elementary, secondary, special education, counseling and psychology within this school district. These individuals are participating in the educator-industry on-site observation-collaboration program.

Supervisor/Trainer-individuals who are full time employees of the high-technology electronics company. These individuals have job responsibilities to provide the training of new and current employees with the knowledge and skills required to successfully perform the employees' job responsibilities. The supervisor/trainers were chosen by the Industry (Company) because they currently have their own children in public schools, and can be paired with the educators who are teaching or responsible for classroom grade levels similar to the trainer's children. Also, the supervisor/trainers are considered to be a natural counterpart to the educators, whereby a collaborative environment can more easily occur.

Educator-Industry On-Site Observation-Collaborative Program—a professional development collaboration program which places educators in an on-site, five week, first hand field experience at a large high-technology electronic company for the purpose of observing and participating in various personnel training, manufacturing, computer system and business related jobs in order to directly assess the knowledge and skills required to perform those jobs successfully.

Professional Development—efforts to promote, by first hand field experience, the professional growth and development of educators through participation in the Educator-Industry On-Site Program.

Naturalistic Inquiry—is an alternative to the conventional methods of investigation. As stated by Guba (cited in Merriam and Simpson, 1989, 19), those studies that have as their goal the discovery of theory rather than verification are often called "qualitative" or "naturalistic" studies. Based in phenomenology, rather than logical positivism, this type of study differs from theory-testing approaches on two
dimensions: (1) "the amount of manipulation of conditions antecedent to the inquiry" and (2) "the degree of constraint imposed on outputs" of the inquiry. Because there is no theory by which to direct the study and predict the results, there is little or no manipulation of the phenomenon and no predicted outcomes.

Collaboration—to work together in an intellectual endeavor; to cooperate with an agency or instrumentality with which one is not immediately connected (Webster's New Collegiate Dictionary, 1981, 217).

Job Shadowing—educator observation and experiential participation in the industry on-site program under the guidance (follow and observe) of the supervisor/trainers as they perform their various job duties and responsibilities.

In-Service—"any professional development activity that a teacher undertakes singly or with other teachers after receiving his or her initial teaching certificate and after beginning professional practice" (Edelfelt & Johnson, 1975, 5).

Industry Program Director—the Company's Human Resource Individual responsible to coordinate the overall Educator-Industry program and be the primary interface between the Electronics Company and the Unified School District.

Industry Program Manager—the Company's Human Resource Individual responsible for the daily coordination, supervision and direct interface between the Educators and all other internal Company employees involved in the Educator-Industry Program.

Assumptions and Limitations

This research was limited to this case study of individuals and respondents directly involved in the educator-industry on-site observation-collaboration program involving this electronic company and this unified school district both located in the Phoenix, Arizona metropolitan area. An assumption was made that this researcher will strive to maintain objectivity throughout the study. However, literature (Kline 1981, 89) has shown that researcher observations are subjective, and subject to researcher bias. The case study narrative, included at the end of the study, is not transferable to a general population. Results lack predictive power to generalize to other studies or other educator-industry on-site observation-collaboration programs. This case study can only result in forming suggestive relationships between this "case" and another similarly designed case study.
Organization of the Remainder of the Study

The organization of the remainder of this study will follow the formal format as described by Merriam and Simpson (1989).

Chapter II - The Literature review
   Introduction and organizational structure of the chapter
   Review of pertinent literature as related to key topics in the case study
   Conceptual/Theoretical framework for the Study

Chapter III - Methodology
   Description of Methodology Selected
   Design of the Study
   Sample and Population chosen for the Study
   Instrumentation selected for the Study
   Data Collection and Data Analysis procedures selected for the Study

Chapter IV - Presentation and Analysis of the Data
   Framework of the Educator-Industry Collaborative-Observation Program
   Chronology of the Five Week Educator-Industry Program
   Summary of the Educator-Industry Program

Chapter V - Conclusions, Discussions, Recommendations
   Introduction
   Conclusions
   Discussions
   Recommendations
Chapter II

THE LITERATURE REVIEW

Introduction

The review of the literature documents research generally inclusive of the overall category of school-business-industry partnerships that have developed in various forms throughout the 1950's, 1960's and 1970's with particular focus from 1980 to the present. The literature review included research relating to global business competition and educational crisis; cost/benefit analysis: business and schools working together; school-business partnerships; professional development of the educator; and school and business collaboration.

Global Business Competition and Educational Crisis

It is widely evident that a crisis exists today in kindergarten-through-12th grade (K-12) education, and the situation is deteriorating. In 1986, Justiz and Kameen found that their a million dropouts a year produced by the country's secondary schools. Achievements of students continue to decline despite increases in funding for education. The American work force is rapidly losing its world-class status. If America falls behind Japan and Europe, as some people forecast, every individual in this country will lose. Specifically, in the Phoenix, Arizona metropolitan area, test scores on standardized tests indicate that the average student is at or below an eighth grade level in the basic skills (Arizona State Department of Education Report, 1990). Also, test scores from this high-technology electronics company's human resource department show that greater than forty percent of applicants for entry level positions do not score favorably on the Company's internally developed and administered Basic Adult Test Battery (B.A.T. B.); a test which measures basic skills such as reading, mathematics and operational skills, administered to all perspective employees from 1987-1991.

Perhaps of greater concern to the U. S. education crisis is the dropout problem. Twenty-five percent of America's children entering the ninth grade--more than 50 percent in some large cities--will fail to complete their high school education (Justiz and Kameen 1986). This is comparable to an industrial company losing 50 percent of its productive output or a hospital losing the battle for lives of more than half its patients.
The nation's secondary schools seem to be losing the battle for our children --- that of productive and positive lives. Thus an economic problem of the near future will be a shortage, not of jobs, but of skilled workers. Business and industry have been drawn into the area of the nation's education system in desperation and concern about their own economic survival as a result. Justiz and Kameen (1986, 106) have stated:

As the only social institution into which all our youth are drawn for prolonged exposure, the school is unquestionably the chief battleground on which today's largely unchecked unemployment-poverty threat to human dignity and economic growth can be fought.

Cost /Benefit Analysis: Business and Schools working together

One approach to improving the education system has been the evolution of school-business partnerships. Such cooperative efforts have benefits for both "partners."

Companies benefit from school/business partnerships in many ways, including:

1. Greater consumer understanding of the company's products, services and policies;
2. More stability in neighborhoods where company's produce or sell;
3. Improved public image through direct involvement in socially responsible activities;
4. Fewer problems with employee job training, equal employment opportunities, and readiness for entry-level jobs;
5. Improved morale in the workplace;

Schools have even broader benefits from partnerships:

1. New resources, ideas, and commitments with which to improve schools;
2. A broader base of support from influential leaders and the public;
3. Improvement in morale as teachers experience a closer relationship with the community and a new dimension of community support;
4. Greater opportunities for students to learn about careers, the economy, and real-world applications for academic subjects;
5. Raising students' aspirations through interaction with adults who serve as positive career role models;
6. Job experiences and opportunities for students;
(7) Support for appropriate education legislation;
(8) Help on management problems;
(9) Use of business facilities and personnel for instruction (Oakes & Thomas 1991).

However, will business get enough return on money spent? Will the return on the business investment be immediate enough or tangible enough to keep them interested in the schools? Funds are flowing from the private sector to public school districts in ever-increasing amounts. In 1988, the ARCO Foundation gave $11.5 million to pre-college programs. The Amoco Foundation in 1989 gave 15 percent of its $22.5 million contributions to pre-college education and BellSouth Foundation announced in September of 1988, that it would give $1.63 million. Two-thirds of 130 major corporations list primary and secondary education as their top concerns (MacDowell, 1989, 8).

The preliminary answers are not encouraging. For example, the Boston Compact, (Farrar and Cipollone, 1988) which aims to decrease the dropout rate includes almost all of Boston's major employers. These businesses help tutor students, provide summer employment, make in-class presentations, provide mentors for at-risk students, and are "on-call" to meet the needs of the Boston schools. Unfortunately, even though the Compact placed hundreds of graduates in jobs and there were modest gains in attendance, "studies found that 43 percent of ninth graders in Boston schools leave before graduation" (The Boston Globe, February 10,1988, 5). This $15 million budget resulted in one positive outcome--academic achievement has risen slightly, but most students remained well below the national norms in reading and mathematics. Could that $15 million have been spent more effectively to improve the schools?

School-business partnerships can be developed around a number of guidelines in order to attain greater benefit for money spent. MacDowell (1989) includes these:

1) Focus on a part of the curriculum or a topic that is of interest to business, aiming to change the entire curriculum can end up changing nothing;
2) Implement a program that is objective and balanced with goals that are compatible with both the school and the business;
3) Concentrate on teacher development as well as on materials. It is best to design the program so that the teachers expand their knowledge of the subject matter and explore new ways to teach it;
4) Make sure that all parties agree upon the objectives of the program and ensure that those objectives can be measured.
By linking subject matter to business, community values, and national aspirations, partnerships can stimulate student interest in practically all subjects. These efforts often produce results that are measurable and relatively immediate. Discipline-based partnerships offer business a more immediate return on their investment, for these partnerships enhance students' skills in communication, math, and decision making—the same areas where new employees presently are weak. In addition, such partnerships enable schools to improve specific areas of the curriculum that may be relatively weak. In short, partnerships between business and schools can dramatically improve education when they focus on the instructional core of education (Gross 1988).

What are School-Business Partnerships?

Partnerships are defined as "cooperative efforts between a school and the private sector to improve the quality of education" by the U. S. Department of Education (cited in Merenda, 1989, 4).

Partnerships in education are not new. As far back as 1956, directors of school volunteer programs were placing lay citizens in the classroom to tutor children in reading and to work with children whose native language was not English. These organized efforts to recruit, train, and place volunteers began in New York City with a grant from the Ford Foundation to the Public Education Association, a citizen advocacy group (Merenda 1989). In the late 1950's and 1960's these volunteers were primarily mothers. During the 1970's, with more women entering the job market, directors of volunteer programs began to recruit retirees, college students, and people from local businesses. In 1982, there were 4.3 million citizens providing volunteer services on a regular basis. Of these 4.3 million, 18 percent were business employees (Annual Report of the National School Volunteer Program, 1983).

These early volunteer efforts were followed by Adopt-a School/Adopt-a Business programs. Both were forerunners to the "partnership movement" where such terms as "collaboration", "cooperative arrangements", "networking", or "partnerships" were descriptive terms for a new phenomenon at work (Konopnicki 1989). Since 1983, the number of schools reporting partnerships has risen from 17 to 40 percent for all schools. Today there are more than 150,000 education partnerships operating in the nation's schools, and number is still growing (U.S. Department of Education, 1989).

Partners range from individuals or small companies to large multinational corporations or government agencies. Just over half of all partnerships reported in
1987-88 were sponsored by the private sector. These included banks, fast-food restaurants, insurance companies, bakeries, law firms, dry cleaners, professional basketball teams, publishing companies, manufacturers, oil companies, civic and service clubs, and many individual volunteers.

The structure of partnerships is also varied, one school and one partner, one partner nationwide, a group of partners community wide, or a group of partners nationwide (Merenda 1989). The most common form of partnership is probably the use of volunteers from corporations who serve in classrooms under the supervision of paid educational staff. The goals of partnership programs include everything from reinforcing classroom instruction to improving employment skills, preventing drug abuse, providing internships for teachers, and providing summer employment opportunities for gifted or at-risk youth.

In June, 1984 the President's Advisory Council on Private Sector Initiatives sponsored the first National Symposium on Partnerships in Education. Approximately 200 educators and business people attended. By the end of the third Symposium in 1986, attendance had almost quadrupled and participants represented 42 States and Canada. By 1988 the symposium was institutionalized under the newly formed National Association of Partners in Education (U. S. Department of Education, 1989).

"The partnership movement," stated O' Connell (1985, 6), "holds the promise of improving education by extending the boundaries of the school and of building better relationships between schools and businesses." The National Alliance of Business through its defining of involvement levels, extends these boundaries even further: Level 1. Policy. Policy partnerships are collaborative among businesses, schools, and public officials that shape the public and political debate about schools, bring about substantive changes in legislation or governance, and affect the overall direction of the educational system. Level 2. Partners in Systemic Educational Improvements. Business people, education officials, and community leaders identify reforms needed in the educational system and then work over the long term to establish these reforms.

Level 3. Partners in Management. Management assistance partnerships provide school officials with management support and business expertise in areas such as, increasing teacher autonomy, labor-management relations, purchasing efficiencies, plant and equipment issues, strategic planning, management information systems, organization development, performance standards, productivity, and public relations. Level 4. Partners in Teacher Training and Development. Businesses involved in teacher and counselor training and professional development provide opportunities to update,
upgrade, or maintain skills, or to learn more about the labor market in the community. Level 5. *Partners in the Classroom*. Classroom partners are volunteers who bring their business or occupational expertise directly into the classroom or bring the class to the business (Executive Summary of the National Alliance of Business 1987).

The 1980 census revealed that 23 million 18-year-olds were functionally illiterate; an additional 46 million were found to be only marginally literate (Wynne 1986). The decline in the nation's education has an impact far beyond the school or the boundaries of local communities. Economic pressure on business and industry has led Americans to identify the cause-and-effect relationship between education and prosperity in a world that is constantly changing. We no longer lead the world solely by the momentum of the industrial revolution and by the generations that followed; America must compete for the market.

**Professional Development of the Educator**

Within the literature various terms are used to describe the professional development activity known as "in-service." For the purpose of this review, the term in-service education will be used. Inservice education is defined as "any professional development activity that a teacher undertakes singly or with other teachers after receiving his or her initial teaching certificate and after beginning professional practice" (Edelfelt and Johnson 1975, 5).

Inservice education programs are diverse in format and can embrace a number of purposes. An analysis of in-service education practice reveals that this education is grounded in fundamental concepts regarding schooling, learning, teaching, and human motivations and relationships. Inservice education is usually required of teachers; the content is usually prescribed by a higher authority; and course credits are mandated (Edelfelt and Lawrence, 1975). However, with the mounting pressure to stay up to date in one's field, the educator wants to participate in his/her plans for improvement. When this is not possible, many leave the field of education (Kline, 1981). School-business partnerships which are "partners in teacher training and development" (National Alliance of Business, 1987), can offer the educator a wide variety of stimulating and educational in-service experiences.

As noted by Wynne (1986, 95), "while most school-business partnerships have a student orientation, some corporations believe that teachers are the key to improving the education process and student outcomes." Three goals, as defined by Gaff (1975) as primary to inservice education and the effort to improve the quality of the educational
system, are:

(1) Educator development--educators acquire knowledge, skills, and techniques to teaching and learning;
(2) Instructional development--educators attempt to improve student learning by preparing learning materials, redesigning courses and making instruction systematic;
(3) Organizational development--educators create an effective environment for teaching and learning, improving interpersonal relationships, enhancing team functioning and creating policies that support teaching and learning.

As previously outlined (see above under "What are school-business partnerships?") by the National Alliance of Business (1987), five levels of involvement were reviewed. These five levels serve to meet the above stated goals of in-service education and define the various types or approaches to school-business partnerships.

In general, education is concerned with a "broad perspective," a conceptual base framing information and solving traditional educational problems. Staff development builds on that philosophical foundation. Business, on the other hand, focuses on the "how to" of a specific need or on issues that address skills necessary for increased employee productivity or quality of life (Labor Force 2000, 1989). How these two areas of educator continuing education and business interest can come together for the benefit of both, involves collaboration and the management of mutual, but sometimes differing needs.

School and Business Collaboration

Although the merits of collaboration seem apparent, achieving it can be difficult. Gleaser (cited in Kline 1981, 23), stated the following:

[Collaboration], although universally applauded in the abstract, has seen little practical application, probably because it requires much from both individuals and institutions... The variables institutional and individual relationships are so numerous that collaboration may appear to be near an impossible task. Yet, in spite of the seeming barriers to achieving real collaboration, the times call for it.
The concerns frequently echo the following: Business says that public education have little focus. Educators argue that business can not place simplistic solutions on complex learning problems. Each perspective reflects a lack of understanding of the other (Mann 1987).

While both systems possess similar internal views, their external views may vary significantly. Business knows that in order to survive, it must center all of its efforts on quality and the customer. Traditionally, educational systems seldom look upon society as customers of their "products."

However, the needs of business and the purpose of education are inextricably tied. Business leaders and educators need to link their approaches more effectively for an enduring exchange of ideas and cooperative effort to address this issue and ultimately improve the entire educational system. Since an institution's strength lies in its human resources, improving skills, knowledge and the quality of educators is in the best interest of both parties. This cooperative effort can only work if business and education build a framework of common understanding and shared goals.

The challenge is clear. Ann Dore McLaughlin, former U. S. Secretary of Labor (cited in Labor Force 2000 1989, 59), defines it as "the need to boost the skills of American workers, maximize the potential of all our citizens, and adjust to the rapid change transforming the traditional workplace of Americans. We are headed for a significant--and expanding and expensive -- skills gap. This must be narrowed." One way is through on-going and collaborative school-business partnerships.
Chapter III
RESEARCH METHODOLOGY

Introduction

The purpose of this study was to describe changes that may occur in various educator's perceptions about industry, and those changes may be planned for in the educator's curriculum, classroom behavior or instructional strategy as a result of being a participant in the educator-industry on-site observation and collaboration program.

More specifically, educators from various content specialities, (e.g. Elementary, Secondary, Special Education, Science, Non-Science and Counseling Education) were provided with hands-on opportunities to observe and participate in evaluating minimum levels of education and training required of the entry-level employee to adequately perform his or her job duties and responsibilities at the real life work site. In addition, the educators will have an opportunity to interface with the various Industry Supervisor/Trainers. Whereby, both educators and supervisor/trainers can collaboratively work to become better informed and aware of the education and training issues each face in the education and training of a well qualified entry-level employee.

Description of Methodology

Theory may be treated and modified in the research process. In either case, it serves to guide the collection of information and the interpretation of results. Theory may also be the end result of research. It is necessary to develop the theory when (1) there is none available, in order to explain a particular phenomenon, or (2) when existing theory fails to provide an adequate or appropriate explanation. The process by which research leads to theory is an inductive one in contrast to the typical hypothetical-deductive theory (Merriam & Simpson 1989, 18).

A naturalistic inquiry paradigm using a descriptive case study methodology approach was chosen for this study. Naturalistic inquiry is an alternative to the conventional methods of investigation. As stated by Guba (cited in Merriam & Simpson 1989, 19) those studies that have as their goal the discovery of theory rather than verification are often called "qualitative" or "naturalistic" studies. Based in phenomenology, rather than logical positivism, this type of inquiry differs from theory-testing approaches on two dimensions:
(1) "the amount of manipulation of conditions antecedent to the inquiry" and (2) "the degree of constraint imposed on outputs" of the inquiry. Because there is no specific theory to direct the study and predict the results, there is little or no manipulation of the phenomenon and no predicted outcomes. The phenomenon is merely observed, and an explanatory paradigm or theory is allowed to emerge from the data itself. Once a theory has emerged, it has the status of an "a priori" or hypothetical-deductive theory and must itself be tested (Guba & Lincoln, 1981).

Another interpretation of qualitative research is from Patton (1980) who defines naturalistic inquiry as a "discovery orientated" approach which minimizes investigator manipulation of the study setting and places no prior constraint on what the outcomes of the research will be. This form of inquiry typically begins inductively; the researcher is open to whatever transpires and emerges from the data. As patterns unfold from the various data sources, the researcher focuses on verifying what has emerged and that the process becomes more deductive. As new data emerge the researcher may return to the discovery phase, followed by the verification phase. Guba (1978) describes this evolving movement from discovery to verification as a wave on which the researcher attempts to understand the real world.

As previously stated, the case study approach was selected for this study because its usefulness in identifying and describing the various patterns that emerge with regard to the collaboration of educators with the supervisor/trainers within this industry. This method was also chosen because a broad range of behaviors and events associated with a given situation can be documented, analyzed, and categorized by the researcher. This design has been described as illuminative evaluation in that its primary concern is with description and interpretation rather than measurement and prediction (Parlett & Hamilton, 1977). It focuses on gathering information rather than decision making. The principle objective is to look at a particular setting very openly to provide a total picture from beginning to the end of the study. This method is particularly useful in eliciting the personal views of individual observations, perceptions and meanings because it is the respondents who are in the best position to explain their perceptions of a given situation or event.

This is an adaptable research strategy for this problem under study. The researcher focuses on the reality of the setting under study. Parlett and Hamilton (1977) note that the task of the researcher to focus in on the setting is "to unravel it: isolate its significant features; delineate cycles of cause and effect; and comprehend
relationships between beliefs and practices, and between organizational patterns and the response of individuals" (p. 14). The strategy (Parlett & Hamilton, 1977) can be summarized in the following stages:

1. Stage one is exploratory in nature with the researcher seeking to understand the setting. The researcher begins this process by becoming immersed in the examination through observation, interviews, and document analysis during an extended time at the site. While maintaining an open mind, the researcher tries to familiarize himself with the setting as impressions emerge.

2. In stage two the examination is more focused. The researcher moves to the verification mode by checking the respondents' input to establish corroboration. Significant features, patterns, or recurring regularities of the setting under study emerge and form the basis for initial categories. Communication with respondents is more logically consistent; inquiry is more directed, systematic, and selective.

3. In the third stage the researcher seeks general principles underlying organization of the program and patterns of cause and effect derived from responses of the individuals. Again, the researcher seeks recurring regularities from various sources of data as the study progresses. He confirms or clarifies these regularities or patterns by continuously cross-checking and monitoring the data through the respondents.

These three stages are not mutually exclusive. "The transition from stage to stage, as the examination unfolds, occurs as problem areas become progressively clarified and defined" (Parlett & Hamilton 1977, 15). Because of the uniqueness of a strategy that requires no prior manipulation or intervention by the researcher, the course of the inquiry cannot be determined in advance. From the enlarged data base that begins in the first stage, the researcher is able through the various stages to reduce systematically in extent of the inquiry so as to concentrate on the recurring issues that arise through the study.

Design of the Study

The study will take the form of field work, that is the researcher is on the site where the program will occur. Selective Elementary, Secondary, Special Education
and Counselor Educator's from a large Phoenix, Arizona metropolitan area unified public school district will be pared up with selected manufacturing, business, facilities, product design-development engineering, computer information systems, and various Industrial Supervisor/Trainers from a large high-technology electronics company, also located in the Phoenix, Arizona metropolitan area, in a collaborative educator-industry on-site observation program.

**Sample and Population**

Sixteen educators with various teaching content area specialities (grade level), teaching experience and counseling responsibilities (Table-1) were matched with sixteen Industrial Supervisor/Trainers (Table-2) that have working responsibilities within the various manufacturing, business, facilities, engineering and computer information system areas throughout the company. The rationale for matching up Educators with the different industrial areas of responsibility, is to allow the Educator with specific content specialties or interests to be assigned to the industrial area which will allow them to shadow individuals with similar interests or responsibility for operations, education and training and the daily activities of that specific area. This being the case, the Educators and Supervisor/Trainers will have the opportunity to interface on a daily basis, and be located in a receptive environment, hence a collaborative relationship to more easily develop throughout the program.

**Instrumentation**

The primary instruments used included: Interviews, Observation, Educator Daily Journals and Researchers' Private Diary.

**Voluntary Interviews**-the researcher was looking for responses from the respondents that are similar, different or diverse as they observe and participate throughout the program.

**Observations**-the researcher observed the Educators actions, reactions, verbal and non-verbal communications throughout the program.

**Voluntary Educator Journals**-the educators collected and documented in their journals the who, what, where, when, how, and why experiences on a daily basis. The information contained within the journals was given to the researcher at the end of each week for descriptive analysis. The educators used the journals as a reference, in order to document their observations and experiences for use when they return to the school district.

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<tr>
<th>RESPONDENT</th>
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<th>GRADE LEVEL</th>
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Researcher's Diary—the diary represented the personal views, feelings, opinions, perceptions, mistakes, ideas and problems that arose throughout the program.

Data Collection and Analysis

In this study, the researcher, a nonparticipant observer, collected the data using observation, semi-structured, open-ended interviews, and an examination of journals, institutional and industrial documents. The interviews included all Educators, all Supervisor/Trainers and selective supporting School Administration and Industrial Management as appropriate to the qualitative holistic nature of the study. Initial interview questions were derived from the initial respondents' program application resume (Figure-1). As the data was gathered the questions were refined by the patterns that emerged during the course of the interview. Each interview was audio-cassette tape recorded (with permission from each respondent) so a precise record of responses to questions, comments, and reactions while permitting the researcher to direct his attention to the conversation and other non-verbal cues of the respondent. Transcripts were made of the interviews, observations, along with an analysis of the journals were used to identify categories and patterns which could indicate regularities such as commonalties and differences that seem important in understanding the situation. These categories were built upon consistently with each succeeding interview and journal review continually looking for the patterns and themes emerging from the data. The data was coded for each respondent and used for the final analysis and assessment in the case study. Also, each respondent wrote a summary report at the conclusion of the five week program. The purpose of this report was for the educator to document their perceptions, changes in behavior, curriculum or instructional strategy to be implemented after returning to the school district. The researcher also sent out a School/Industry Program Assessment Questionnaire to each of the sixteen educators at the end of the program for use in their overall evaluation of the educator-industry on-site collaborative-observation program.

The analysis of all information and data collected from interviews, observations, Educator's daily journals, Educator's final program assessment questionnaire, as well as the Researchers private diary was used to describe the educator-industry on-site observation-collaboration program in the following ways:
FIGURE 1
Example of the Unified School District Educator Application to participate in the Educator-Industry On-Site Observation Collaboration Program.

(Note: This researcher will use questions from this application during interviews.)

Name-

Name and address of school where you are currently teaching-

Highest degree held-

Content area speciality-

Number of years teaching experience-

List non-teaching/education work experience-

What oral presentation experience do you have outside the classroom?

What image and work relationship would you establish at the industry site during the program?

How will this program benefit you personally?

What impact do you foresee this experience will have on your students when you return to the school?

What can you contribute to the success of this program?

What experience do you possess that will strengthen you participation in this program?

How will this program help you to increase your ability to perform your job in the school system?

Do you have any general information or comments you wish to share with the selection committee?
• Changes in **perception/awareness** on the part of educators in the role they personally play in the preparation of students with the skills required for successful employment in high-technology occupations.

• **Commitment** to make changes in behaviors, curriculum and instructional strategies that will provide the skills, identified through their participation in the educator-industry program, that can be incorporated into the teaching of essential concepts required for success in this rapidly changing world of technology.

• Assessed the **impact** on the educators prior to returning to the school district, in reference to, perceptions, behaviors, curriculum changes and their plans for "spreading the word about their experience in industry" with other educators in the unified school district.

• Assessed the level of **collaboration** between the educators and supervisor/trainers as they worked side-by-side to become better informed and aware of the education and training issues each faced in the education and training of a well qualified entry employees.
CHAPTER IV
PRESENTATION AND ANALYSIS OF THE DATA

Introduction

This chapter presents the findings of an Educator-Industry On-Site Collaborative-Observation Program. Specifically, the purpose of this study was to describe changes that may occur in various educator's perceptions about industry, and those changes may be planned for in the educator's curriculum, classroom behavior or instructional strategy as a result of being a participant in the educator-industry on-site collaborative-observation program.

The chapter presents the findings from an inductive comparative analysis of the data. First a narrative framework of the educator-industry program is presented. This is followed by a chronology of the five-week program time period, whereby the educator's observations, collaboration, and hands-on activities is described. Finally, a portrayal of the impact of the educator-industry program is presented in a thematic format, e.g. Education/Industry Collaboration, Components for Student Success and the Educator's Summation and Recommendations.

Framework of the Educator-Industry On-Site Collaborative-Observation Program.

The Phoenix metropolitan area is located in Maricopa County, the largest County in the State, with a population of 2,099,789. Phoenix, the Capital of Arizona, and the seven closely linked surrounding cities of Chandler, Mesa, Gilbert, Glendale, Paradise Valley, Tempe, and Scottsdale which make up this metropolitan area is located near the center of the State with a population of around 1,500,000, covering an area of 403 square miles (Phillips 1991).

High-technology manufacturing, agriculture, tourism, utilities, various service industries, the State Government and Arizona State University comprise the majority of employers.

The large high technology electronics company selected for this study employs over 25,000 professional and non-professionals at manufacturing facilities located in four of the eight cities included in the Phoenix metropolitan area.

The unified public school system contained within the Phoenix metropolitan area consists of 302 Elementary and Secondary Schools.
The student population in these schools are 298,040 and growing. The Phoenix area unified public school district included in this study is one of the largest, educating over 61,917 students in 1989/90. The district employs 3,104 teachers with a typical student/teacher ratio of approximately 28 to 1 (Unified Public School District 1991).

The sixteen educators selected to participate in the Educator-Industry On-Site Collaborative Observation Program were given a five week schedule to follow consisting of the following components:

**Week One:**
- Introduction/overview of the company’s policies, practices and procedures
- Review of basic, supervisory and engineering skills required for employment
- Introductory electronic manufacturing training class for the educators
- Tours of the manufacturing sites and assignment to their respective supervisor/trainers

**Week Two-Three-Four:**
- Job shadow various manufacturing, business, facilities, product design-development engineering, and computer information systems personnel throughout the company. (Job Shadowing Goals-Observe, Interview, Discuss, Relate, Understand and Assimilate)

**Week Five:**
- Summarize observations, perceptions, and experiences and develop educators recommendations
- Presentation to the school district administration and industry management and recommend how each group could most effectively aid rapid improvement to the schools.

A Chronology of the five week program, and a description of the educator’s observations, collaboration, and activities are presented below.

**WEEK ONE**

- Educators’ introduction/overview to the company’s policies, practices and procedures:

The educators started off their first week on-site with presentations by various company management and human resource personnel.
The first presentation was given by the Company Vice-President and General Manager, who personally welcomed each educator and provided a brief history of the company and its rapid growth. This rapid growth resulted in hiring many individuals with minimal skills to fill entry level positions. This situation created a pool of unacceptable employees and a high turn-over rate. In an attempt to improve the basic skill level of existing employees and reduce the level of employee turn-over, the company implemented an in-house training program. This program has been successful, but is very costly and time consuming. Therefore, it was hoped that through collaboration programs with education and industry, improvements can be made in the quality of individuals entering the workforce in the near future. It was felt that the need for better trained employees was necessary in for this electronics company to remain competitive in the world wide marketplace currently dominated by the Japanese who are able to produce more efficiently than most U. S. Company's.

The General Manager also discussed the company's fundamental objective of **TOTAL CUSTOMER SATISFACTION** and the company's **Key Beliefs** (How We Will Always Act): Constant Respect for People, and Uncompromising Integrity; **Key Goals** (What We Must Accomplish): Increased market share-Best-in-class technology, manufacturing and people-Superior financial results; **Key Initiatives** (How We Will Do It): Six-sigma-total cycle time reduction-product and manufacturing leadership-profit improvement-participative management within and cooperation between organizations. He also went on to explain how the Company's fundamental objectives, key beliefs, and key initiatives are used to accomplish world class (Six-Sigma) Quality and Total Customer Satisfaction goals. Six-Sigma is a statistical term which translates into no more than 3.4 defects per million in the products sold to the customer (Near perfect products). Upon hearing these comments, one of the Respondents E-5 (Elementary-1st-6th) stated in her journal:

How did this company get the employees to strive for 6 sigma standards of accuracy without sounding ruthless? If I expected 99.9999998% accuracy for acceptable school work, many parents would label it "to harsh" and transfer their children to other classrooms. However, if standards were raised nationwide, they'd have to accept it.

The second person to address the educators was the Manager of Personnel. His primary focus was the company's vision to become the finest company in the world.

The personnel manager stated that to become the finest company in the world, it requires that every employee take personal responsibility in accomplishing the
company's fundamental objective of Total Customer Satisfaction. This is necessary because the electronics industry is the second most competitive marketplace in the world just behind women's make up/cosmetics. He also stated that people were the key to success. The strategies of participative management, constant research and development, the use of high performance "TEAMS" to identify problems and implement solutions (institutional change) and pay for performance is an on-going process and part of the everyday culture throughout the company. A number of Respondents, E-15 (Sr. High-Science), E-6 (Sr. High-Non-Science) and E-13 (Jr. High-Science), commented in their journals that they were already being challenged to consider a more proactive use of team work and problem solving activities in their classrooms starting with the new school year. Respondent E-12 (Elementary-1st-6th) summed up this situation best in her journal entry noting:

Much to my surprise, by the end of this presentation I had already been challenged to make a change in my teaching methods. This manager spoke of some of the deficiencies in the work force today. He emphasized the importance of teamwork at the company. One of the teaching styles that can address this problem is Cooperative Learning. Cooperative Learning reverses the idea that each child must do their own work without the help of a neighbor. It not only encourages collaboration but requires it. I have been trained in this technique but have not implemented it to its fullest form. I feel that by using cooperative learning at an early age the students become comfortable with the idea of relying on each other for solutions to problems and supporting each other through the problem solving process.

• Review of basic, supervisory and engineering skills required for employment:

   A presentation on the Quality of Hire, and the Hiring process was given by the Manager of Recruiting. The information presented here related to the company's "Quality of Hire Program." The philosophy of the "Quality of Hire Program" is that by hiring the best people possible, our people will become the primary force creating the distinct advantage to overcome the competition and excel in the marketplace. This program is used when hiring new employees for entry level direct labor positions out of High School, and professional level employees from selective Universities. Professional employees are generally recruited from the top Universities such as: MIT, Stanford, Cal-Berkley, Cornell, Univ. of Illinois, Georgia Tech. Univ. of Texas, R.I.T. Purdue and Univ. of Arizona. The company recruits primarily Engineering graduates, but once hired they may move into a variety of occupations such as Marketing, Sales, Materiels, Manufacturing as well as traditional Engineering assignments. The candidates selected for hiring typically possess a Grade Point Average in the range of 3.4-3.8 and then
assigned to a one year rotational training before placement in their permanent job responsibility.

The entry level direct labor applicants are required to pass an extensive screening process which includes the following elements:

- Four-hour multiple choice test
- Multiple interviews with recruiters and hiring managers
- Physical dexterity assessment
- Mandatory drug testing
- Departmental tours and job overview
- Background investigation
- Assessment and evaluation of previous experience

Both the Professional and Direct labor applicants are required to pass all these screening tests with the exception of the professional applicants who are not required to take the multiple choice test. The Manager of Recruiting commented that less than 50% of the entry level direct labor applicants passed the written 8th-9th grade level reading and math test, and that only 4 out of 100 direct labor applicants successfully passed all the components in the screening process required of those hired by the company.

The next presenter was an Engineering Manager from one of the Advanced Manufacturing Departments discussing the qualities looked for in engineering skills:

- TEAMWORK is the core skill. The majority of engineering work occurs in teams. Each individual contributes to and can lead team activities. Team success is a critical part of the business success.

- PROBLEM SOLVING allows one to examine problems from different viewpoints and apply a variety of engineering tools to solve a problem. Then the use of statistical techniques to focus on the simple before the complex results in managing the details and resolving the problem.

- INNOVATION will only occur if you create it. If you are not innovative and stop creating new products, you will not be in this business within 3 years.

- LEADERSHIP is to encourage action. Work as a team member, identify problems, the important issue is not to be as interested in the "What?" as much as the "Why?"

- COMMUNICATION skills are an important part of team work required within the workplace. Written and verbal communication skills are
essential to successfully interact with people of varied educational backgrounds and levels of responsibility throughout the company.

Supervisory skills are also essential to the success of the organization. Problem solving and Communication skills, along with the ability to teach and maintain a leadership role are the sought after "Qualities" of the successful supervisor.

One of the journal entries from Respondent E-7 (Elementary-1st-6th) identified possible outcomes to pursue when he returned to the classroom this next year. They included:

- Vision in the classroom: Jobs students do in the classroom.
- Letter writing unit to find out specific requirements of various jobs.
- Set up job application training sessions.
- During class possible "Teams" with a specialty in various areas where they can present to the entire class, e.g. safety, research, scientific method, etc.
- Develop teams each representing a different continent yet each must be part of a whole. Each is cooperative yet competitive.
- Continue working on problem solving, team work, and interactive skills.
- Increase emphasis on communicative skills on all levels, utilize oral presentations, and videotape whenever possible.
- Increase networking/communication between teachers at various grade levels.
- Set up seminars with Principal to discuss/solve problems between Principal-Teachers-Parents.

One other Educator E-2 (Jr. High-Science) commented in her journal that another major theme was the degree to which teams are utilized as a way to accomplished goals.

In the past, I have allowed students to select their lab partners, shifting those who selected poorly or pairing up different combinations when I felt it would be beneficial educationally. Next year, I'm going to emphasize cooperative skills more, then force them to use these skills to get lab work completed. Each quarter I will draw names out of a hat. A student may be paired up with a pal, or maybe not. They will have to establish a working relationship with their partner. I would still reserve the option of switching students where this was not as effective as necessary. Last year I incorporated cooperative groups, like support groups, that I personally matched up for particular strengths and weaknesses. I want to do more of that next year.

The next presenter was the company's human resource department basic skills training specialist. The information presented was an overview of the employees basic skill requirement and company sponsored training practices currently in practice. The training specialist discussed the basic skills testing and effective performance by employees that required critical skills such as reading, math, problem solving and
communication skills. Today’s jobs are more demanding and require multi-task skills. This situation was not the case 10 years ago when less demanding and simpler routine tasks were required. Basic skills classes are provided in-house during the day. The classes are targeted to increase reading and math levels up to the 8th grade level. Classes are mandatory for employees who failed a particular area on the Test of Adult Basic Education (T.A.B.E.). (Note: The T.A.B.E. is a criterion referenced test given to existing employees.) Classes and tutoring are provided free of charge to the employee and are held during their normal working hours. Approximately 300 employees take these classes each quarter and are allowed to re-take classes until they acquire a passing score. This in-house testing offered to the company employees is very time consuming and expensive in terms of time and productivity (one can’t be on the job and attend class at the same time), but this is a commitment the company has made in order to develop the qualified employees required to meet the need of the competitive and demanding electronics industry.

After the completion of this presentation there were various mixed emotions and concerns stated by many of the educators relating to the company’s basic skills training. The following journal entries by three different educators are representative of these emotions: Respondent E-2 (Jr. High-Science) stated that “this company provides a wonderful resource for education to its employees. Each employee must have 40 hours of education per year. Classes can be taken in house or at a community college or University and the company pays for everything, except the books (because you can keep the books).” A second Respondent E-7 (Elementary-1st-6th) expressed a less joyous opinion on this subject noting that:

One of my concerns is that I have not been convinced by the information we’ve been given that our graduates are failing to pass the basic skills tests. This is, of course, what I would prefer to believe and what other teachers want to believe. Unless we are given some pretty specific information to the contrary, my feeling is that we will tend not to accept this as fact. We were told during the Personnel Managers presentation that such information was confidential. I’m willing to accept that there are reasons for that, but without it, it will simply be too easy for teachers (myself included) to believe that those students who fail the tests are those who did not graduate or those who barely made it through school.

The other Respondent E-5 (Elementary-1st-6th) related her feelings and observations about the fact that the company expected the employees to continue their education throughout their career. Several employees told her:
You must be trying to move up. If your not, they think something is wrong with you. For example, engineers are earning master's degrees and doctorate degrees. Technicians are earning bachelors degree's. I met a mother going to night school at a technical college. With such heavy demands on workers' time, who's raising the children? Who's talking to the children? The company should be aware that the oral language proficiency of children entering kindergarten is dropping at about the same rate as the basic skills scores of our graduates. Much more time is devoted to teaching reading in the early grades than ever has been before (not leaving adequate time to teach math). We must teach both written vocabulary and oral vocabulary. It's not enough any more to teach children to decode words. Schools must also teach what the basic words mean that children used to learn as preschoolers talking to their parents. Day care centers have too many children per adult to provide an environment for oral language development. As a result, elementary schools get children that recite the alphabet and nursery rhymes but can't communicate basic ideas and don't have basic concepts of beginning words. When the company lures the parents off to college, what happens to the young children? Is the company also contributing to the problem of an unprepared workforce???

As described by various educator's comments, there is definitely a perception that basic skills problems are a shared responsibility of both the educational system and industry, and that both sides must work together to find ways to reverse this trend and make improvements in the area of basic skills literacy.

- **Introductory electronic manufacturing training class for educators**

  The primary purpose of this class was to introduce the educators to the basic language, procedures, and technology practiced on a daily basis in the manufacturing of high technology electronic products. The class was taught by a Manufacturing Training Specialist who presented the information in detail to ensure that the educators had a fundamental grasp of what they would be exposed to during their next four weeks when actually visiting the areas and observing the manufacturing process. The class presented to the educators was 8 hours in length, compared to the typical 40 hours normally given to new employees. This shorter version would suffice in imparting a sufficient level of knowledge without overwhelming them with details unnecessary for their observation and collaboration activities. One of the Respondents E-2 (Jr. High-Science) recalled in her journal after the completion of the class:

  His explanation of the process for producing electronics was extremely helpful. At last we had a pretty good idea of what takes place. I told him that engineers had been making presentations to us all week, but they didn't seem to realize that
we did not speak their language. Even when they thought they were putting it in a language simple enough for us to understand, they were not. I told him he made an excellent translator, and he appreciated that complement. He probably did not appreciate the kind words as much as we appreciated his explanation and his patience.

• **Tours of the manufacturing sites and assignments to their respective supervisors/trainers.**

Prior to taking a tour of two major manufacturing sites, a film of one of the manufacturing sites to be visited was presented to the educators as an overview of what to expect on the actual tour of the areas. The actual tours were taken by all the educators on two separate days.

The first tour was taken through the advanced manufacturing site #6. Prior to entering the work area, which is known as a "Clean Room," the educators were required to put on special clean room attire, a process much like dressing to enter a hospital operating room. The actual tour was guided by an experienced engineer who introduced them to the various types of equipment, technology, and manufacturing personnel working in the area. The educators were allowed to ask questions about any of the activities taking place and observed the skills required to perform the various functions necessary to produce the specific products assigned to that manufacturing area. The second tour was taken through a less advanced manufacturing site #5. The educators were again required to wear clean room attire and again the tour was conducted by an experienced engineer who would follow a similar routine as in the case of the first tour on the previous day.

The primary focus of the tours was to allow educators to experience a hands-on exposure to the kinds of equipment, the environment, and the people working in these highly computerized and technological complex areas. On the tour they observed the types of skills and knowledge which is essential to be an efficient, successful and productive employee. Journal comments by most of the educators at the end of the tours appeared to have a common theme presented in their own special way. The following responses were typical of the experience: Respondent E-16 (Elementary-1st-6th) "The tours were very interesting. It was amazing what is being accomplished in industry today. Everyone was friendly, helpful, and welcoming." Respondent E-2 (Jr. High-Science) "Most of the technology is well beyond our understanding, but after touring the areas and having several people explain bits and pieces, I am beginning to get a faint idea of the
process.” Respondent E-4 (Sr. High-Special Ed.) “This is a very different environment-business is very serious-very professional. It’s a pleasant change-stimulating/exciting...have learned a lot!!”

Now that the educators were given a chance to get a brief view of what a manufacturing environment was like, and had an opportunity to observe and speak to various individuals on the job, they appeared ready to start on the next phase of their observation/collaboration program.

On the last day of "Week One", the company supervisor/trainers assigned to the educators made a short presentation the group designed to provide a general overview of job responsibilities, described the area they worked in, and how their area fit into the overall role in the operation of the company.

The first supervisor/trainer to present was S/T15 (Manufacturing). The educator assigned to this area was: E-2 (Jr.High-Science). The supervisor talked about the area's goals of quality, yield, productivity, and cycle time. The strategies were: Total customer satisfaction; Benchmarking-finding out what the competition was doing; Bullet proofing-preventative efforts to avoid mistakes; CIM-computers which integrate everything that is done; Matrix Teamwork-working together and continuous improvement. Most of the jobs in this area are in the "clean room". It is important that each individual adopt a common vocabulary; speak the same language to understand and support each other. Team work is of critical importance. Support of the entire process, and other contributions while giving opinions and ideas on change. The supervisor also gave the educators some of the characteristics of people who seem to do well in this type of environment---namely, someone who seems to be at the correct level and does not get bored because they think they should have a more important job right away. Team players with the ability to work well in social situations and the ability to adapt to this type of working environment are important. For general information, the products produced from this area are used in cars (dashboard controls, anti-lock brakes, engine controls), computer disc drives, radios, and computers.

The next supervisor/trainer to present was S/T11 (Manufacturing). The Educator assigned to this area was: E-11 (Sr. High Math/Compu). The supervisor also commented that teamwork is very important. His area is responsible to produce very precise photographic plates with microscopic images on them which will be used throughout the manufacturing of electronic devices. He discussed the need for proficiency in basic skills, and also emphasized that it is important for his employees to understand
the concept of using coordinates, since it is used to ensure that any defects created by the process be accurately located and eliminated as soon as they occur. Quality and Cycle Time are important objectives in this area and the area teams are continually looking for better was to do their jobs.

The two Supervisor/Trainers to present were S/T13 (Research) and S/T14 (Research) both were from the same Advanced Research Area. The following two Educators assigned to this area were: E-13 (Jr. High-Science) and E-14 (Jr. High-Math). Supervisor S/T13 volunteered to present an overview of this area. He stated that this area is a research laboratory where they are responsible to develop and set up the new manufacturing procedures, ensure that they are working properly, and then transfer them to the manufacturing departments for high volume production. The direct labor employees who work in this area receive 250-300 hours of training during the first year working on the job. He also stated that high school graduates need to realize that graduation is not the end of learning, it's just the beginning—particularly when employed in high technology occupations.

Another supervisor/trainer to present was: S/T4 (Engineering). The Educator assigned to this area was: E-4 (Sr. High-Special Ed). The supervisor noted that he worked in the area that was responsible for Military Products. He mentioned that most of the employees working in this area were trained as engineers, but many work in areas of materials, product engineering, marketing and sales. Military products require close working relationships with the various government agencies and a lot of red tape and paper work are a routine part of the job. He also noted that the technology that is used in most advanced military systems such as the Patriot Missile is considered older technology than the new technology commonly used in commercial products like Computers, VCR's, T.V. and Telephone Communication Systems. The use of older technology in Military Products is a result of the extensive qualification and evaluation time required to ensure that these products are highly reliable. The supervisor reinforced the theme heard throughout previous presentations, that problem solving and communication skills are critical to success throughout all the job responsibilities.

The next supervisor/trainer to present was: S/T5 (Info/System). The Educator assigned to this area was: E-5 (Elementary-1st-6th). The area
supervisor indicated that the primary responsibility of her department was to supply information to all groups and business units throughout the company in the most efficient and accurate manner possible. Having the appropriate information, e.g. financial, product inventories, status of products at various stages in the manufacturing process, orders and sales etc. is essential to ensure that the company has all the required data readily available to make accurate and timely decisions required to achieve the company goals.

Supervisor/trainer S/T12 (Prod Develop) was assigned educator E-12 (Elementary-1st-6th). The supervisor gave a brief overview of his responsibility in developing the hardware and software tools such as computer design work stations and other computer systems so that the company’s design engineers, working directly with customers, could jointly develop new customized products in very short periods of time. Therefore, that the customer would have a competitive edge in getting his product into the marketplace ahead of the competition.

The next supervisor/trainer S/T1 (Facilities) was assigned educator E-1 (Counselor). The supervisor showed a video tour of the facilities the educators would be assigned to and also talked about the responsibilities of managing and maintaining the 30 buildings housing more than 4000 employees. He mentioned that the effective utilization of resources, providing a safe and comfortable work place and protection of the environment was a formidable task, requiring a 24 hour- 7 days a week task.

The final supervisor/trainer to make a presentation was S/T3 (Manufacturing). The educator assigned to this area was: E-15 (Sr. High-Science). The supervisor talked about the advanced products manufactured in the area. He presented information on the role of the manufacturing supervisor hierarchy within the area such as: operator, equipment adjustor (ratio of 5 to 1), line supervisor (ratio 11 to 1), unit supervisor-shift Administrator, manufacturing manager, and finally, the operations manager. The latter has responsibility for the entire manufacturing area. He also briefly mentioned that new hires were given two weeks training under the direction of experienced trainers learning paraeto analysis (statistical problem solving skills) and interpersonal skills so that as they are assigned to work with other personnel within the area, they would quickly become a functional member of the team.
Note: The following supervisor/trainers did not make a presentation during the first week because of time limitations. For the purpose of clarification and information important to this study, I have listed those supervisor/trainer and educator match up's below:

S/T8 (Engineering)----- E-8 (Counselor)
S/T6 (Design)-------- E-10 (Counselor)
S/T7 (Design)-------- E-9 (Elementary Special Ed.)
S/T16 (Purchasing)---- E-10 (Elementary 1st-6th)
S/T2 (Training)------- E-3 (Sr. High Non-Science)
S/T9 (Design)-------- E-6 (Sr. High Non-Science)
S/T10 (Design)------- E-7 (Elementary-1st-6th)

With all scheduled presentations and supervisor/trainer- educator assignments completed, the last half of the day ending this first week was devoted to informal discussions with various company personnel who wanted to spend time talking and getting to know the educators on a less formal basis.

On this last day of this first week, the educators made a request of the company's program director stating that the educators felt it would be advantageous for all of them to meet each Friday afternoon to share their observations and experiences in order to network and process information as a peer group. This request was accepted and implemented as a regularly scheduled activity for the remainder of the Observation/Participation Program.

WEEKS TWO-THREE-FOUR

- Job Shadow various manufacturing, business, facilities, product design development engineering, and computer information system personnel throughout the company.

At the starting off the second week, the educators went to the various company locations they were assigned to Job Shadow (See Appendix B). Some of the educators were assigned with partners (E-13 Jr. High-Science and E-14 Jr. High Math); (E-6 Sr. High-Non-Science and E-7 Elementary-1st-6th); (E-9 Elementary-Special Ed. and E-10 Elementary Counselor), while others were assigned individually (E-1 Jr. High-Counselor); (E-2 Jr. High-Science); E-3 Sr. High-Non-Science); (E-4 Sr. High Special Ed.);
(E-5 Elementary-1st-6th); (E-6 Sr. High-Non-Science); (E-8 Jr. High-Counselor); (E-11 Sr. High-Math/Compu); (E-12 Elementary-1st-6th); (E-15 Sr. High-Science) and (E-15 Elementary-1st-6th).

Although the educator's were assigned to specific company locations, each supervisor/trainer structured the job shadowing experience in different ways. Some supervisor/trainers had the educators follow a detailed scheduled observing many different employees doing different jobs. Other supervisor/trainers decided to let the educator determine what they were interested in observing. They were given much latitude in determining what their job shadowing would entail to meet the needs of those educators preferring less structure. The newness of the program meant that there was no formula to fit the job shadowing experience to follow. Therefore, the educators' experiences were varied, each one a diversity dealing with new partners, employees and the other educators involved in the program. Some of the educators spent up to three weeks shadowing one person, but most of the others shadowed different people every day, or every couple of hours. The educators were exposed to the broader picture of the industry, from marketing to manufacturing to engineering. Other assignments allowed the educators to concentrate on spending time with every type of employee and observed them as they do during throughout the course of their day. Many of the company employees asked what the educators what they wanted to see while shadowing them. The educators said to just perform their daily tasks as they would on any given day, and would sit back and observe. After observing for some period of time the educators would ask many questions in order to find out the full scope of their jobs that shadowing alone would not provide. The educators asked the employees how their job related to the final product. They also became involved in discussions about a variety of broader educational issues of the day. Almost everyone had an opinion when it came to education, and the educators seemed to value the employees input. During the job shadowing, the educators wanted to learn about the employee's on a more personal level. They asked background information about their spouses and families (e.g. employee's education, children's education, marital status, previous work history, etc.). They also asked about their personal educational backgrounds, and about what it is that motivates them to do a good job. Relating on a personal level broke down the barriers and helped to establish the bonds necessary for the successful school/industry relationship.

One important point should be mentioned at this time. Because there had been had a wide diversity of educators observing and collaborating with many different
employees from the company, the relationships that were established helped to ensure that the educators actually observed and related to the skills required necessary to successfully perform specific job responsibilities. One educator entry E-1 (Jr. High-Counselor) stated that "working with company employees on a face-to-face basis helped me to relate to shared experiences with each other in a mutually professional manner."

**WEEK FIVE**

- **Summarize observations, perceptions and experiences and develop educator recommendations:**

  When the educators began their Observation-Collaboration Program, many of the expectations were unclear. But through the process of observation and collaboration during the past three weeks, the educators were able to develop various ideas and themes relating to their experiences both as educators and participants in the program.

  During the final week of this program, the educators used brainstorming sessions to summarize their experiences and made recommendations to schools and industry. These recommendations involved changes which could have a positive influence on improving the education of students at the unified school district.

The recommendations made by the educator's (Educator's Presentation 1991) contained the following six component levels:

- POLICY
- SYSTEMATIC IMPROVEMENTS
- MANAGEMENT
- PROFESSIONAL DEVELOPMENT
- CLASS ENRICHMENT
- SPECIAL SERVICES

The policy level relates to federal legislative policy and school district policy.

Identifying long term needs and long term goals in which improvements involve looking at partners in management support with the expertise which is the focus of this partnership between this company and this unified school district.

Professional Development has numerous overlaps between schools and industry and how we train people to deal with other people. Professional Development means identifying schools to upgrade and to attain business expertise to improve the school proficiency and productivity.
The area of concentration relating to the components that are the focus of this analysis included, Class Enrichment (Components for Success) and Special Services. The following five areas of "Components for Success" are described below:

LANGUAGE/COMMUNICATION SKILLS
QUANTITATIVE SKILLS
PROBLEM SOLVING SKILLS
INTERPERSONAL/ATTITUdINAL SKILLS
JOB SEEKING/SELF-ADVANCEMENT SKILLS

Language/Communications Skills

In the educators' observations, they separated language and communications skills into three areas: Reading, Writing and Speaking. In their observations they noted that reading activities included reading journal articles, processing management publications, reading operational manuals and process procedure specifications. In the writing area, they observed people who write evaluations of colleagues, internal progress reports and status reports, abstracts, proposals and applications, an generally a wide variety of writing being used in the work place. In the area of speaking, the educators observed presentations using effective communication skills. At the operational level and the manufacturing level they witnessed on-going communication as a major requirement for all persons to possess at all levels. The main point here, was that the ability for each individual to communicate at multiple levels, be it operators, technicians, engineers, managers, and supervisors throughout the system was imperative.

One educator E-15 (Sr.High Science) stated that:

the school district already has many programs in place. In the area of basal and literature based reading programs, and content reading programs at the elementary schools, they have applied reading in some high schools and they have college prep reading programs. There also exists a mandatory 9th grade writing proficiency requirement for student graduation within the school district. In the area of speaking, the schools give instruction in presentation, speech and debate activities and extracurricular activities featuring problem solving and peer teaching and also require that students give presentations to their classmates at various times throughout the school year.

As a result of the educators' observations and experiences, the following recommendation was suggested for presented to school and industry management: In the area of reading, encourage reading at home, insist that the students do more than they are
by tapping into some of the established reading programs in the community. Many of the high schools have only a part-time reading teacher at the elementary levels. When you have a student population of 2000-3000 students, this is not adequate. In the area of writing, the educators recommended an additional support for writing across the curriculum program. The district currently has 200 teachers skilled in writing across the curriculum skills, but there are 3000 students in the system. In the area of public speaking the educators recommended the development of a presentation skills course which would define the skills essential for students to graduate comfortably speaking before others. The "Key" recommendation is that the district research and develop a district-wide curriculum K-12 unifying reading, writing, and speaking as a whole new approach to the Language/Communication Skills requirement (Educator's Journals 1991).

Quantitative Skills

Some of the quantitative skills observed by the educators were varied and numerous. Many of the skills observed were at the lower levels using calculators and computers. However, they also observed many activities and noticed that in the area of science, scientific notation was often used by different people and at various times. Regarding Algebra and Advanced Mathematics, the educators observed various degrees of usage, but the process of logical step-by-step thinking skills was commonly used in many of the daily practical job responsibilities conducted throughout the workplace.

One educator, E-11(Sr. High Science) commented that:

Students in the school district are expected to show proficiency in Math skills at the 9th grade level sometime during their high school career. This is evaluated by their performance on either a state standardized test or a district adoptive test. The school district already has a program which includes problem solving and hands on learning, but it is not yet implemented at all the K-12 grades.

Based on the educators' job shadowing observations, they made four recommendations in the area of quantitative skills improvements for the school district, they are:

1. Implement a two year Algebra 1 program because they found that industry emphasizes Algebra 1 as an important skill. This course should be made available to more students and even to those who work at a slower pace. This would allow more students to successfully complete Algebra if they were offered this alternative to the standard one year course.
2. Establish a structured communication link between teachers. This communication link should take place between science and math teachers at all levels. This would help to maintain a much more cohesive curriculum. It would help teachers prioritize curriculum information and if new ideas were emphasized or brought into the curriculum including technology and cooperative learning, it would allow the teachers to eliminate those items that are no longer necessary in the curriculum. The teachers then could successfully share and implement new ideas.

3. Include the use of computer technology in Math and Science courses. This would allow students to experiment with equations and to make predications as well as perform simulations. Additionally it would help students become more experienced and proficient with the use of computers before leaving high school. (Until the students have more access to computers, they will not develop the technological familiarity that is necessary for success in the workplace.)

4. Investigate methods to implement an immediate student intervention plan. School district studies show that holding students back to repeat a year is not always the best solution. Yet it is clear that teaching 5th grade concepts to someone who has a 2nd grade quantitative skill level is setting up a student for failure. As the student progresses through the education process, the gap only magnifies. Teachers need to find a method to intervene and provide support when this problem occurs. Perhaps a combination of providing tutoring during the summer or in the evenins to supply the student with alternative methods of instruction would help solve the dilemma. With further investigation and research, hopefully an appropriate method of successful intervention will be discovered so that all students will have the proper quantitative skills at each step of the learning process to successfully complete the remainder of the education process (Educator's Journals 1991).

**Problem Solving Skills**

The educators witnessed first hand that problem solving skills are indeed a necessary skill in the electronics industry. This was continually reinforced with conversations and observations with line operators, engineers and supervisors throughout the workplace. The educators observed operators categorizing defects created in a particular process. Once the problem had been identified, a team of
individuals began a problem solving process to eliminate the defect and implement a corrective action plan.

One educator E-10 (Jr. High Counselor) indicated that:

Creative problem solving is addressed in their classrooms. It is also included in the extra curricular activities at the elementary and secondary levels logical thinking and problem solving activities such as: the chess and debate teams. The school also teaches future problem solving using a six step model that they are trying to coordinate into the K-12th grade program. This model can be used to tackle problems that students may encounter in the future as well as in the present.

As a result of the educators observations, they made the following recommendations to the school district the area of problem solving:

- Incorporate problem solving into all areas of the curriculum
- Emphasize process over product, recognize students for their effort
- Provide exposure and inservice training for future problem solving at a greater level by attending training classes offered by the electronics company
- Involve industry in developing and presenting real life problems from the workplace for the students to work on. (e.g.) The goal is not to solve the problem, but to actually give students practice in the process working on a real problem that exists so there is relevance to the problem solving learning process (Educator's Journals 1991).

Interpersonal Skills

The educators during their job shadowing observations were very interested in determining the needs for, and the level of usage, of interpersonal skills. What they discovered was that a great deal of team work was used frequently throughout the company. Without the use of interpersonal skills, the effectiveness and success of the employee in accomplishing their job responsibilities could be severally effected. In fact, what they observed was that the ability to work cooperatively with others increases both job satisfaction and opportunities for advancement. The employee not only needs these skills, they know the importance of them as well.

Two educators E-7 (1st-6th Elementary) and E-12 (1st-6th Elementary) noted that:

the cooperative learning model currently practiced in the district can be used to give students, the industry' future employees, the skills they need to work with others and to function effectively as a member of a team. It can do this because it
does not just focus on giving students the opportunity to work in groups, but because it focuses on teaching students those cooperative skills they need to do so successfully.

Unfortunately, although the educators have personally observed the power of working in groups and that cooperative learning in the classroom is a powerful teaching strategy to use in many classrooms, the majority of educators would not begin to do the things they need to do to use cooperative learning in the classroom. It would not be because the massage was not clear enough and it wouldn't be because the educators are not willing to make the changes that they know the will be valuable to their students, it's because of the many obstacles required to overcome in implementing cooperative in the classroom.

One obstacle many educators face is curriculum requirements. Many educators have so much information they are required to cover in a course of a year or semester, they would not be able to teach it all if they took the time to have their students learn even some of it by working in cooperative groups. The structure of the school day also presents problems. This is particularly difficult because of the 50 minute teaching hour is not conducive to many cooperative learning activities. There is also a problem with the lack of educator training and administrative support. Educators who wish to receive training in cooperative learning must get that training one their own time and at their own expense. By far the most difficult obstacle to overcome is the time commitment. Mastering this new instructional strategy requires an enormous investment in teacher time. It is not simply a matter of having students working in groups to complete an assignment they would normally have completed individually. Educators who are willing to work at it for two to three years will eventually discover that it becomes easier to use cooperative learning, but it is easy to understand why many educators give up before they reach the point of becoming proficient and comfortable using this teaching strategy.

The main recommendation submitted to the district administration by the educators to overcome these obstacles is to encourage the use of cooperative learning by removing these obstacles which make it difficult or impractical for educators to learn, implement, and master cooperative learning strategies.

Job seeking and self-advancement skills

The process of acquiring Job Seeking and Self Advancement skills may be considered following four stages: assessing ones ambitions, determining the skills required to fulfil those ambitions, assessing what abilities one possess and obtaining the skills required to achieve those ambitions.

The educators observed that job seeking and self advancement skills are developed through the company's emphasis on the need for continuous improvement, planning process for continuous improvement and the company commitment to employee training. This process is identified by all employees of the company as "Continuous Improvement Methodology." This methodology has been used very successfully through-out the company to continually improve its products and services to all its customers.
The educators recognized the value of this process and listed the following programs currently utilized in the schools to practically address this issue:

- Self assessment of ambitions
  - Journals
  - Biographies and Literature
  - Interest Inventories

- Determine skill needs
  - Library and Career Center Materials
  - Career Fairs and Field Trips
  - Classroom Simulations
  - Work Experience and Student Internships
  - Extracurricular Clubs

- Obtain skills
  - Wide Variety of Academic and Vocational Classes
  - Study Skills

The educators made the following recommendations to the industry as a means to improve job seeking skills and self-advancement student skills:
(In order of priority with increasing impact on students’ success- cited from Educator’s Journals)

1. Provide guest speakers to the schools,
2. Student tours and job shadowing throughout industry,
3. Continue educator internships with industry,
4. Have the industry sponsor a school club,
5. Use industry professionals and non-professionals as role models and mentors,
6. Provide summer work study programs for students.

- Educator’s presentation to the school district administration and industry management, with recommendations on how education and industry could most effectively aid in improvement to the schools and students.

During final week of the program, the educators summarized their experiences and made a series of recommendations to both education and industry management groups (Educator’s Presentation 1991). A summary of the recommendations included:
Technology Supported Education System

- Use political influence to support funding designed to bring schools technologically up-to-date
- Help the Unified School District discover new opportunities for community funding efforts
- Help the Unified School District create a technology-based communication network between teachers, administrators, other districts, databases and parents
- Help provide resources for educators to research and develop technology-based alternate methods of instruction, e.g. Interactive video hardware/software; Tailor made interactive computer programs; Additional computer labs; Data management/interpretation software training; and TIME
- Consider making computer literacy a graduation requirement

Political Support

- Establish an Education/Industry "Educational Issues" political group
- Schedule regular meetings to discuss issues and outline plans of action
  (Examples of political issue)
  - TEACHER TIME
  - CLASS SIZE
  - TECHNOLOGY SUPPORTED EDUCATIONAL SYSTEM
  - PARENT INVOLVEMENT
  - BUILDING ISSUES

Increase Parental Involvement

- Promote Parental Support of the Schools
  - Advertise the Unified School Districts' Parent University
  - Circulate parenting pamphlets to the industry and sent to students homes
  - Establish parent support groups
  - Establish a newsletter and distribute to industry and students homes

- Encourage Parent-Child Interaction
  - Parents as co-educators at home
  - Improve the quality of childcare and preschool effectiveness
- Encourage Teacher-Parent Interaction
  - Parent volunteers
  - Parent advisory council
  - Parent co-educators program

- Parent involvement and support is essential in determining a student's success in school

**Teacher Time**

- **Why is it needed?** Students' different abilities, interests, levels of motivation
- **How could it help?** Professional growth, preparation, parent contracts, teacher sharing, extracurricular activities
- **How can we get more?** Fewer classes/students, more prep time, Industry substitute teachers, extended contracts, computers to increase efficiency

**Summary**

The Educator-Industry On-Site Collaborative-Observation Program was designed to be a five-week summer orientation to a high technology electronics company, placing educators with various specialities, in critical business facilities throughout the company, and supplementing exposure with technical training. The program consisted of three phases. The first phase involved general orientation to the industry, introducing the educators to the industry's goals, philosophy, and culture. The educators learned about the manufacturing environment, the selection and hiring process, and current and future skill requirements for entry-level positions. Speakers provided an overview of the industry's training and educational function. In addition the educators received basic technical training, classes on electronic technology and "Continuous Improvement Methodology." During the second phase, Job Shadowing, the educators spent time in individual departments, including engineering, manufacturing, information systems and facilities. During this time they met employees at a variety of levels in their assigned departments, and were provided with hands-on opportunities to observe and participate in evaluating what minimal levels of education and training is required of the entry-level employee to adequately perform his or her job duties and responsibilities at the real life work site. The third phase of the program revolved around results. The
educators summarized their experiences and made a series of recommendations to both management groups on how each could most effectively aid rapid improvement to the schools. Recommendation to the unified school district included adopting Continuous Improvement Methodology and Total Customer Satisfaction philosophies. Adopting these would better enable the schools to assess needs and plan for specific, measurable changes, as well as providing common terminology and a format for implementing change. Parental involvement was another key area for attention for both the schools and industry. The educators encouraged parents to become "co-educators at home" and to become more active in the schools. The company was requested to encourage parental involvement in the schools and to provide a mechanism for providing school information to employees who are parents. The educators urged both groups to form an educational issues action group to influence current legislation and support for school funding issues, particularly as they affect teacher time and class size. Finally, many of the recommendations involved the use of technology to improve the quality of instruction and free teacher time to work with individual students. The schools require not only increased funding to acquire necessary equipment, but support and advice from industry on how to best manage their technological tools. Technology would also aid internal communications between teachers and their peers. Technology must be taught at all levels in the schools if students are to possess the skills needed to meet the job requirements of industry.

The Educator-Industry Program Has already logged significant accomplishments. Two schools in the district will pilot technology-based interactive learning programs in English and Social Studies this year. One engineering employ from the company has already sought certification as a temporary substitute teacher to change places periodically with one of the educators from the program to allow time for the educator to return back to the industry for further training. Arrangements have been made for educators to take courses from the company's internal training department. The Industry's Advanced Technology Center will sponsor the development and operation of a computerized laboratory at one of the districts high school, a special Science and Math projects at one of the districts elementary schools, and mentoring activities at one of the districts jr. high schools.

This "Program" has been nominated for the National Alliance of Business to be recognized as partnership program of the year. A video documentary has been created
for the project so it can be adopted in other areas of the company. This "Program" may serve as a model for school projects within other Divisions throughout the Company.
Chapter V
CONCLUSIONS, DISCUSSIONS, RECOMMENDATIONS

Introduction

This study was designed to describe changes that may occur in various educators' perceptions about industry and, those changes may be planned for in the educators' curriculum, classroom behavior or instructional strategy as a result of being a participant in the Educator-Industry On-Site Collaborative Observation Program. Specifically, the study examined the process of collaboration between industry and education and assessed the impact of the program on the participating educators and industry personnel. This chapter presents the conclusions derived from an inductive comparative analysis of the data, a discussion of the relevant information and recommendations made by the participants and the researcher.

Conclusions

This study provides a process model for establishing an Educator-Industry Collaborative On-Site Observation Program which included Educators representing a wide range of content area specialties including: Elementary through High School, Special Education, Counseling, Math, Science and English. The following four conclusions were derived from the findings of this study:

1. The educators were introduced to the business settings and practices of this high technology electronics industry during the first week's general orientation phase. The educators were thoroughly introduced to the industry's goals, philosophy, and culture. They learned about the manufacturing environment, the selection and hiring process and the current and future skill requirements necessary for employee success in this industry.

2. The educators were exposed to the real-world of the workplace during the Job Shadowing phase. As they spent time in the individual departments observing employees at a variety of levels in their assigned departments, they were seeing first hand the skill requirements necessary for the various jobs, and also receiving an introduction to the industry's communication and computer systems. They were also exposed to the numerous times that English, Math, and Science applications were utilized on a hourly and daily basis throughout the workplace.

3. The educators developed a collaborative relationship with all the varied industry personnel they came in contact with throughout the program. This process of
collaboration was symbiotic and involved a mutual exchange by both the educators and the employees to achieve results. While the relationship that existed between education and industry was not serial or linear in all aspects of the process, the cooperation that occurred throughout was a major element that contributed to the achievement of collaboration. With regard to the educators and employees, both groups were successful in working side-by-side and became better informed and aware of the education and training issues each face in the education and training of well qualified students prepared for the workplace.

4. Throughout the length of the program, the educators were developing ideas and ways to take what they had observed and transferring those ideas into their individual teaching strategies. They are developing ways to teach their students participative problem solving skills, develop better language and communication skills, and teach students how to successfully work together in groups. And finally, instill in the minds of their students, the importance of acquiring good interpersonal and presentation skills.

5. One of the key purposes during this study was to describe what changes that may occur in various educator’s perceptions about industry, and those changes may be planned in the educator’s curriculum, classroom behavior or instructional strategy as a result of participating in this program.

From the educators perspective: It was evident that this program exposed the educators to the many and varied aspects of what really takes place in the workplace and what students really need to know to be successful employees. Although the educators are teaching an abundance of material required within their specific scope and sequence subject material, the educators also discovered that group problem solving, interpersonal relationships, hands-on computer experience and the ability to identify, analyze and implement solutions to everyday problems are critical skills that must be taught and mastered by the use of a continuous learning process while in school and long after they complete their formal education.

From the industry perspective: Many employees were exposed to 16 educators who are among the best and brightest in the school district. The employees spent three weeks learning and listening to what the educators were asking/talking about, how they can become better teachers for their students. In turn, the educators shared with the employees their concerns about the many roles and difficulties they must
overcome in order to teach the vastly diverse students in their classrooms. These educators believe all their students deserve to be given the opportunity to achieve the highest level of education that their abilities will allow.

This researcher during his interviews with industry representatives from Manufacturing, Research, Design, Product Development groups that participated and interacted directly with the educators reported they were extremely impressed with the professional, knowledgeable and overall enthusiasm emanating from each and everyone of the educators they worked with throughout the program. The employees stated that their respect and admiration had been strongly increased by this close working relationship and expressed that they felt honored in having the opportunity in participating in this program and would like to be included in the program again.

Discussion

During the five week period of the program, the educators were exposed to vast quantities of information about the high technology electronics industry. They learned about the industry culture and the product line, about the skills entering employees need a various levels, about computer networks and Electronic-Mail and the criteria of the company to select, motivate and reward their employees. They learned about rapidly expanding technology and the urgency involved with teaching more at an early age, about continuous improvement, globalization, foreign competition in the marketplace, and the desperate need for better trained graduates and applicants. Likewise, industry learned from the educators that the communities do not always see this industry as they would like to be seen, but rather as an old fashioned assembly line, where they attract high numbers of applicants with basic skills problems because of their out-of-date wisdom: "this industry will hire anybody." A quote from an article written for the industry's monthly newsletter ("Opportunities" 1991), Dr. Jeremie Hill Grey, Educator-Industry Program Director stated:

We learned that the average high school teacher and student may work and study for years down the street from our plants, and yet have little or no idea of what we do behind 'those high walls.' We learned that teachers and counselors do not know about the variety of jobs available within our plants, and so are unable to advise their students of possible career choices. We learned that they did not know of our desire to be involved in their schools, nor about the assistance we could render. They didn't know, for instance, that we have lots of computer wizards and guest speakers and tours and used equipment and political clout. We learned that some of the schools' perceived problems are probably a lack of concentrated effort on the part of us and others in our industry, and that many goals (including basic skills and diversity) are equally important to both of us.
The educators and industry have come a long way toward bridging the gap between industry and the schools. The importance of this bridge can be measured with the following statistics: The educators who participated in the program had among them 150 years of professional experience in education. If they teach for another 30 years each, they will amass another 330 cumulative years. For each of those years, an elementary teacher will affect 30 students, and a secondary teacher 150 students. The five elementary teachers who participated in this summer program will therefore affect 4500 students and the secondary teachers 45,900 students over the next thirty years. A total of 54,000 students will be affected by this Educator-Industry Program.

Recommendations

1. As a result of this Educator-Industry On-Site Collaborative Observation Program, a wide variety of recommendations were made to the unified school district administration and industry's senior management. The recommendations revolved around the following key areas:

   TECHNOLOGY
   TRAINING
   SUPPORT FOR CONTINUOUS IMPROVEMENT

   Specific recommendations involved the use of technology to improve the quality of instruction and free teacher time for work with individuals students. The schools require not only increased funding to acquire equipment, but support and advice from industry on how best to manage their technological tools. Technology would also aid internal communication between teachers and their peers. Technology must be taught at all levels in the schools if students are to possess the skills needed to meet job requirements of industry.

   If educators are to use and teach technology effectively, the quality of training provided to them must greatly increase, both during their college preparation and on the job. In addition, they must be exposed to the types of positions available and the skills required in industry if they are to effectively counsel their students. These skills will include not only technology, but also life-long and cooperative learning, and the interpersonal skills required to work productively in groups. All of these recommendations, if implemented, would create the participative environment most conducive to continuous change and development.

   In addition to the above recommendations on Technology, Training and Continuous Improvement, the following recommendations were made by the educators:
• Provide a School District liaison for a pilot program to integrate Special Ed Students into the Electronics Industry
• Partner students with industry mentors
• Expand extended learning programs for elementary students to be more inclusive
• Establish smaller class size
• Investigate screening for advanced placement classes
• Hire more counselors for elementary and secondary schools
• Implement technological support in education (People and Equipment)
• Establish a political partnership
• Increase parental involvement
• Incorporate participative management methodology in the school district
• Provide more teacher time
• Develop a plan to support effective strategies
• Extend the Partnership between Industry and School District

2. At the conclusion of the Educator-Industry Program, the industry program manager asked the educators to make recommendations on how industry could better improve this program? The educators responded anonymously with 25 recommendations (See Appendix D for complete responses), but the following are a general summary of ways in which the educators thought the program should be modified, changed or improved:

A. Make sure enough time is allowed for the educators to get to know each other and develop trusting relationships before the program begins.
B. Define the roles of the educator participants more clearly.
C. Have industry representatives on the selection team for the program.
D. During the program let the educators get together more often to talk about what has been happening. More time is needed to talk about program goals.
E. Allow some educators to work in 2-4 person teams by grade level, and allow others to work alone.
F. Have school administrators participate along with the educators in the program.
G. Change the sequence of activities during the first week of the program (classes, tours, presentation training, etc.), to help the educators more easily orient themselves to the industrial environment and the technology.
3. Throughout this study, this Researcher has described the recommendations made by educators and industry personnel to members of the school administration and industry management on ways to improve both the educators' and students' performance towards preparing the student for a successful career in the world of work. One area of recommendation that had been briefly discussed by the educators was where are we going with education in the future and how do we get there. The educators know that the country is evolving toward increased technology, a demanding competitive global market, and toward Workforce 2000. The educators believe that they must provide more opportunities for students to work in teams, to adapt to change, to demonstrate leadership and to take responsibility for their own learning. If educators are successful in achieving these goals, then some progress can be made in preparing students for the future. Unfortunately, it will be very difficult to make any significant improvement in the educational process unless we can achieve a form of "Evolutionary Education" or as more commonly called educational reform. Quoting from an article appearing in the Arizona Republic Newspaper on August 25, 1991 written by Edward Klein after interviewing Lamar Alexander, U.S. Secretary of Education:

Along with many others, Alexander says that the U.S. faces a clear and present danger to its existence because of what he describes as the failure of our schools. He is aware, of course, that generations of reformers going back to to the philosopher-educator John Dewey have tried, and often failed to fix the country's educational system. Nonetheless, Alexander, a man of boundless energy and enthusiasm, has stepped forward to propose a clear cut strategy and a timetable for achieving what many people think may be impossible. Improving America's schools will require tackling a wide range of complicated social issues, ranging from poverty and illiteracy to anti-intellectualism and parental apathy.

The many recommendations presented throughout this study are directed toward an evolutionary approach to improving the education of students located within the Phoenix metropolitan area. But, with the achievement of the goals and recommendations defined during this Educator-Industry Program would provide a first step toward the revolution of the "Educational System" whose time has come.

For researchers who wish to conduct a naturalistic inquiry-descriptive case study, this researcher recommends the following:

1. Use of a case study approach is a particularly effective investigative technique for the examination of dynamic systems such as a collaborative -observation program
investigated in this study. Use of this technique yields descriptive information about programmatic processes which are helpful in the interpretation and explanation of products and processes relevant to the program's effectiveness.

2. Be cognizant of ambiguities which arise in this type of research. There will be immense amounts of data which must be recorded, coded, analyzed, but this type of data can yield vast amounts of detailed information about the natural environment and the feelings of the participants in that environment.

3. A. follow-up study should be conducted which includes a longitudinal study, whereby evaluations of the educator's performance may be assessed prior to the Christmas school break and again near the end of the spring school term. During these follow-up assessments, interviews should be conducted with school administrators to determine any impact relative to improvement in student performance as a result of the educators participation in a Educator-Industry Program.
REFERENCES


The Boston Globe. 10 February 1988, 5 col. 7.


What Advocates say about Partnerships. (1986). Instructor- Special Issue, Winter: 6-11


APPENDIX A

EDUCATORS' CONTENT AREA BY GRADE LEVEL
EDUCATORS CONTENT AREA BY GRADE LEVEL

37.50%

31.25%

31.25%

- High School
- Junior High
- Elementary
APPENDIX B

EDUCATORS' JOB SHADOWING ASSIGNMENT BY SITE LOCATION
SCHOOLS/INDUSTRY AMBASSADOR PROGRAM ASSESSMENT

Please respond to the following comments by rating each on a scale of one to five. Circle the number that most accurately reflects your reaction.

1. The program content met my expectations.
   1  2  3  4  5
   Not at all  More or less  Absolutely

2. The program content will increase my ability to perform my job in the school system.
   1  2  3  4  5
   Not at all  More or less  Absolutely

3. I will be able to apply what I learned in this program on my job in the next 90 days.
   1  2  3  4  5
   Not at all  More or less  Absolutely

4. The program significantly increased my knowledge and understanding of the skills needed in industry.
   1  2  3  4  5
   Not at all  More or less  Absolutely

5. I feel the program achieved its objectives.
   1  2  3  4  5
   Not at all  More or less  Absolutely

6. I feel I will be able to do my job better because of this program.
   1  2  3  4  5
   Not at all  More or less  Absolutely

7. The first week of orientation was useful and helpful.
   1  2  3  4  5
   Not at all  More or less  Absolutely

8. The time spent within the department was long enough.
   1  2  3  4  5
   Not at all  More or less  Absolutely

9. Five weeks was an adequate length for this program.
   1  2  3  4  5
   Not at all  More or less  Absolutely
10. Adequate time for feedback was provided for program activities.

1 Not at all 2 More or less 3 Absolutely

11. The program gave me a good knowledge of the business environment.

1 Not at all 2 More or less 3 Absolutely

12. I was satisfied with the quality of the information provided by this program.

1 Not at all 2 More or less 3 Absolutely

13. How would you improve the Schools/Industry Ambassador program?

Other comments?

Thank you.
Educator Response Rating Scale Response Rating scale from 1 to 5 that most accurately reflects your assessment of the program

Assessment Criteria

Program Implementation and Goal Objectives (Questions–1, 5, 7, 8, 10)

Program Content and Application to the Classroom (Questions–2, 3, 4, 6)

Program Duration (Questions–9)

Program Quality (Questions–11, 12)

Educators Overall Rating of the School/Indust. Program (Questions–1 thru 12)

(not at all) 1 2 3 (more or less) 4 (absolutely) 5
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Overall \( \bar{X} = 4.2 \)
APPENDIX D

EDUCATORS' RECOMMENDATIONS FOR CHANGES TO THE PROGRAM
EDUCATOR'S RECOMMENDATIONS FOR CHANGES TO THE "PROGRAM"

1. Make sure enough time is allowed for the educators to get to know each other and develop trusting relationships before the summer program begins.
   - Assistance in team work/group processing.
   - Team building activities during the first week of the program.
   - Someone from the district work with the educators in the area of group dynamics.

2. Define the roles of the educators more clearly-what the expectations are for the educators during the program.

3. Have the information on six-sigma before starting the program.

4. Give educators a choice of electives or programs available to take.

5. More minorities in the program.

6. Have industry representatives on the interview team.

7. Do not pass out applications without our permission.

8. During the program let the educators get together more often to talk about what has been happening. More time is needed to talk about program goals. More time is needed to work on presentations.

9. First week of orientation was too much information at one time.
   - Tours should start from beginning to end of the process. Take the semiconductor class before the tours.
   - More orientation to the "big picture" of the company.
   - First week of orientation needs a little more restructuring.

10. Time spent in department was too long in one place.
    - Time spent within one department should be two weeks in one department and two week in another.
    - Observing in departments half days and then processing, researching, writing and working with parents the other half day.
    - One day in a production is enough.

11. Educators should work in pairs.
    - Put educators together in 2-4 person teams by grade level.
    - Do not work in pairs-more interaction between employees and educators when educator is alone in the department.
    - Do 3-4 weeks in job shadowing with 3 days in company and 2 days meeting as educators (in different sized groups) to debrief.

12. Less presenters(or spread them out over more time) but schedule time for questions.
    - More time for educators to interact with speakers during the first week.
    - Have presenters tell positive and negative experiences in while in school.
13. Program should be six weeks.
   - Add a week to the program for educators to meet at the curriculum instruction
     center, by discipline or elementary/secondary, to develop specific objectives
     which can be accomplished in classrooms, schools and district.
   - Program needs to be 6-7 weeks and an additional week to get more completed at
     the end of the program.

14. Two or three groups of educators started and staggered schedule that way more
    people can participate but in manageable groups.
   - Administrators participate in this program along with educators.
   - Make it a program principal and educator to partnership in together.
   - Have administrators in the program and take leave without pay for the time in
     the summer and pay them equal dollar amounts as the educators.

15. Maybe school/industry can work together on a viable parent portion of the program.
    - All educators should be matched with a parent.
    - Hold parent seminars with discussions on Friday's.
    - The parent part of the program needs to be organized.

16. People from the company come and observe in the schools.

17. Next year, work with this year's educators to map out a more specific course for the
    new group to accomplish new and specific goals.
    - Bring one or two educators back to help facilitate and guide new group.
    - Invite educators to participate in one more summer program.

18. Show the video about Total Customer Service competition finalists.

19. Have discussions over evaluation forms and methods for employee evaluation,
    including exempt and non-exempt.

20. Provide educators with pagers while in the program so they can have that
    experience.

21. One day presentation class.
    - Viewing the video tape of the practice sessions of the presentations for self-
      feedback would have been beneficial.

22. Schedule day after the major presentation for feedback and debriefing.

23. No adequate time provided for the program activities.
    - Schedule specific meeting times and specific items to be addressed.
    - Clear time commitment for meetings after the program is over.

24. More time to spend talking with employees at all levels of the spectrum.

25. Show the video "Seed to Semiconductor" twice before and after the semiconductor
    class.
VITA

John Thomas Hornak was born in Hazleton, Pennsylvania on June 19, 1942. He graduated from Hazleton High School in 1960. He served in the United States Navy from 1960-1964 receiving an Honorable Discharge (in June of 1964). He attended Princeton University as a Pre-Engineering student from 1966-1968, then moved to Tempe, Arizona with his family in 1969 to accept a position with Motorola, Inc. In 1975, he received a bachelor's degree in Engineering Science, with a Chemistry Major, from Arizona State University. He also completed a Post-Baccalaureate Teacher Certification Program with a Masters option in Secondary Education from the same University in December, 1990. In January, 1991 he entered the Master of Arts Graduate program at Ottawa University. He is currently employed as a Senior Engineer/Scientist at Motorola, Inc. in Mesa, Arizona.