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ABSTRACT

A business and education partnership model addressed a shortage of local, qualified, entry-level, technically skilled workers through a school-to-work apprenticeship program at the North Montco Technical Career Center in Lansdale, Pennsylvania. The research-based solution plan of the Pennsylvania Youth Apprenticeship Program (PYAP) included three components. First, four committees were formed to plan and facilitate the model: stakeholders, marketing, recruitment, and mentor workplace committees. Second, a school-to-work coordinator and appropriate academic teachers were hired. Third, an industry-based, academic and technical skill curriculum was developed and implemented. Members of the business community, sending school staff, and career center staff were actively involved in the formation and implementation of this model. A comparative analysis of traditional program students and PYAP students indicated that the 1994 placement rate of PYAP graduates either employed in a field related to their training or furthering their education was increased by 40 percent over the traditional program graduate rate of 60 percent. The 1994-95 first-semester school absence average of 2 days for PYAP students was 187 percent less than the average 5.7 days for traditional program students. The 1993-94 through 1994-95 PYAP enrollment increased 425 percent compared to the traditional program enrollment increase of 25 percent. (Appendixes include tables, forms, and publicity materials. Contains 100 references.) (Author/YLB)

The Development and Implementation of a School-To-Work Apprenticeship Model at a Technical Career Center

by

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A Major Applied Research Project Report
submitted in partial fulfillment of the requirements
for the degree of Doctor of Education

National Ed.D. Program for Educational Leaders
Nova Southeastern University

April 1995

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As Major Applied Research Project Committee Chair, I affirm that this report meets the expectations of the National Ed.D. Program for Educational Leaders as a representation of applied-field research resulting in educational improvement.

Karen Ruskin, Committee Chair

Karen B. Ruskin — 4/10/95
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Abstract

The Development and Implementation of a
School-To-Work
Apprenticeship Model
at a Technical Career Center

This project was a successful business and education partnership model, which was jointly funded by the Pennsylvania Department of Education, the Department of Commerce, and the Department of Labor. The project addressed a shortage of local, qualified, entry level, technically skilled workers through a school-to-work apprenticeship program at the North Montco Technical Career Center in Lansdale, Pennsylvania.

A research-based solution plan included three components. First, four committees were formed to plan and facilitate the model: a Stakeholders Committee, a Marketing Committee, a Recruitment Committee, and a Mentor Workplace Committee. Second, a school-to-work coordinator and appropriate academic teachers were hired. Third, an industry-based, academic and technical skill curriculum was developed and implemented. Members of the business community, sending school staff, and Career Center staff were actively involved in the formation and implementation of this model.

A comparative analysis of traditional program students and youth apprenticeship program students indicated the project objectives were achieved. First, the 1994 graduate placement rate of youth apprenticeship graduates either employed in a related field to their training or furthering their education was increased by 40% over the traditional program graduate rate of 60%. Second, the 1994-1995 first-semester school absence average of 2.0 days for youth apprenticeship students was 187% less than the school absence attendance average of 5.7 days for traditional program students. Third, the 1993-1994 through 1994-1995 youth apprenticeship program enrollment increased 425% from 4 to 21 students compared to the traditional program enrollment, which increased 25% from 585 to 731 students.

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List of Acronyms

ACT	American College Testing
AFL-CIO	American Federation of Labor--Congress of Industrial Organizations
AVTS	area vocational-technical school
CIPP	Context, input, process, and product evaluation model (Stufflebeam, 1970)
CNC	computer numerical control, refers to machinery
CORD	Center for Occupational Research and Development
DVIRC	Delaware Valley Industrial Resource Center
GAPP	German-American Partnership Program
HSTW	high-schools-that-work
HVAC	heating, ventilation, and air-conditioning
IEP	individualized education plan
IRB	Institutional Review Board
ISP	individual student plans
ITB	Industrial Training Board
JOC	Joint Operating Committee
JTPA	Job Training Partnership Act
KEC	Key Evaluation Checklist (Scriven, 1991)
MARP	Major Applied Research Project
NAB	National Alliance of Businesses
NMTCC	North Montco Technical Career Center
NOCTI	National Occupational Competency Testing Institute
OAC	Occupational Advisory Committee
PAC	Professional Advisory Committee
PDE	Pennsylvania Department of Education
PIC	Private Industry Council
POICC	Pennsylvania Occupational Information Coordinating Committee
PYAP	Pennsylvania Youth Apprenticeship Program
SAC	Student Assessment Committee
SCANS	Secretary of Education's Commission on Achieving Necessary Skills
SME	Society of Manufacturing Engineers
SREB	Southern Region Educational Board
STWOA	School-To-Work Opportunities Act of 1994
TEC	Training and Enterprise Council
TPAD	tech prep associate degree
WBL	Work-Based Learning Program
WMCAVTS	Western Montgomery County Area Vocational-Technical School
WRAT	Wide-Range Achievement Test
YAP	youth apprenticeship programs

Chapter 1

Problem

Problem Statement

An analysis of the 1985 through 1993 graduating classes at the North Montco Technical Career Center (NMTCC), located in Lansdale, Pennsylvania, revealed that out of 1,662 graduates within 90 days of graduation, only 864 (52.0%) entered a related occupational trade and only 176 (10.6%) furthered their educational training. The remaining 622 graduates either worked in a nonrelated occupation, 339 (20.4%), were in the military, 62 (3.7%), or were available for employment, 221 (13.3%) (see Table 1).

Table 1

North Montco Technical Career Center Senior Placement Report Summary, 1985-1993

Placement	1985	1986	1987	1988	1989	1990	1991	1992	1993
Continuing schooling	16	5	9	10	19	28	26	35	28
Related field	133	119	130	95	81	80	88	65	73
Nonrelated field	45	45	31	30	41	40	41	39	27
Military	11	7	5	9	10	1	5	10	4
Available for employment	37	31	39	49	16	15	16	13	5
Total	242	207	214	193	167	164	176	162	137

An analysis of the 1992 labor market information for Montgomery County, Pennsylvania, revealed that the county will face a critical shortage of workers in the high-skill technical trades toward the 21st century. As of 1992, there were over 500 employment openings per year within the county in manufacturing-related, technical-skill occupations. All of these manufacturing-related employment opportunities were occupations reflective of the preparatory vocational-technical secondary curriculum offerings at NMTCC (Pennsylvania Occupational Information Coordinating Committee, 1992).

Since 1984, NMTCC manufacturing and engineering-related technology programs have experienced a decline in student participation (see Table 2). Although jobs were available to graduates from these programs, many of the graduates did not choose professions related to their area of training.

The three NMTCC manufacturing-related training programs functioned since 1966 with enrollments as high as a combined total of 107 students during the 1981-1982 school year. The enrollments were so great during the late 1970s that the center had to offer a postsession that ran from 3 p.m. to 6 p.m. to accommodate the increased class sizes. This increase in school enrollment also occurred at the sending school level and was attributed to the baby-boom era. Then in 1991-1992, for the first time, the machine trades and welding programs' enrollment diminished to the point whereby

the two program teachers were reduced to part-time employment during the afternoon session only. The welding program also experienced a decline in enrollment; however, this program sustained full-time operation during this period of time.

Table 2

NMTCC Manufacturing-Related Technology and Engineering-Related Technology October 1 Enrollment Comparisons, 1981-1993 School Years

School years	Machine trades	Welding	Engineering
1981-1982	65	38	107
1982-1983	49	43	93
1983-1984	49	45	102
1984-1985	42	40	102
1985-1986	36	30	84
1986-1987	20	23	68
1987-1988	14	22	57
1988-1989	12	22	51
1989-1990	20	19	38
1990-1991	18	18	43
1991-1992	10	17	37
1992-1993	12	22	39
1993-1994	12	19	38

Note. Engineering-related technology was a new program beginning in 1993-1994. Prior to 1993-1994, three programs--electronic servicing, electronics technology,

and electrical systems--comprised the figures as reported.

The appropriate academic and vocational-technical preparation of NMTCC graduates in relation to high-skill manufacturing occupations was an additional concern of the Pennsylvania Youth Apprenticeship Program (PYAP) Stakeholders Committee. The PYAP stakeholders represented 23 manufacturing companies located in northern Montgomery County. In response to this concern, the PYAP machine trades Mentor Workplace Committee identified the academic and technical skills necessary to adequately prepare high school youth for the manufacturing occupations of the 21st century. These committees determined that the current delivery of both the academic and vocational-technical school curriculum did not meet the work-based learning needs of this industry (North Montco Technical Career Center [NMTCC], 1994e).

Overview of the Project Setting

The North Montco Technical Career Center is located 25 miles north of Philadelphia, Pennsylvania. It was built in 1966 to accommodate a maximum of 760 students from five school districts: North Penn, Souderton, Methacton, Wissahickon, and Perkiomen Valley. NMTCC is a shared-time school whereby, as of October 1993, 576 students, Grades 9 through 12, received academic courses for one-half day in their sending school and the other half of their day in vocational training at the center (NMTCC, 1994b).

The focus of this project and the newest program addition to NMTCC was the Pennsylvania Youth Apprenticeship Program. The PYAP began in September of 1993 with a pilot group of five machine trades youth apprentices. The PYAP students were enrolled in academic courses at the center 3 days per week and were employed in the local machine trades industry as student apprentices 2 full days per week. An integral part of this project was to expand the PYAP initiative for the 1994-1995 school year to include two additional youth apprenticeship offerings: welding and engineering-related technology. Due to increased interest in the PYAP initiative during the last month of the 1993-1994 school year, the center's PYAP offerings were expanded to include heating, ventilation, air-conditioning (HVAC); graphic arts; commercial art; carpentry; outdoor power equipment; automotive technology; welding; and drafting and design technology.

Western Montgomery County Area Vocational Technical School (WMCAVTS), located 12 miles west of NMTCC near the town of Limerick, Pennsylvania, was one of the five initial PYAP metal trades pilot sites implemented in September of 1992. Because the program participation of WMCAVTS grew from five initial participants in 1992-1993 to 50 in 1994-1995, the center's PYAP anticipated similar enrollment figures for the 1995-1996 school year.

Operating as a full-day school for seniors only,

WMCAVTS's programs differ from the half-day, Grades 10 through 12, traditional vocational-technical program offerings at NMTCC. The PYAP and a program for special education students are the only 2-year programs offered at WMCAVTS. Both schools operate machine trades PYAPs, encompassing technical and academic skill training 3 days per week at the schools and work-based training experiences 2 days per week at the sponsoring companies.

During this project, NMTCC employed a total of 34 teachers: 22 (64.7%) taught vocational-technical program offerings, 1 was a cooperative education teacher, 4 were academic teachers, 4 were special education teachers, 1 was an intermediate unit special education teacher, 1 was a full-time counselor, and 1 served in a new capacity as the school-to-work transition coordinator. The latter person was responsible for coordinating the work-based component of the PYAP.

During the 1993-1994 and 1994-1995 school years, the PYAP academic teachers were employed on a part-time basis due to the low enrollment of the pilot group of students. These part-time teachers taught English, social studies, science, and physical education. The full-time mathematics teacher who is employed by NMTCC also provided instruction to the PYAP students. Two of the part-time teachers who were employed during the 1993-1994 school year left NMTCC at the end of the 1993-1994 school year to be employed

elsewhere on a full-time basis. New social studies, English, and physics teachers were employed prior to the start of the 1994-1995 school year.

In 1991, NMTCC's enrollment projections for the years 1991-2000 indicated the school population could increase to as high as 820 secondary students by the year 2000 (see Appendix A). The center's projected enrollment figures were computed by calculating the percentage of NMTCC's participants from the five sending districts since 1984 and dividing this number into the projected total high school enrollment figures. The implementation of the new apprenticeship programs during the 1994-1995 school year added to the enrollment growth of the center. The total school enrollment during the 1994-1995 school year reached 731 students or an increase of 155 students (21.2%) over the previous year. This figure represents an increase of 93 (14.6%) students over the 1991 projected enrollment for the 1994-1995 school year. This increase in students meant that space constraints within the building would be a concern if the disparity in enrollment projections continued in subsequent years.

In May of 1993, the Governor of the Commonwealth of Pennsylvania, Robert P. Casey, selected NMTCC as one of 16 sites statewide to receive grant money totaling $90,000 per school over 3 school years (1993-1994 through 1995-1996) to develop and implement a School-to-Work PYAP (Casey, 1993).

Since 1992, Pennsylvania piloted machine trades apprenticeship programs at five vocational-technical sites. Beginning with the start of the 1994-1995 school year, NMTCC was the first public school in Pennsylvania to provide a combination of PYAP machine trades, welding, and engineering-related technology, HVAC, graphic arts, carpentry, outdoor power equipment, and automotive technology apprenticeship training.

NMTCC's administration employed a PYAP Coordinator, beginning in March 1994, in conjunction with WMCAVTS--a position which was funded through the Delaware Valley Industrial Resource Center (DVIRC), located in Philadelphia, Pennsylvania. This agency is operated by the Department of Commerce and was directly involved in the PYAP initiative on a statewide basis.

The PYAP Coordinator alternated 3 full days per week at the center and alternate days spent working with the PYAP at WMCAVTS. This position was eliminated during the summer of 1994 due to the reorganization of NMTCC PYAP coordinator position. The DVIRC-funded PYAP coordinator became the full-time adult education coordinator at NMTCC and the former full-time cooperative education teacher became the new school-to-work coordinator. This person gained the responsibility of coordinating the PYAP work-based training. A newly hired assistant principal was given the responsibility of coordinating the academic portion of the

program. Furthermore, the project manager was given the responsibility of PYAP technical training and overseeing the project operations.

Problem Definition and Evidence of Problem Data

Increasing numbers of NMTCC technical occupations employers are expressing concern about the mismatch between the low-skill ability of new employees and the demands of the modern workplace. Inger (1990) reported that American employers are "complaining that they cannot find sufficient workers with even rudimentary basic skills" (p. 1). He attributed this factor as the primary cause of the decline in U.S. international economic competitiveness. He also stated, "international comparisons have found that U.S. students perform particularly poorly on tests that determine adaptability and flexibility" (p. 1). Huelskamp (1993) further noted that the recent education debate "focuses on the system's inability to adequately prepare students with skills for the work force [sic]" (p. 720). Nowhere is this concern etched more sharply than in the manufacturing sector of the Commonwealth of Pennsylvania (National Governors' Association, 1990).

Montgomery County leads the commonwealth as the largest manufacturing county with over 500 manufacturing companies. This compares to the manufacturing industry statewide, which is in excess of 6,000 companies (Rozansky, 1992). Due to the high number of companies, the availability of new

technically trained employees to fill technical manufacturing occupation vacancies is an acute problem. Harrington-Lueker (1991) emphasized that Pennsylvania high school and postsecondary graduates are not electing to enter the metalworking occupations.

Another employment problem is the late age at which adults become apprentices in the United States. Denby (1991) reported that in 1990 the United States adult apprentice average age was 29.1 years; however, in the manufacturing industry, where workers must bid for apprenticeship openings on the basis of seniority, the average age of an apprentice was 38. Wonacott (1992) also found that "two-thirds of all U.S. adult apprentices are in 20 of the 830 apprenticeable occupations" (p. 10). A striking 17 out of the 20 occupations are in the construction and metal trades. The diversity of potential registered apprenticeable occupations was a primary reason for offering the PYAP to students from all trade areas at NMTCC.

Although many companies are laying off workers, highly skilled employees are still in demand. According to the National Tooling and Machining Association, which is comprised of 3,100 subcontractors, an estimated 15,000 additional workers are needed annually, but only a fraction are being trained (Rozansky, 1992). The U.S. Department of Labor, Bureau of Labor Statistics' (1991) report, Durable

Goods Manufacturing Jobs 1985-1991, predicted that there would be a 3% decline in jobs during this period. The Pennsylvania Department of Labor and Industry's Employment Outlook in Pennsylvania Industries and Occupations (1990) listed the average annual change in employment for engineers and industrial computer programmers for years 1990 through 2000. There will be an average of 3,740 openings per year for engineers and 1,270 positions per year for industrial computer programmers.

The manufacturing occupations that are experiencing growth in the 1990s require a different type of skill than in the past. Esther Whitten (cited in Rozansky, 1992), a training supervisor for the National Tooling and Machining Association, emphasized this point, "the metalworking trades have come to rely more on computers to perform sequences of tooling operations, and to do drafting and design" (p. 31).

The Pennsylvania Occupational Information Coordinating Committee (POICC) maintains information on the status of jobs in each county within the state of Pennsylvania. Labor market data, which indicated a local need for the youth apprenticeship program (YAP), were presented as an 11-year comparison (see Table 3).

Despite the decrease in actual numbers of workers employed in the machinist and tool-and-die professions from 1984 through 1995, there still exists a great need to secure new technically skilled workers in these trade areas as

indicated by the number of new openings per year. The information presented in Table 3 is therefore misleading to the general public.

Table 3

POICC Labor Market Data, 1984 and 1995

Type of occupation and location	1984 No.	1995 No.	Percent of change	Openings per year No.
Machinists:				
Philadelphia region	9,380	8,394	-10.5	204
Montgomery County	1,464	1,310	-10.5	32
Tool and die operators:				
Philadelphia region	8,850	9,742	+10.1	150
Montgomery County	637	544	-14.6	15
Mechanics, installers, repairers:				
Philadelphia region	88,977	97,242	-9.3	3,534
Montgomery County	9,809	10,710	+9.2	371

Note. 1995 figures are projected by POICC. These occupations do not represent all occupations that are taught within the NMTCC PYAP.

Locally, the Philadelphia, Pennsylvania chapter of the Society of Manufacturing Engineers (SME) was also perplexed with the lack of employees to fill the local voids in the manufacturing industry. The president of this chapter sought the assistance of the center's machine trades

instructor to develop dialogue on this matter.

The SME hosted two roundtable discussions in Philadelphia, Pennsylvania in February and September 1994 to discuss the process of developing relationships between industry and schools to determine the skills that would be necessary for students to succeed in the manufacturing industry upon high school graduation (Davis, 1994). These discussions were equally represented by postsecondary schools offering engineering programs, Philadelphia region manufacturing industries, and secondary technical schools, including NMTCC. A consensus was that all three groups must work collaboratively to increase and improve the quality of education and technical skills necessary for the 21st century.

The lack of NMTCC graduates to fill the Montgomery County manufacturing workforce was also evidenced by examining the cooperative education telephone requests for center students from these technical skill areas (see Table 4).

The NMTCC Cooperative Education Department was comprised of one full-time teacher and one part-time teacher. During the 1994-1995 school year, this department was reduced to one full-time teacher. The remaining teacher was named the new school-to-work transition coordinator when this position was created. This coordinator maintained a file of potential jobs. During the years 1989 through 1993,

local industry employers indicated their frustration at the lack of available vocational-technical students to fill their advertised positions.

Table 4

NMTCC Cooperative Education Telephone Job Requests for the Machine Trades, Welding, and Engineering-Related Technology Programs, 1991-1994

Programs	1991-1992	1992-1993	1993-1994
Machine trades	6	7	15
Welding	7	8	11
Engineering tech	13	16	15

Note. For years 1991-1992 and 1992-1993, 80% of these job requests were made during the spring of the year.

An inadequate supply of trained graduates to fill industry-identified positions was congruent with NMTCC's statistics for graduates of the three manufacturing programs. All NMTCC's graduates were surveyed 90 days after graduation to discern their career path. These survey data were reported as an entire graduating class rather than by individual programs. However, data over a 2-year span were obtained to provide an indicator to the career-path directions of the three traditional manufacturing programs offered at NMTCC (see Table 5).

The low number of graduates entering the career for which they were trained was a concern of NMTCC's administration, teachers, and the Joint Operating Committee

(JOC). The center's Occupational Advisory Committee (OAC) also echoed this concern.

Table 5

Machine Trades, Welding, and Engineering-Related Technology (formerly Electronics Technology) Graduate Placement Statistics, 1991 and 1993

Program	Total graduates		Related occupations		Nonrelated occupations		Furthering education	
	1991	1993	1991	1993	1991	1993	1991	1993
Machine trades	6	5	5	3	1	2	0	1
Welding	10	2	7	2	3	2	0	0
Engineering	13	7	6	3	4	1	3	3
Totals	29	14	18	8	8	5	3	4

Note. The engineering-related technology statistics reported are representative of two previous programs: electronics technology and electronic servicing.

Even though many NMTCC graduates were not entering a related occupation, the center experienced a rising number of graduates who were pursuing postsecondary training (see Table 1). The NMTCC Senior Placement Survey (NMTCC, 1994g) of the 1992 graduating class of 162 students yielded that 35 (21.6%) of the graduates furthered their training at a postsecondary institution upon graduation. This compares with the 1993 graduating class of 137 students with 28 (20.4%) of the graduates furthering their education (see

Table 1).

The NMTCC 1993 Senior Placement Survey (NMTCC, 1994g) conducted by Career Center teachers in June of 1993 indicated two main reasons for this all-time high number of graduates enrolled in postsecondary education programs (see Table 1). First, the economic recession prevented many students from obtaining employment, especially in the construction trades. Second, graduates realized that many industries were hiring students with advanced technical degrees.

The center's officials pointed to the U.S. Labor Department's statistics released in 1992, which emphasized another labor concern that 80% of the jobs by the year 2000 will require a postsecondary technical degree in lieu of the traditional 4-year baccalaureate degree (U.S. Department of Labor, Bureau of Labor Statistics, 1992). "America's economic prosperity during the next 10 years will depend upon improving the skills of millions of our nation's young people who will find success by pursuing a path other than the traditional college route" (Lagana, 1992, p. 1).

NMTCC prepared for the onslaught of students who continued to pursue the technical preparatory (tech prep) track in response to the U.S. Department of Labor, Bureau of Labor Statistics' (1992) report. A 1991 poll conducted by the National School Boards Association revealed that 92% of the board members surveyed were in support of tech prep

programs (Hull, 1993). According to Hull (1993), "in 1993 there were more than 650,000 U.S. students enrolled in some form of tech prep program taught in more than 23,000 high schools in all 50 states. By the fall of 1995, this number is expected to grow to 2.5 million" (p. 193). This figure represents an anticipated increase of 285%.

In 1993-1994, the Engineering-Related Technology Program was the most recent curricular addition to NMTCC. This new offering was one of the hopeful solutions to meet the local workforce demand by providing students with hands-on training. This experience enabled students to become industrial maintenance mechanics or to further their training through postsecondary technical associate degree opportunities and possibly become electrical or mechanical engineers. Due to steadily declining enrollment, the existing electronics program was terminated at the conclusion of the 1992-1993 school year, and a new 5,000-square-foot lab was created in its place to house the engineering-related technology curriculum. Three local pharmaceutical companies donated approximately $500,000 worth of packaging equipment to the engineering lab to train both secondary and postsecondary students.

During the 1993-1994 school year, an articulation agreement was established through a Tech Prep/Associate Degree Agreement between NMTCC and the Ogontz branch campus of Pennsylvania State University and the Montgomery County

Community College Engineering Department. Students electing to participate in the new PYAP Engineering-Related Technology Program, beginning with the 1994-1995 school year, were provided with the opportunity to obtain advanced standing credits through the Penn State Ogontz Engineering Technology Program and Montgomery County Community College. This opportunity enabled students to enter the workforce with an associate's degree in engineering or continue on for a bachelor's degree in a related field of study. In this sense, local industry had a hand in the development of this program's curriculum. Due to an interest expressed by these companies, the center's PYAP was developed and implemented.

Unlike a traditional high school, NMTCC must continually recruit students to enroll in the center's programs. During the late 1970s, when the enrollment was quite high, the means of recruitment was not as aggressive as compared to the late 1980s and early 1990s. Recruitment efforts in the last 15 years consisted of fall presentations by NMTCC guidance counselor before each of the participating school's ninth grades. Follow-up meetings with ninth graders who expressed an interest in attending the center were usually conducted within 4 weeks following the initial presentation. Each student received brochures depicting the course offerings, and direct mailers were sent to the parents of every ninth-grade child.

In February of each year, a ninth-grade parent Open

House was held at the center to give parents of potential students an opportunity to ask questions about the programs. Career expositions were also held at each of the sending schools whereby current center students provided hands-on, trade-related demonstrations.

New for the 1993-1994 school year was a professionally planned and constructed recruitment video titled, Discover a Future That Works (NMTCC, 1993a). This recruitment tool was developed by a professional educational video production company and was the first P/AP recruitment tool featuring an actual youth apprentice working in both the technical school as well as an industry setting.

Due to limited human and budgetary resources, the NMTCC administration became concerned with the effectiveness of the marketing efforts. This additional problem prompted the Marketing Committee and the administration to survey the current students to determine the most effective means of marketing the programs. Springhouse Resources, a local marketing firm, assisted with the development of the Program Delivery Improvement Questionnaire instrument (NMTCC, 1994d) (see Appendix B). Out of 426 students randomly surveyed by grade level, the four most helpful recruitment activities reported in order of preference were touring the center, reviewing the Career Clustering brochure, talking with friends or relatives about the programs, and talking with their sending school guidance counselor (see Table 6).

Table 6

Responses of NMTCC Students to Program Delivery Improvement Questionnaire, September 1994

Question	Responses	Students (n = 426) Frequency	Percent
1. What is your present grade level?	. Grade 9	60	14.1
	. Grade 10	209	49.1
	. Grade 11	106	24.9
	. Grade 12	48	11.3
	. missing	3	.7
2. Which type of North Montco program are you taking?	. career clusters	359	84.3
	. PYAP	9	2.1
	. WBL	17	4.0
	. career enrich-ment	27	6.3
	. missing	14	3.3
3. Are you taking tech prep courses at your high school and/or North Montco?	. yes	182	42.7
	. no	232	54.5
	. missing	12	2.8
If not, why aren't you taking tech prep courses?	. courses too hard	11	2.6
	. preparing for college prep	24	5.6
	. courses not offered	31	7.3
	. didn't know about tech prep	148	34.7
	. other	34	8.0
	. missing	178	41.8
4. If you are in Grade 11 or 12 and did not enroll in the PYAP, please indicate the reason:	. poor grades	11	2.6
	. will enroll next year	16	3.8
	. didn't know	78	18.3
	. other	43	10.0
	. was not in Grade 11 or 12	278	65.3

(table continues)

Question	Responses	Frequency	Percent
5. The following is a list of Career Center promotional activities used during the 1993-1994 school year. Indicate the activities either you or your parents participated in during the year.	. seeing the Career Clustering brochure	212	49.8
	. seeing the video, Discover a Future That Works	141	33.1
	. attending course selection night	96	22.5
	. parent's night at the center	112	26.3
	. PYAP meeting in high school	54	12.7
	. seeing PYAP presentation in academic classes	80	18.8
	. reading articles in newspapers	130	30.5
	. talking with sending school guidance counselor	209	49.1
	. touring the center	233	54.7
	. follow-up in high school by center counselor	127	29.8
	. talking to friends or relatives	248	58.2
	. other	273	63.8
6. List the three activities from the list above that were most helpful in informing you about the center's programs. (Frequency represents the total of subjects' responses.)	. seeing the Career Clustering brochure	124	--
	. seeing the video, Discover a Future That Works	93	--
	. attending course selection night	53	--
	. parent's night at the center	63	--
	. PYAP meeting in high school	32	--

(table continues)

Question	Responses	Frequency	Percent
6. (cont.)	. seeing PYAP presentation in academic classes	24	--
	. reading articles in newspapers	45	--
	. talking with sending school guidance counselor	99	--
	. touring the center	132	--
	. follow-up in high school by center counselor	41	--
	. talking to friends or relatives	105	--
	. other	5	--

Further information from this survey indicated additional information is needed to spread the information about the program offerings available to potential NMTCC students. The information taken from Table 5 was used to develop recruitment efforts for potential 1995-1996 PYAP students.

An additional student questionnaire was developed with the assistance of Springhouse Resources to ascertain the effectiveness of recruiting the 1994-1995 PYAP students (NMTCC, 1994c) (see Appendix C). All 19 of the PYAP students responded to this questionnaire (see Table 7).

The PYAP students indicated the two most helpful recruitment means were talking with their sending school guidance counselor and touring the center. They were equally divided on the third most helpful means, which were

seeing the new recruitment video, attending the PYAP informative meeting in their sending school, and talking to friends or relatives.

Table 7

Responses of NMTCC PYAP Students to PYAP Improvement Questionnaire, September 1994

Question	Responses	PYAP students (n = 19) Frequency	Percent
1. What is your present grade level?	. Grade 11	17	89.5
	. Grade 12	2	10.5
2. Is this your first or second year in the program?	. first year	18	94.7
	. second year	1	5.3
3. Did you take tech prep courses at your high school?	. yes	4	21.1
	. no	15	78.9
If not, why didn't you take tech prep courses?	. course too hard	0	0
	. college prep	1	5.3
	. courses not offered	2	10.5
	. didn't know about tech prep	8	42.1
	. no reason	1	5.3
	. no time	2	10.5
	. missing	5	26.3
4. Post-high-school plans	. work full-time with employer	4	21.1
	. adult apprentice-ship	1	5.3
	. technical school	4	21.1
	. 4-year college	0	0
	. work and go to college	7	36.8
	. armed forces	1	5.3
	. other	2	10.5

(table continues)

Question	Responses	Frequency	Percent
5. The following is a list of center promotional activities used during the 1993-1994 school year. Indicate the activities either you or your parents participated in during the year.	. seeing the Career Clustering brochure	2	10.5
	. seeing the video, Discover a Future That Works	6	31.6
	. attending course selection night	7	36.8
	. parent's night at the center	6	31.6
	. PYAP meeting in high school	8	42.1
	. seeing PYAP presentation in academic classes	9	47.4
	. reading articles in newspapers	7	36.8
	. talking with sending school guidance counselor	15	78.9
	. touring the center	8	42.1
	. follow-up in high school by center counselor	7	36.8
	. talking to friends or relatives	9	47.4
	. other	2	10.5
6. List the three activities from the list above that were most helpful in informing you about the center's programs. (Frequency represents the total of three subjects' responses)	. seeing the Career Clustering brochure	0	--
	. seeing the video, Discover a Future That Works	2	10.5
	. attending course selection night	0	--
	. parent's night at the center	0	--
	. PYAP meeting in high school	2	10.5
	. seeing PYAP presentation in academic classes	0	--
	. reading articles in newspapers	1	5.3

(table continues)

Question	Responses	Frequency	Percent
6. (cont.)	. talking with sending school guidance counselor	4	21.1
	. touring the center	3	15.8
	. follow-up in high school by center counselor	1	5.3
	. talking to friends or relatives	2	10.5
	. missing	4	21.1

Additional information was obtained from this survey instrument that indicated the effectiveness of the academic preparation of the PYAP students prior to enrolling in the PYAP. A surprising eight (42.1%) of the respondents indicated they were not informed about tech prep academic courses prior to enrolling at NMTCC. This information was used to address the recruitment efforts for potential 1995-1996 PYAP students.

Lastly, this questionnaire asked about the postsecondary plans of the current PYAP students. A variety of responses were given. Students continuing their apprenticeship training while pursuing their college degree comprised the highest response at seven (36.8%).

Possible Causes

Many causes were linked to the shortage of qualified skilled workers in the manufacturing industries of Montgomery County, Pennsylvania. The critical shortage of qualified skilled workers was not only a Montgomery County

problem, but also a national problem. This project addressed the center's decline in student enrollment in the programs that corresponded to the local workforce needs in the manufacturing occupations. Primary focus was on the marketing strategies used to increase the programs' attendance and to provide a fresh approach to training secondary students in preparation for the high-skilled workforce of the future.

According to the National Governors' Association's (1990) Training the American Work Force conference proceedings, the emerging crisis of workforce preparation has been well documented in the form of studies in Pennsylvania and throughout the nation. Some of the key findings of these studies yielded the following:

> The effective application of modern technology to manufacture specialty products for international markets requires workers with new and higher skills.
>
> Many secondary aged students graduate without appropriate academic, technical, and occupational skills or the ability to swiftly acquire new skills.
>
> The link between school and work or between employers and postsecondary institutions is weak, and there is a lack of opportunity for secondary students to learn career skills in a job setting.
>
> Quality employer training programs for new or current workers are scarce and most on-the-job training is not linked with formal education. (National Governors' Association, 1990, p. 36)

Due to the increased public school population, the vocational-technical schools in Pennsylvania flourished during the 1960s and 1970s. During the mid-1960s, all four

of the Montgomery County area vocational-technical schools were built. The enrollment patterns in Table 1 echoed this trend in school growth. Upon examining the enrollments of NMTCC and its five sending schools, I discovered that the percentage of high school students who attended the center changed very little throughout this period. This information was useful in determining the projected enrollment through the turn of the century (see Appendix A). The exception was the Souderton Area School District participation, where a dramatic decrease in student participation occurred during the late 1980s and early 1990s. This was attributed to the change in demographics within the community during this period as well as increased graduation requirements imposed at the high school level. Prior to the 1993-1994 school year, students electing the NMTCC course of study could not return to the high school after they made this career decision or they would be faced with a graduation credit deficiency. This was the result of credits being waived to participate in the center's program. If students returned to their high school, they were required to make up the waived credits.

Beginning with the 1993-1994 school year, the NMTCC administration and sending school principals committed to increasing the academic requirements of all center students. These administrators also made a decision to offer the center programs in a more flexible format. In lieu of the

traditional 3-year course of study, students were able to participate in programs in 1-, 2-, 3-, or 4-year courses of study.

Another primary reason for decreasing student participation at the center was society's bias against vocational schools and the skilled trades. Jean Wolfe (cited in Rozansky, 1992), PYAP State Coordinator, summarized this cause by stating:

> Part of it is our culture, we all want our kids to do better than we do. We push them towards college and no one wants to get their hands dirty. Everyone wants to use their head, not their hands. That sounds good until you need your car serviced. (p. 31)

Many parents of secondary school students have false presumptions about options available to students who enroll in NMTCC programs. Parents surveyed indicated the prevailing opinion that their son or daughter could not go on to college if their child elected a vocational program. A typical response by center staff was that the students must select appropriate academic course work at the sending school to maintain the option of postsecondary schooling. Parents traditionally failed to see the opportunities available through vocational education. To dispel these false assumptions, the NMTCC counselor provided students and their parents with a fact or myth brochure. The U.S. Department of Labor, Bureau of Labor Statistics' (1992) description of the need for postsecondary technical training, Occupational Outlook Quarterly, was also

explained. The tech prep initiative with local postsecondary schools was aimed at addressing this concern and a county tech prep consortium marketing committee addressed this problem in the form of a comprehensive marketing plan during the summer of 1994.

NMTCC has also been called the dumping ground for students who are not academically talented. This viewpoint was documented as far back as 1968 in a comment from an observer who attended the center's first open house (Gumperson, 1968). The comment, which was printed in a local newspaper, The Reporter, described the school as serving as the "dumping ground" (p. 2). This stereotype is difficult to break. McKenna (1993) emphasized that adults and particularly educators need to adjust their thinking about vocational education as a "pigeon hole for second-class citizens" (p. 18). The impact of vocational-technical education will be felt when parents and potential students see the vast number of college graduates who are unable to obtain employment. Fifty-two percent of the 1993 and 1994 center graduates were employed in an occupation related to their training within 90 days of graduation (NMTCC, 1994g).

The declining enrollments in the center were also attributed to the increased graduation requirements imposed in 1985 through the new Pennsylvania Chapter 5 regulations (Pennsylvania Chapter Five Regulations, 1985). The result

of increasing graduation requirements from 21 to 24 credits in an effort to raise the academic competence of secondary students statewide was that vocational students were locked into a very tight schedule, whereby elective courses were virtually impossible to schedule. NMTCC students were also provided with reduced vocational course time. One of the school districts, Perkiomen Valley, only participated in the afternoon session at the center, which limited the number of students who could participate in the vocational programs.

In the late 1970s when the center enrollments were booming, criteria were developed for determining student eligibility in the center programs. These criteria limited the number of student admissions as an administrative strategy for dealing with the large number of students who were applying for the center's programs. The criteria for admission included recommendations from an assistant principal, academic teacher, and an industrial arts or home economics teacher. Students also were required to complete Algebra 1 in order to enroll in either drafting or building technology, which were considered technical programs. These prerequisites were deemed discriminatory when the Carl D. Perkins and Applied Technology Act (1984) was instituted. Special education students were denied access to the programs because of their limited academic ability. Therefore, prior to 1984 students entered programs without appropriate documentation of the students' interest or

aptitude. The center's source, "feeder" school districts, began sending a higher number of special needs students to the center. Special needs students at NMTCC were defined as students who had an individualized education plan (IEP) or who were academically disadvantaged (below the 25th percentile academically).

The center's all time high for this group was 60% of the student population during the 1991-1992 school year. In the last half of the 1992-1993 school year, the administration took steps to develop and implement a system to evaluate student aptitude and interest prior to students registering in a center program. The result was a decline in the inappropriate matchup between students and appropriate career training placement.

A preponderance of employers in the manufacturing industry indicated that the future prosperity of this nation depends on the energy, flexibility, and creativity of a well-trained workforce that possesses knowledge, innovation, efficiency, and dedication to quality (William T. Grant Foundation, 1991). From an industry viewpoint, the concern was focused on the number of older Americans in the workforce increasing, while the 16-to-24-year-old portion of the population has been declining since 1980 (Carnevale, Gainer, & Schulz, 1990). The 16-to-24-year-old population is expected to increase the availability of more entry-level workers. Carnevale et al. cautioned, "as the demands of the

workplace become more technologically complex, the rising pool of workers lack many of the most basic skills, including reading, problem solving, and computation" (p. 1). These same concerns were voiced by the center's Occupational Advisory Committee during the curriculum redesign planning phase throughout the 1993-1994 school year.

Barber, Crouch, and Merker (1992) reported that 30% of the potential labor pool comes from populations that are disadvantaged, poor, unemployed, or unemployable. The problem is that "as the nature of work becomes more complex, alternative approaches to educating and training in the workplace will be necessary to promote continuous learning and development" (p. 99). Realizing that 60% of the center is comprised of students who are academically disadvantaged or in special education, NMTCC developed an alternative to the PYAP. During the summer of 1994, the center developed a work-based learning program (WBL) modeled after the PYAP to serve the occupational needs of special education students. This unique model follows the same instructional delivery format as the PYAP with one difference--the jobs these students possess are not highly skilled in nature. During the fall and winter of the 1994-1995 school year, four students participated in this program. By April of 1995, only two students remained in this program. These students were employed at an automotive tire service center where they received training for lifelong employment. The two

students who left the program did so because they were in need of a more restrictive environment. These students returned to their sending high schools to receive their academics in a traditional classroom setting.

Summary of the Problem

Of the 1991 and 1993 Career Center graduates from the machine trades technology, welding technology, and electronics technology secondary programs, 67.5% did not pursue working directly in the trade or a related profession upon graduation, nor did they pursue advanced technical training. The technical-skill shortage problem that faces Montgomery County, Pennsylvania's, manufacturing workforce also is a problem on a national level.

Academic competence and the premise that all high school graduates must go on to college were determining factors in the shortage of a skilled workforce (Harrington-Lueker, 1991). Recruiting students to fill the technical-skill shortage was the greatest challenge that faced the success of the Youth Apprenticeship Program. This problem was compounded by the fact that the students who were entering the technical-skill trades through the traditional training approach were lacking the academic competence to meet employer expectations (Hamilton, 1990; Hull, 1993).

In response to these plaguing problems, two professionally developed surveys--the Program Delivery

Improvement Questionnaire (NMTCC, 1994d) (see Appendix B), and the Pennsylvania Youth Apprenticeship Program Improvement Questionnaire (NMTCC, 1994c) (see Appendix C)--were administered to ascertain the most effective means of recruiting potential PYAP students and to determine the academic preparation of the current PYAP students prior to their enrollment in the program (see Tables 6 and 7). This information was necessary to develop a marketing plan for the 1994-1995 school year that maximized human, budgetary, and time resources.

The traditional approach to vocational-technical skill secondary student training at NMTCC has served the community very well. The traditional model was no longer viable and required either "fixing" or "replacement." The Montgomery County manufacturing industry and manufacturing associations were committed to the improvement of the quality of the workforce. The traditional factory worker is being replaced by machines or by personnel who have a sophisticated array of technical talents. The future American workforce will be comprised of individuals with high technical skills. The Montgomery County manufacturing industry turned to NMTCC to provide entry-level workers with a blending of trade skills, academic skills, and problem-solving skills in order that the skilled-worker shortage would be reduced.

No longer can the center afford to keep up with the technical equipment needed to train students to move

directly from NMTCC to entry positions in the local manufacturing industry. The local industry was willing to link secondary students with on-the-job mentors to provide students with real-world training experience. The students who enroll in NMTCC's programs in the future will be committed to enter the profession for which they have been trained. This will be the result of the apprenticeship, applied academic course work, and skill training in relationship to industry hands-on experience.

Chapter 2

Setting

Demographics and Organizational Characteristics

North Montco Technical Career Center is located in Montgomery County, Pennsylvania, approximately 25 miles north of Philadelphia, Pennsylvania. The school serves and is jointly owned by five sending districts: North Penn, Souderton, Methacton, Wissahickon, and Perkiomen Valley. The center, which was built in 1966 on a 15-acre campus, is a one-story structure with steel sheathing exterior and a cinder-block interior. None of the interior walls support the roof; thus classrooms may be modified to accommodate fluctuations in enrollments and course offerings. The building was built to accommodate 760 daytime students; however, modifications were made to the building during the peak enrollment period in the late 1970s to accommodate 1,300 students. During this period, the school operated with three sessions; the third session ran from 3:00 p.m. to 6:00 p.m. (NMTCC, 1994b).

The center primarily serves the secondary school population of Grades 10 through 12. Ninth graders also attend the school through an exploratory program, which began in 1991 on an experimental basis and continued as an official course offering during the 1993-1994 school year.

The purpose of this program is to provide ninth-grade students with a career exploration. They experience each of the seven cluster areas at the school to enable them to make a more meaningful career-training decision. The ninth-grade students spend approximately one week in each cluster area. All program teachers assess the students' aptitudes, and the center guidance counselor monitors the students' interests. At the conclusion of the first working period, the ninth graders enroll in a cluster of related programs to further assess their interests and aptitudes.

Students traditionally spend a half-day at the center and another half-day at their sending school. One district, Souderton, sends students only in the afternoon session. The other four source school districts send students to the school in both the morning and afternoon sessions. North Penn School District is the largest participating high school and is located adjacent to the center. This school's close proximity is an asset to NMTCC because the students do not need to rely on busing back and forth between schools.

Adults also attend NMTCC in both daytime and evening school programs. The daytime adult enrollment increased at the center during the 1990s due to local industry contracting with the center to send their employees to the school for training and retraining. The three main technical areas that were the focus of the original PYAPs attracted the highest number of daytime adults to the

center. As of February 1994, 41 adults were enrolled in the machine trades, welding, and engineering-related technology regular daytime training programs (NMTCC, 1994a).

The local manufacturing industries utilize NMTCC as an official training site because of the close proximity to their industry and the diversity of training options that are available. Another reason is the flexibility of scheduling the training to suit the needs of the local industry. The center teachers coordinate the curriculum to maximize the instructional training opportunities for the adult students. The reasonable cost of training is another positive factor. The 1993-1994 cost was only $4 per hour of training.

During the 1993-1994 and 1994-1995 school years, the center went through an intensive curriculum and facility renovation phase. In 1991, the North Montco Joint Operating Committee (JOC), which is representative of the five district school boards, initiated a feasibility study of building renovation options that would, potentially, improve the image of the school. Estimated renovation costs varied widely from $2.5 million for minor renovations to $13 million to build a new school on a new site (Breslin, 1991). This architectural study was delivered at a time when the United States was entering a recession and local taxpayer groups were forming to scrutinize school-district expenditures. Several questions were raised by the JOC,

including a decrease in school enrollment, which prompted placing a hold on the building renovation plans. Instead, the focus shifted toward identifying the rationale for students not electing to attend NMTCC and the need to look at alternative curriculum delivery methods.

In the fall of 1991, the center's administration prepared six curriculum enhancement options to address the decline in the school's enrollment. The administrative director developed a position paper that was based on vocational-technical education research and was prepared to support the six curriculum initiatives. In February of 1992, administrators at NMTCC and the sending schools proposed a seventh possible curriculum restructuring option that would alter the delivery of the course offerings at the center to complement the building-restructuring initiative.

The seventh curriculum-restructuring option was deemed Option G and was based on the U.S. Secretary of Labor's Commission on Achieving Necessary Skills (1992), What Work Requires of Schools: A SCANS Report for America 2000, and The Neglected Majority by Parnell (1985). The seventh initiative incorporated clustering the 21 course offerings at the school into five related cluster areas. This would provide the students with a broad-based training focus in lieu of training for a specific occupation. This determination was in direct response to the U.S. Labor Department statistics which indicated that today's high

school students will change jobs up to 10 times within their lifetime (Hamilton, 1993). The seventh option also was directed at raising the academic level of all center students to assist them in succeeding in the modern workforce as well as preparing them for postsecondary technical training. The Center for Occupational Research and Development (CORD) applied academic curriculum would be utilized in lieu of technical training for nonhandicapped students in the 10th grade; thus the nonhandicapped students would spend at most only 2 years at NMTCC. Work-related training experiences would be encouraged. The "beefing up" of the academic course work was also in response to the SCANS report and would provide the local workforce with center graduates who would satisfy the workforce expectations of a worker who can function in the technically advanced occupations of the present and future.

Option G was not a popular option for NMTCC teachers because several programs were thereby eliminated. Also, five of the seven clusters were to be delivered on sending school sites instead of at the center. The rationale for this recommendation was based on three premises that were voiced by several JOC members: the stereotypical image of the vocational students going to a vocational-technical school site would be reduced, thus increasing program participation; the applied academic interdisciplinary activities could be conducted in the same building, thus

more efficiently; and the building renovation expenditures would be greatly reduced. This option required a change in the Articles of Agreement for the school and prompted a need for support from all of the sending district school boards. A consensus could not be reached to approve this restructuring initiative as written. During this time period, the morale of the vocational teachers was greatly reduced as the uncertainty of their jobs hinged on votes from the sending school boards.

During this tumultuous period, the center's administrative team consisted of an administrative director, supervisor of curriculum and instruction, supervisor of student services, and a supervisor of continuing education. In February of 1992, the supervisor of curriculum and instruction resigned, and his position was not filled. In August of 1992, the administrative director resigned and the MARP project manager, who was the supervisor of student services at that time, became the acting administrative director in addition to filling the duties of the former supervisor of curriculum and instruction.

During the fall of 1992, the clustering concept as a modified form of Option G was initiated. This new initiative was named Curriculum Redesign. Each of the five sending school principals and the acting administrative director served as cluster chairpersons to the seven clusters at the center. A former sending district

administrator was hired to assist with the facilitation of the cluster meetings.

By January of 1993, a new administrative director was hired and the curriculum restructuring initiative continued on an upward turn. In February of 1993, the MARP project manager was named the assistant director and the two previous positions--supervisor of curriculum and instruction and supervisor of student services--were incorporated into the project manager's job description.

By February of 1993, the center's administration made plans to close two programs at the end of that school year and to create a new program, engineering-related technology. This program was a recommendation from the Curriculum Redesign initiative and was in response to the high-tech skilled occupational opportunities that were outlined in the SCANS report (U.S. Secretary of Labor's Commission on Achieving Necessary Skills, 1992). Plans were also made to tear down walls and build a new 5,000-square-foot engineering lab in order to house two programs and industrial packaging equipment. Approximately a half million dollars worth of equipment was donated by three local pharmaceutical firms to incorporate a course in industrial packaging equipment into selections offered by the center. The JOC gave full support in this initiative, which included renovating the lab for under $20,000 and using paid center staff and students during the

summer months.

In February of 1993, the administration also pursued a competitive grant to incorporate a pilot PYAP in the machine trades portion of the center beginning with the 1993-1994 school year. In May of 1993, Pennsylvania Governor Robert P. Casey's office notified NMTCC that the school was the recipient of a 3-year grant totaling $90,000 to develop and implement three PYAPs over the 3-year period (see Table 8).

Table 8

NMTCC 3-Year PYAP Budget Comparison

Category and Object	Percent of Budget by Year					
	1993-1994		1994-1995		1995-1996	
	State	Local	State	Local	State	Local
1000-100 Salaries five teachers avg. 3.5 hrs./day x 36 weeks	75.6	37.4	75.6	37.4	75.6	37.4
1000-200 Benefits five teachers Social Security	5.7	-	5.7	-	5.7	-
1000-300 2-day workshop	5.0	-	5.0	-	5.0	-
1000-600 Supplies, books, etc.	6.1	-	6.1	-	6.1	-

(table continues)

	1993-1994		1994-1995		1995-1996	
	State	Local	State	Local	State	Local
2100-100 Counselor 3.0 hrs./week x 36 weeks	-	13.0	-	13.0	-	13.0
2200-100 PYAP coordinator (mach. trad.) 3.25 hrs./day x 5 days/wk.	-	49.5	-	49.5	-	49.5
Summer work 60 hrs.	5.0	-	5.0	-	5.0	-
2200-100 Curriculum development three teachers x 12.5 hrs.	2.5	-	2.5	-	2.5	-
Total 2100 & 2200	7.5	86.3	7.5	86.3	7.5	86.3
Project total	100	100	100	100	100	100

In March of 1993, a temporary facilitator was hired for the remainder of the school year to coordinate the center's Southern Region Educational Board (SREB) high-schools-that-work (HSTW), and tech prep initiatives. The center joined the SREB initiative in 1992 as one of five pilot sites in Pennsylvania to integrate the interdisciplinary applied academics and vocational-technical curriculum, to promote a greater understanding of the subject matter as it pertains to industry needs. This initiative is headed by Dr. Gene Bottoms of SREB and was dubbed the High-Schools-That-Work initiative (Bottoms,

Presson, & Johnson, 1992).

An initiative related to SREB is tech prep associate degree (TPAD). This initiative is predicated on interdisciplinary applied academics and technical skill high school preparation to adequately prepare high school graduates for an additional associate's degree through 2 years of study at a participating postsecondary technical school. The TPAD initiative is frequently referred to as the 2 + 2 initiative because of the 2 years in high school and 2 years in an associate's degree program (Cahill, 1994).

Another TPAD model is the 4 + 2 model, which combines 4 years of secondary applied academics and technical preparatory course work with 2 years of additional associate degree course work. NMTCC continues to work on developing articulation agreements with 2-year associate-degree-granting institutions in order to offer advanced technical-training opportunities to center graduates. By the end of the 1993-1994 school year, two TPAD programs were developed: one in engineering and one in the Medical Lab Technician Program. The future PYAP students will be able to enter either of these postsecondary programs upon graduation from high school.

Culture of the School, School System, and Community

NMTCC's community setting has changed drastically since 1966 when it was built on what was previously farmland. Two of the former center teachers recalled hunting on the

surrounding grounds before school hours during the early years of the school's existence. In 1992, the North Penn School Board condemned the last remaining farm in Montgomery Township for the construction site of a needed elementary school. All five of NMTCC's sending districts indicated significant growth (see Appendix A). North Penn High School, which is adjacent to the center, had a 1993-1994 school enrollment of 2,900 Grade 10 through 12 students. Because of the district growth, a second high school will be built on another site and will be ready for the 1996-1997 school year. The expansion of North Penn High School will have a positive effect on the number of students the center will serve in the future. In 1993-1994, the North Penn students comprised 47% of the total NMTCC enrollment. This continued enrollment trend is important to the success of the PYAP.

In 1992, the North Penn School District leased 3 acres of the center's land for use as an extension to their bus garage facility. In September of 1993, the North Penn School Board leased and made improvements to convert 5 acres of the center's land for temporary athletic fields. These land improvements remained the property of NMTCC. To be enrolled in the PYAP, the PYAP students must satisfy both health and physical education requirements. The enhancement of the athletic fields was considered to be an asset to the physical education requirement of the PYAP students.

NMTCC's Grade 9 through 12 enrollment on October 1, 1993 was 624 students (NMTCC, 1994b). This figure represented 585 (93.8%) traditional program students, 34 (5.4%) exploratory ninth-grade students, and 5 (.8%) PYAP students. The October 1, 1993 student enrollment represented an increase of 62 (9.5%) students over the previous year and 29 (5%) students above the 1991 student enrollment (NMTCC, 1994b).

NMTCC also serves the adult population of the northern Montgomery County area. As of February 1994, 80 adults were enrolled in the daytime programs representing an increase of 20 students from the same time period in 1991. Sixty-three of the 80 adults were enrolled in the courses associated with the proposed PYAPs. The related PYAP areas experienced an increase of 22 students between February of 1991 and 1994 (NMTCC, 1994a).

The center is comprised of a predominantly white student population, representative of the ethnic composition of residents which it serves. The October 1, 1993 Grade 9 through 12 ethnic breakdown included 2.0% Asian, 6.5% black, 1.1% Hispanic, and 90.4% white (NMTCC, 1994b). The ethnic composition of the center has changed very little over the 27 years of the school's existence.

According to the Montgomery County Planning Commission's (1989) Development Trends, the county covers 482 square miles and contains 62 municipalities. In 1987,

the county population was 680,000, the third largest in Pennsylvania following Philadelphia and Allegheny Counties. The population forecast for the year 2000 is 724,300 and 746,600 for 2010. Montgomery County leads all other counties in the state in assessed value of personal property and per capita personal income ($21,174 in 1987) and is ranked as the 59th wealthiest among more than 3,200 counties in the nation.

Since the 1950s, the county has changed from a sparsely populated residential suburb into a regional employment center. Close to 100,000 workers commute into rather than out of the county each day. Another dramatic effect on the county-wide workforce is the prediction that the county will account for 43% of the jobs created in the five counties surrounding Philadelphia, Pennsylvania between 1990 and 2010 (Montgomery County Planning Commission, 1989).

Internal Influences of Potential Impact on Intervention

NMTCC is in the process of major curriculum and facilities restructuring and renovation. Throughout the "Curriculum Redesign" initiative process, the JOC, sending school superintendents, sending school administrators, center staff and administrators, and local industry representatives devoted many hours into plotting the future of the center.

The development and implementation of the PYAP was an outgrowth of the dedication by stakeholders towards delivery

of a radically different technical education. The key was to listen to the employers of the local workforce and revise the programs accordingly. The support and encouragement by the persons who had a vested interest in the PYAP success was a positive internal influence. The support of this program was evidenced by the involvement of the PYAP project stakeholders. The Stakeholder Committee governed the PYAP and was representative of the Mentor Workplace Committee, the Marketing Committee, and the Recruitment Committee. The chairperson of the Stakeholders Committee was from one of the sponsoring companies (see Table 9).

Another positive impact was the financial backing the program received. In order to promote the PYAP marketing and data collection efforts, a $3,000 minigrant was obtained through the Pennsylvania Department of Education in the fall of 1994. As a requirement of this grant, the project manager was required to make his research findings available to any interested party.

In May of 1993, NMTCC received a grant from the governor's office totaling $90,000 over 3 years to develop and implement the PYAP. In addition to the grant funding, local funds totaling $41,373 during the first year with a 3% average increase per year in Years 2 and 3 were used to fund this project (see Table 8).

Table 9

NMTCC Machine Trades PYAP Stakeholders Committee

Relationship to Project	No. of Members
Chamber of Commerce	2
Parents	2
Superintendents	4
JOC chairperson	1
High school principal	1
High school asst. principal	1
Transition coordinator	1
High school and NMTCC counselor	2
DVIRC project coordinator	1
NMTCC administration	3
NMTCC machine trades PYAP teachers	4
Postsecondary schools	2
Companies	23
State legislator	1
Total	48

The center JOC allotted the necessary local funding beyond the grant money to facilitate the planned intervention. An example was the facility renovations to create the engineering technology lab during the summer of 1993 and the automotive technology, machine trades technology, and welding technology labs during the summer of 1994. Center teachers were paid to renovate the labs during

the summer months. The total renovation cost the local taxpayers approximately $25,000. This was considered money well spent by the JOC and administration. The major benefit was an enhancement to the image of training at the center. This facility's enhancement addressed the need to update the labs to foster a refreshed image to the program offerings. The result was an increase in the PYAP enrollment in these program areas during the intervention period.

A third positive influence with internal impact on intervention was the new clustering concept, which began with the incoming classes during the 1994-1995 school year. The center teachers worked as a cluster of related programs and students rotated through the programs to complete identified core competencies. This exposure to the PYAP students and teachers during the clustering process resulted in generating an increased student interest in the program. As a result of the clustering process, the teachers were also able to provide evidence of better assessment of the potential students' aptitude prior to their entry into the program.

An important internal factor which may have negatively impacted the intervention was the high level of commitment and possible social sacrifices required of the PYAP students to be enrolled in the program. The PYAP model requires that the PYAP students receive their academic preparation within the NMTCC setting. These PYAP students are removed from

their sending school environment and are expected to make a professional commitment at the 10th- or 11th-grade level. The large volume of center students (approximately 10% annually) who transfer between traditional and vocational course offerings is an indication that many students are not ready to make a commitment to a profession at age 16. Additionally, because PYAP students are full-time center students, their participation in extracurricular activities at their sending school is hampered but not eliminated.

External Influences of Potential Impact on Intervention

The local manufacturing industry is in need of highly skilled employees to fill the jobs that will become available as technology evolves and workers retire long into the 21st century (see Table 3). The PYAP model is one approach that will serve the industry qualifications by training workers who can perform high-skill tasks while applying their academic knowledge to live situations. As a safeguard to this approach, the sponsoring industry interviewed potential PYAP students and selected the students with the qualities the industry was seeking.

Another positive external influence of potential impact on the intervention was the improved vocational education image the PYAP students exemplified while enrolled at the center. The PYAP students attracted students who would not typically enroll in a NMTCC program. This was accomplished through PYAP student presentations to service organizations

and sending school classes. Because of these efforts, members of the community could view the center as a source of high-skill training and a place where students receive technical skills to become employable.

The majority of NMTCC sending school students aspire to attend a 4-year college upon graduation from high school. Out of the five center districts, Wissahickon High School had the largest percentage of students going on to a 4-year college. Eighty-one percent of the 1992 Wissahickon High School graduating class furthered their education at a 4-year college upon graduation (Wissahickon High School, 1993). The fact that parents of most of the sending school students wanted their students to go on to college was a negative influence on the intervention. Overcoming the perception that technical education does not lead to a successful career was a difficult task and required a large-scale public relations marketing effort.

Another major externals negative factor that impacted the intervention was the lack of financial incentives for American industry to support the youth apprenticeship concept. Federal-funding incentives were, however, supplied to the participating states and were passed down to the grant recipients. Hull (1993) stated that U.S. public and private employers spent an estimated $30 to $40 billion annually on employee-training programs.

Summary

The NMTCC curriculum content and delivery, as well as the facility, were under renovation throughout this project. The Curriculum Redesign initiative received the cooperation and financial support of the JOC and sending district administrators. Applied academics and work-based learning were combined to facilitate the PYAPs. The PYAP initiative, in addition to HSTW and TPAD initiatives, were designed to supply the local workforce with the highly skilled academically competent workers needed in the 21st century.

Many eyes were focused on the PYAP model throughout the intervention time frame. The success of the PYAP depended on the continued cooperation of center and sending school staff and administration, the JOC, and the local manufacturing industries. Through a variety of innovative marketing means, the perceptions of the majority of sending school students and parents were also changed to view technical education through the PYAP model as the future delivery system of technical skill training.

Chapter 3

Review of Literature

Research on the Youth Apprenticeship Model

Since 1990, numerous articles have been written about the school-to-work transition program models. The Pennsylvania Youth Apprenticeship Program is one such model that is a viable part of the secondary education curriculum of the 1990s. The School-To-Work Opportunities Act of 1994 (STWOA) is the piece of federal legislation that requires public schools to provide programs for students to bridge the gap between high school and the world of work (Brustein & Mahler, 1994). "A 1991 Louis Harris poll indicated that less than a third of U.S. employers believed that recent high school graduates were prepared to hold jobs in their firms" (Malkin, 1993, p. 1). America's high school students are not familiar with the world of work. School and work lives of these students are almost completely divorced. What students learn has little to do with what they do in work. Part-time sector jobs neither require nor develop sophisticated skills and offer little job security for the future. Ironically, the school-to-work linkages for students who graduate from vocational programs are almost as tenuous: only 27% ever hold a job in the trade for which they were trained (Nothdurft & Jobs for the Future, 1990).

The most important step government can take is to spell out how youth apprenticeship programs can fit into existing laws to quickly eliminate obstacles that would discourage businesses from training apprentices (Tifft, 1992). One approach suggested to make YAPs more attractive to businesses was to provide incentives for businesses to train youth apprentices. Another approach was to break down the barriers of union labor concerns. The American Federation of Labor--Congress of Industrial Organizations (AFL-CIO) issued an encouraging position paper regarding youth apprenticeship programs in May of 1993, which offered support for this initiative. The largest point of contention was the clause that defined the support as, "limited insofar as the apprenticeship program could displace a current union member" (p. 2).

The youth apprenticeship model was heralded as one of the positive outcomes of the educational reform movement. A general consensus was that youth apprenticeships have been accepted as a good idea; however, the journey to successful implementation is long and treacherous (Hamilton, 1993).

Both U.S. Presidents Clinton and Bush have endorsed youth apprenticeship programs as a means of meeting the demands of the high-skill workforce (Clinton, 1991). President Clinton was quoted endorsing the STWOA in a speech made at an aviation school in Delaware in September 1993: "The truth is, there's a lot of very serious academic

research which indicates that significant numbers of our people actually learn better in practical circumstances than they do in classroom settings" (Malkin, 1993, p. 2).

Casey (1993) and Clinton (1991) described the youth apprenticeship program as a means of providing promising work for the large masses of students who probably will not go on to college. Representative Robert Goodling (Republican, Pennsylvania) broadcast his support of the apprenticeship programs as a solution to the lack of help for students who are not college bound, which severely undercuts the ability of the U.S. to compete in the international economy (Salwen, 1993). Dubbed The Forgotten Half in a report by the William T. Grant Foundation (1991), the youth apprenticeship proposal was described as one of the most significant and promising programs to address the half of all 18-year-olds in America who do not plan on going on to college (Finegold, 1993). A caution, however, was issued by skeptics that the proposed apprenticeship programs repeat the well-documented problems of vocational education programs in that they will serve the students who have failed in mainstream education.

There is another forgotten group that would benefit greatly from and strengthen the youth apprenticeship program. They are the 25% of high school graduates who enter postsecondary education but never obtain a degree (Finegold, 1993). Bailey (1993) emphasized that in order

for our workforce to remain competitive with other nations, such as Japan and Germany, youth apprentices will need to further their skills through postsecondary technical training.

America can no longer afford to educate its students and not provide an avenue for the students to land jobs. Two prominent reports--America's Choice: High Skills or Low Wages (National Center on Education and the Economy, 1990) and the United States Secretary of Education's Commission on Achieving Necessary Skills (1992) "SCANS report--forecasted a bleak future for the United States as a second-tier industrial nation unless business and schools work together to prepare all young people for work" (Tifft, 1992, p. 2). Prior to the passing of the STWOA in May 1994, the United States was the only industrialized nation in the world that did not have an established school-to-work transition system (Brustein & Mahler, 1994). The German dual youth apprenticeship model addressed this concern by providing a proven system of blending the academic and skill training that has a promising future for secondary youth in America (Harrington-Lueker, 1991).

German Youth Apprenticeship Model

Germany's dual system of youth apprenticeship training combines vocational and academic training with work-based training experiences. This system of vocational training came into existence in Germany through the comprehensive

vocational training law, Berufsbildungsgesetz/BBIG, approved by the Grand Coalition in 1960 (Bildung & Wissenschaft, 1992). The German youth apprenticeship program grew substantially in the early 1980s when the secondary-aged population was also experiencing growth. As of 1992, there were 380 recognized skill trades, which prepared students to enter 25,000 different occupations (Bildung & Wissenschaft, 1992).

Germany's on-the-job training portion of the dual youth apprenticeship program is linked to the craftsmen guilds of the medieval time period. During medieval times, apprenticeship training focused on the principle of demonstrating and copying. Due to the lack of systematic theory, the training depended on the master craftsman's skill level and attitude (Bildung & Wissenschaft, 1992). One of the unique features of the German system of training since the mid-1970s is that while the number of apprenticeships declined in countries such as the U.S. and the United Kingdom, the number of apprenticeships in Germany actually increased. This was an explicit attempt to reduce the unemployment rate of youth. The advantage of the German youth apprenticeship program is that German students may be engaged in a well-structured training program; U.S. workers must wait longer between completing school and entering their career. "By the year 2000, it is forecasted that two-thirds of all German production workers will have

received their training from an apprenticeship program" (Lynch, 1993, p. 28).

As of 1989, 1.7 million (70%) of Germany's 16-to-19-year-olds age group were apprenticing with about a half million employers to earn formal certification in 380 different occupations (William T. Grant Foundation, 1991). This compared to 300,000 adult apprentices in the U.S. in 1989 with an average age of 29 years. As of 1993, the number of German students entering youth apprenticeship programs was greater than the 50% of American students who entered college as freshmen (Bailey, 1993).

There are numerous apprenticeable trades in Germany; they range from highly technical skills to fine craftsmen and banking. Upon graduation from apprenticeship training, many students are offered full-time jobs with the company. Those who do not stay with the company go to work for other firms or take more advanced vocational postsecondary technical training. Apprentices complete their training in 3 years and spend their 4th year working full-time at the company. Approximately, "85% finish their apprenticeship training, and 10% leave to pursue further education" (Perry, 1991, p. 31).

The length and configuration of training schedules varies within the European countries (Lynch, 1993). Students must pass very difficult entrance tests to be accepted at many training sites (Bildung & Wissenschaft,

1992). Industry sponsors the student apprentices and plays an active role in the selection of students and their training program from academics to technical skills. One employer, Heidelberger, which produces printing presses, administers approximately 400 preapprenticeship exams per year and only accepts 100 students in the program that serves students from Grades 9 through 12. This same company spends $92,000 per student over the 4 years of training (this includes overhead and equipment expenses, teacher salaries, and apprentice wages). The students' monthly stipends range from $450 to $650 per month. The youth apprentices work a 37-hour week and have the month of August off (Perry, 1991).

The contents of the training programs in industry and in the schools are determined in a tripartite way at the federal level. Unions, employers' confederations, and the state will negotiate the curriculum and the types of occupations to be covered by an apprenticeship. At the industry level, training is guided by the Works Council, which has primary responsibility for overseeing the training contract. The Works Council is also interested in the school grades of potential and existing apprentices. A built-in incentive for students to do well in their academics improves the quality of the workforce (Bildung & Wissenschaft, 1992).

According to Soskice (1991), local chambers of commerce

also play an important role in facilitating the German youth apprenticeship system. The chambers support and encourage larger firms to hire more apprentices than they expect to need within their labor force. These apprentices will eventually work for the smaller industries. The result is the reduction of poaching, which could exist. In other words, this process reduces the number of apprentices being trained by smaller companies and then leaving for another firm. The larger companies assist the smaller companies by training their apprentices.

There are many cultural differences that preclude the U.S. from simply copying the German model of youth apprenticeship. The most striking is the rich German cultural tradition that advocates apprenticeship as a system rather than as a program. German citizens respect people who go the apprenticeship route in lieu of the traditional college route so popular in the U.S. (Harrington-Lueker, 1991). The German government also insures national apprenticeship standards. Students are receiving the same skills in related trades anywhere in the country. Student apprentices must take and pass national apprentice exams before receiving their journeyperson's papers. The papers are a means of professional certification that are transferable anywhere in the country (Harrington-Lueker, 1991).

German students are also grouped differently than

American students throughout their elementary and secondary school years. Dichanz and Zahorik (1994) identified three prevalent practices--multiyear grouping, community-based curriculum, and responsive teaching--which aid in the development of students' internal knowledge structures and build their metacognitive capacity. Students are heterogeneously grouped and remain together for up to 4 years. Because of the long-term relationships, teachers come to know the students' preferred ways of learning, behavioral patterns, interests, emotional stability, and social skills (Dichanz & Zahorik, 1994). Since the NMTCC PYAP started as a small group of teachers and students, this methodology was transferable to the center model.

Companies readily accept the apprenticeship training as a way of life and help finance the training. Companies established relationships with financial institutions.

German companies also employ "meisters" to provide the youth apprenticeship training experience. They also ensure technical skill experience with the latest production technology. The English translations for meister is mentor. The PYAP model mentor was the employee on the work site who was assigned the job of training the youth apprentice (Hamilton & Hamilton, 1992). Perhaps the most important factor to the quality of training provided is a large pool of employers who have organized the work process in a way that utilizes the skills that apprentices require. Quality

assurance in the PYAP model meant the youth apprentice was receiving the technical skill training that was identified in the established curriculum. The center's school-to-work coordinator was responsible for overseeing that the technical skill curriculum delivery process was being followed by the mentor and youth apprentice.

The German system tracks students beginning at the age of 10 into separate academic, technical, and vocational schools. Performance is linked closely with the quality of apprenticeships and ultimately career opportunities (Finegold, 1993). The center PYAP model was developed at the high school level. Ultimately the PYAP model may be viewed as a program that is the perfect blend of academic, technical, and vocational skill training. Due to the forecast of a need for skilled technical workers in the United States, the German system has only achieved acceptance as a viable training option for use in the United States since the late 1980s (Harrington-Lueker, 1991).

Pennsylvania Youth Apprenticeship Model

The Pennsylvania Youth Apprenticeship Model grew out of the 1990 Pennsylvania Interagency Work-Based Learning Study Team's findings. The team concluded that the following qualities of the German youth apprenticeship model have merit for use in Pennsylvania's school-to-work transition initiative:

> (1) using the workplace as a learning center and integrating school with work; (2) measuring learning in

> terms of common proficiency standards; (3) emphasizing technical flexibility, critical thinking, and learning to learn skills; (4) integrating secondary and postsecondary credentials; and (5) promoting the values and status of manufacturing employment. (William T. Grant Foundation, 1991, p. 5)

Finegold (1993) reported that youth apprenticeship programs must insure three things to work,

> first, the system must have enough status to attract and motivate young people. Second, the system must provide incentives and institutional support for employers to offer high-quality youth training. Third, the system must be flexible (i.e., one that is suited to the U.S. context and can be implemented with the resources available) (p. 2).

In Germany, individuals accept a small training allowance and live at home during apprenticeships. The state pays for all off-the-job training, and the sponsoring industry pays for the technical on-the-job training. In the U.S., firms that may want to invest in training new workers may not do so because of our highly mobile workforce. An alternative would be to capitalize on President Clinton's campaign proposal to require companies to spend 1.5% of their payroll on training apprentices (Finegold, 1993). This proposal has not come to fruition and is not part of the STWOA of 1994.

The youth apprenticeship model operating in the U.S. not only addresses the partial solution to filling the high skill needs of the manufacturing industry, but also provides an avenue for graduates to advance into higher wages more rapidly than workers without the special training. The industry that sponsors the Tulsa, Oklahoma's C-2000 youth

apprenticeship program indicated apprenticeship graduates will earn between $30,000 and $50,000 upon graduation from the program (Brown, 1993).

The German apprenticeship system has inspired and challenged American leaders to build an effective, formal system for the transition from high-skill/high-wage positions. Germany, however, is different, for there is a tradition of work-based learning. Elford (1993) proclaimed, "the American challenge is not to emulate the German system, but to create an institutional arrangement tailored to the American training environment that yields similar results" (p. 82).

The real strength of the Pennsylvania youth apprenticeship model is that it is truly unique in the fact that it capitalizes on the needs of the manufacturing industry. McKenna (1993) stated, "the 2-year-old PYAP initiative is already beginning to fulfill the state mandate: to assist the manufacturers by securing the skilled workers needed for the companies to remain competitive" (p. 16). The PYAP model operates on shared governance through local industry and the vocational-technical schools. The model also emphasizes that academics be taught from an applied approach. Hamilton (1990) argued, "U.S. vocational schooling needs a stronger dose of planned work experience for students, in addition to greater academic rigor" (p. 116).

The Commonwealth of Pennsylvania has promoted applied academics for students in the tech prep track. Tech prep students are those who plan to pursue postsecondary technical studies upon graduation from high school. PYAP students, through their enrollment in the PYAP, are in a good position for tech prep postsecondary studies. Tech prep academic course work at the 9th-grade or 10th-grade level is recommended for any student desiring to be a part of the PYAP at the 11th-grade level.

The PYAP model also requires that all academics be taught from a project-based approach at the Center. Ingram and Worrall (1987) were proponents of the project-based approach. Students plan the curriculum, thus seeing relevancy of the curricula to their real-world training. Student-centered classrooms offer better opportunities for development of internal motivation, planning skills, goal setting, and perseverance than does the traditional teacher-directed model (Ingram & Worrall, 1987). NMTCC was one of 16 sites in the commonwealth to participate in the SREB integration of academic and vocational curricula. The SREB initiative was renamed "High Schools That Work" in March of 1994. The tech prep model is a related statewide initiative designed to integrate the academic subject matter taught at the sending schools with the applications of the academics in the technical occupational training occupations, which are taught in the center environment. A

strong postsecondary component is the second half of the 2 + 2 concept that blends technical preparation at the secondary level with a technical degree program at the postsecondary level. Alternative models are the 4 + 2 model and the 4 + 2 + 2 model. The 4 represents Grades 9 through 12; the first 2 represents an associate's degree, and the additional 2 equates to the bachelor's degree (Hull & Parnell, 1991).

Bottoms et al. (1992) emphasized the process of integrating academic learning into vocational classes must go beyond the traditional approach to academic instruction. The authors provided examples of weaving mathematics, science, and problem-solving and communications skills into vocational activities for students to see the connectiveness between the classroom, laboratory, and technology. Additional pertinent information taught includes designing, analyzing, and writing technical reports and laboratory exercises that use real tools and equipment. The authors stressed that the integration process will not work without the assistance of both academic and vocational teachers. Rosenstock (1991) stated, "the integration concept will require nothing less than a full restructuring of the high schools, otherwise the students are seen as vessels into which both academic and vocational contents are tossed" (p. 435). The PYAP model provided an average for academic and technical curriculum integration activities to be

developed and utilized by the teaching staff and students. Because the program had low numbers of students, the thematic units of study could be applied to all students with a similar occupational focus. Activities varied depending upon the youth apprentice's training needs, ability level, and interests. An example of a unit was a tool-time project whereby the youth apprentices each had to research on tools of their trade and invent and construct a tool that could be used in their work environment.

A crucial component of the PYAP model is the use of mentors to provide the on-the-job training. This component is also borrowed from the German model of apprenticeship where experienced workers who were themselves apprentices provide the mentoring to youth apprentices (Elford, 1993). Hamilton and Hamilton (1992) acknowledged that recent research supports the concepts that mentors can make a difference in the lives of young people. The authors stated, "adults who feel helpless in the face of complex economic and social problems can make a tangible contribution by working with a single young person" (p. 9). Additional research emphasized the fact that adults who remember someone important to them while they were growing up often wish to play a role in a young person's life. It is also interesting to note that Hull and Parnell (1991) equated positive parental experiences when the mentors were growing up to the desire to actually serve as mentors.

The PYAP model requires that all academics be taught on the NMTCC premises. Part of this rationale was the fact that the curriculum is taught from a project-based approach, thus both academic and vocational teachers must team teach. Rosenstock (1991) stated, "the rift between academic and vocational education has been magnified by the physical location of vocational facilities. This isolation promotes psychological segregation of the academic and vocational education components, which further damages the image of vocational education" (p. 434). NMTCC experienced difficulty integrating academic and vocational curricula utilizing the SREB model because of the location of these existing programs.

The German model of youth apprenticeship provides incentives to encourage increased student performance. Companies share the cost with government by paying small union-negotiated stipends to apprentices. Wages for beginning apprentices are approximately half of those paid to fully trained workers and usually advance at 6-month intervals until the training is completed (Van Erden, 1991). As reported by Casey (1986), "a 16-year-old would earn approximately 25% of a skill wage, and that would rise to approximately 44% by the age of 18" (p. 13). Cahill (1994) emphasized it was important for students to see the connection between the classroom and the real world, "they must be provided with opportunities to work and earn a wage"

(p. 13). Brown (1993) described the C-2000 youth apprenticeship program operating in Tulsa, Oklahoma, where student wages were linked to grade point averages and were adjusted each semester according to student performance.

The PYAP model was developed and predicated on the premise that students are to be provided with a wage from the employer while on the job. The PYAP model does not provide for incentives beyond the set hourly wage.

Cahill (1994) described several key components to successful youth apprenticeship programs. The interaction of the employer and students in the selection, grading, and delivery of instruction are important components to the YAP model. Individual student plans (ISPs), which define the curriculum the students will be pursuing, need to be drawn up in contract form and signed by the student, employer, parent, and school. This is necessary for all parties to understand the training process and expectations. The curriculum needs to be developed and governed by the employer with grading also the responsibility of the employer based upon established criteria. The students must also take and pass periodic academic and competency outcome exams to ensure the criteria have been met. This differs from the German model where an entrance test is typically administered as a part of the selection criteria and an exam is issued to receive the journeyperson's papers at the conclusion of the training experience. One of the reasons

for the entrance test administered under the German model is to select students with appropriate aptitudes. The second is the fact that the German apprenticeship programs are in such demand. Seventy percent of the students enter a youth apprenticeship program; thus the companies must have a system to recruit based upon need (Wills, 1993).

Negative Viewpoint of the Youth Apprenticeship Model

"Despite the emergence of the youth apprenticeship program as a strategy to accomplish many of the goals of the educational reform movement, the topic of youth apprenticeship is not without controversy" (Imel, 1993, p. 1). Issues about the program include its name, the potential for union apprenticeship program conflicts, the acceptance by schools and businesses, and the caliber of leadership necessary for program acceptance by policymakers on a national level (Imel, 1993).

The term youth apprenticeship programs can be confused with the adult apprenticeship programs, which are registered programs through the Department of Labor. Related to the terminology concern is the issue of potential conflicts with unions (Tifft, 1992). Some labor unions see the youth apprenticeship programs as a threat to the current apprenticeship structure. According to Tifft, the youth apprenticeship programs cause a threat that young, cheaper apprentices will cause wages to decline. Kiester (1993) also stated a similar concern, "others have expressed fears

that a focus on high-skill training for young people might come at the expense of incumbent, unionized employees" (p. 54). The AFL-CIO issued a position paper in May of 1993 that provided support of the youth apprenticeship programs as long as sponsoring employers do not displace workers (AFL-CIO, 1993). This major union realized that a supply of competent, skilled workers is needed to maintain the structure of the union workforce.

By comparison, in Germany the trade unions are an active part of the vocational education system. They act as advisors of the development and delivery of vocational training. Bildung and Wissenschaft (1992) stated, "In Germany the trade unions share equal representation on the land committees for vocational training. These committees advise the land governments on vocational training matters" (p. 13).

The youth apprenticeship model is so new to the U.S. that it was heralded as a success before the collection of hard data (Staff, 1993b). Hull (1993) wrote, "it is unrealistic to believe that the German youth apprenticeship model can simply be copied in the U.S." (p. 169). Hull also stated, "Americans would not readily accept the thought of locking students into specific vocational careers at an early age" (p. 169). Others are concerned with the cost-effectiveness of the programs (Malkin, 1993). There are already 154 separate federal job training programs in

place in this country. Some experts feel we should consider combining these efforts before new initiatives are born. Basing the successes of the youth apprenticeship programs against the track record of the federal training programs will not be encouraging for the YAP initiative. An example is the Job Training Partnership Act (JTPA) that actually lowered the earnings of young people (Malkin, 1993). The PYAP model differs greatly from the JTPA youth training model and all the federally funded training for employment programs. The PYAP model provides a direct linkage between academic and technical skills and applies these skills to a work-based training experience. The JTPA model is only for economically and academically disadvantaged people and only provides training in a school environment. Furthermore, the JTPA training experience does not specify training for technical skill, high-wage employment to meet the needs of business and industry. An additional difference between the PYAP model and other training programs is that business and education jointly developed the model based upon business employment needs.

Companies have raised several concerns with the work-based learning model. One employer contended that students should receive all of their hands-on training in a laboratory setting with a heavy emphasis on academics (Staff, 1993a). Forrest Chisman, President of the Southport Institute for Policy Analysis, was quoted voicing another

business concern, "Businesses think it's a great idea for someone else to do. Very few of them want kids running around their plant" (Malkin, 1993, p. 2).

One way to address the concern of businesses is to involve them in the process. Finegold (1993) suggested that in order for the U.S. to compete in a high-tech global economy, "federal matching funds could be used to build a national network of Manufacturing Extension Centers and create a new set of Regional Technology Alliances" (p. 1). These cooperative ventures provide companies of all sizes with an array of services that are currently beyond the means of individual firms. Although firms would pay a fee to become members of the consortia, their successes have been proven in Japan, Germany, and other industrialized nations.

American adult apprenticeship opportunities tend to produce inadequate numbers of skilled workers. This results in part from fluctuations in labor market conditions, the high costs of apprenticeship, and the lack of financial incentives (Cantor, 1990). The PYAP model addresses each of these issues. Companies are not compelled to hire apprentices, and those that do hire are an integral part of both the students' academic as well as technical training experiences.

Bailey (1993) provided three concerns with the successful operation of apprenticeship programs: (a) the

extent to which employers want to participate, (b) the quality and nature of the learning that will take place on the job, and (c) issues of equity and social satisfaction. The industry will want to participate as long as they feel they have a vested interest and a need exists for the trained apprentices. The quality and nature of the program will be left to each team of sponsoring schools and industries. Standardized testing will also ensure that skills are being taught. Equity and social satisfaction will involve a careful system of checks and balances. The Stakeholders Committee at NMTCC and the technical subcommittees were responsible for rectifying these concerns.

Program Evaluation Models

Program evaluation models were used to ascertain the successes of the PYAP on a statewide basis. In 1942, Tyler developed a program evaluation model that identified behavioral objectives and not simply conventional testing (cited in Rossi & Freeman, 1989). The PYAP utilized a competency-based curriculum for both academics and technical skill training. Each competency had clearly defined behavioral objectives students followed when completing the skill.

In 1970, Stufflebeam and his colleagues developed a more detailed model called the context, input, process, and product (CIPP) evaluation model (cited in Scriven, 1991).

The CIPP model emphasizes systematic procedures of decision making. The Stakeholders Committee facilitated the decision making as it related to evaluation of the PYAP.

Scriven (1991) suggested that the former models of program evaluation were not true representations of evaluation research. Scriven developed a Key Evaluation Checklist (KEC), which was described as being essential to investigating the thoroughness of the programs' implementation. The versatility and importance of checklists to the program evaluation process were described by Scriven as reducing a crucial factor that is a frequent cause of low reliability. Checklists should also be grouped under headings that have obvious meaning to facilitate interpretation and weightings.

The KEC was utilized to evaluate the PYAP implementation. This model was chosen because of its ease of use and relevance of design to the existing PYAP model. The KEC program evaluation model incorporates the following components: (a) description, (b) background and context, (c) consumer, (d) resources, (e) values, (f) process, (g) outcomes, (h) costs, (i) comparisons, (j) generalizability, (k) significance, (l) recommendations, (m) report, and (n) meta-evaluation. This model can only be effectively utilized if all components are followed in sequence. Scriven (1991) defined a stakeholder as, "one who has substantial ego, credibility, power, features, or other

capital invested in the program, and thus can be held to some degree of risk with it" (p. 334). The stakeholders in the PYAP model expanded upon Scriven's definition to include program academic and technical skills governance. This meant that the Stakeholders Committee was responsible for overseeing the complete operation of the program. This included: (a) developing subcommittees, (b) establishing program guidelines, and (c) making recommendations on further program development to the NMTCC administration. Funding and budgetary considerations were not part of this committees function. The center director and Joint Operating Committee secured the funding and budgetary control.

Hull and Parnell (1991) provided guidelines for evaluation of the mentor portion of the youth apprenticeship program. Although mentor relationships last for many years, the determination about the success of individual activities and the mentor portion of the program needs to be made early in the program. Evaluation should address issues such as:

1. To what extent were the goals and objectives clear?
2. What were the accomplishments of the program?
3. Did the activities meet the participants' needs?
4. How can the mentor program be improved?
5. Should modifications be made to the goals?

(p. 292).

Alternatives to the Youth Apprenticeship Model

The United States educational system was founded on apprenticeship training. The original apprenticeship concept emphasized specialty skill and pride in craftsmanship. The demise of the traditional apprenticeship system occurred around the time of the invention of the factory when Americans could work with little skill knowledge (Kliebard, 1990).

During the 1970s, a version of the youth apprenticeship program was tried in vocational-technical schools without much success (Kazis & Roche, 1991). This model was similar to the present-day cooperative education program whereby students spent part-time in the area vocational-technical school (AVTS) and part-time working for an employer in the occupation for which the student was trained. Much like the traditional apprenticeship programs, this program did not address the employers' need for employees who, in addition to being technically skilled, were also academically competent (Cantor, 1990). The cooperative education program differs from the PYAP model in that students are not permitted to work on the job site until they near the completion of their vocational training. The cooperative education program, also called Co-Op, is looked upon as a culminating training experience.

Another unsuccessful training model for vocational youth was the Youth Entitlement Demonstration Program, which

operated in the U.S. in the 1970s. This program guaranteed training jobs for students who stayed in school. The program operators found it difficult to recruit employers. When employers were sampled, the wage paid to the employees was not a concern; one fifth of the employers were unwilling to hire the students even if the wage was zero. The employers believed that the students would not contribute enough to justify the effort needed to supervise them (Bailey, 1993). Bailey further stated, "cooperative education programs, which share some of the same features as the youth apprenticeship programs, have remained marginal to the overall education system despite positive views about the effects of Co-Op education" (p. 6). The youth apprenticeship programs, on the other hand, have the support of the industry that has ownership of the student apprentices' training experience.

Another modern American model of youth apprenticeship was termed Exploratory Apprenticeship by Hamilton (1990). This program introduced students as early as the middle school years to community roles and settings without a long commitment to paid employment or future careers. Another apprenticeship program, described by Hamilton, was school-based learning. This form of apprenticeship may involve paid employment in specific occupations but retains a primary focus on school-related learning. School-based apprenticeships are more demanding than exploratory

apprenticeships but shorter in duration and less focused on specific occupations than work-based apprenticeships. The center implemented an exploratory program for 9th-grade students beginning in 1992-1993 and a clustering program for 10th-grade students in 1994-1995. The exploratory program provides ninth-grade students with the opportunity to "explore" all of the traditional vocational training program career options. The clustering program provides students with a broad exposure to careers within a specified industry (i.e. manufacturing or building trades). A nonpay internship program for health occupations students was also added in 1994-1995. All of these program options will prepare students for entry into the PYAP at the 11th-grade level.

A modern vocational training model that is gaining popularity in the United States is the academy or magnet school model. This school-within-a-school concept was originally designed to stop students from dropping out of school and prepare them to go immediately into the work force upon graduation. One of the earliest academies was the Health Academy, which was started in Philadelphia, Pennsylvania, in 1969 (Cutler, 1992). This academy is still an option for students, however a PYAP was added as a program option for health occupations students in 1993-1994. Philadelphia School District was one of the 16 sites to receive state funding for a PYAP. Instead of students

receiving their training from mentors on a work site as they would with the PYAP model, the school caters to a particular occupational field, such as business, and supplies all of the training in the school environment. Students receive their academics and vocational training in the same facility. Mentors provide the training under "simulated" conditions. Students may also participate in field trips and internships (Cutler, 1992). Both the magnet school and the academy school models of youth training are viable models in areas that do not have a sufficient number of sponsoring industry training sites. These models are similar to the PYAP model with one major difference--they do not provide for the technical skill training in an authentic paid work environment.

The youth apprenticeship model relies heavily on applied academic course work and integrated academic discipline projects with a strong tie to postsecondary education. The modern academy model also has a strong tie to postsecondary education.

The Hopkins/Dunbar Health Professions Program in Baltimore, Maryland, is an example of a high school and university collaborative model that sets high standards for Grades 9 through 12 students to enter the program. The school day is extended so students may go to Johns Hopkins Hospital and the university to observe and shadow workers or the workers may go to the school to lecture or demonstrate

(Jobs for the Future, 1992).

"The Japanese system of training is almost orthogonal to the German system" (Lynch, 1993, p. 30). In Japan, students are expected to receive their training through postschooling. The Japanese system also promulgates flexibility and the ability for workers to be retrained. The Japanese system has workers identify with a company within the industry rather than an occupation. "Over 97% of all Japanese firms that employ 1,000 or more employees provide training to their work force [sic]" (Lynch, 1993, p. 31).

The Japanese postsecondary curriculum does not focus on technical skills but rather math, science, reading, and most importantly "citizenship skills" (Hashimoto, 1991). The citizenship skills develop teamwork and pride in workmanship; they establish links with firms so students know that their school performance will influence their ability to obtain certain jobs. The government provides public vocational training. As in Germany and the U.S., Japanese students must take and are expected to pass a national trade skill test. The firms that hire the workers offer bonuses to workers who pass these tests (Lynch, 1993). Registered apprenticeship programs in the United States frequently require that the apprentice take and pass a national trade test for the apprentice to become licensed. An electrician license is an example of a transferrable

credential as the result of successfully completing the testing requirement.

In 1964, Industrial Training Boards (ITBs) were created in Britain to promote the skill development of the workforce. According to Blanchflower and Lynch (1991), the ITBs could impose levies on employers to raise training funds to support an extensive apprenticeship program. This program developed skill-training standards and was designed to provide training for school completers at age 16 who did not plan on furthering their education.

The ITBs were dismantled by the Thatcher government in the 1980s and were replaced by a government-led youth training scheme, which is called youth training, in the 1990s. All 16-to-18-year-olds who are not in school or are unemployed who wish to receive support must participate in youth training. This system has virtually eliminated youth unemployment for this age group of students. The program is governed by Training and Enterprise Councils (TECs) which are similar to the Private Industry Councils (PICs) that operate in the U.S. (Blanchflower & Lynch, 1991).

A major problem is associated with the operation of the youth training program in the United Kingdom. By 1989, due to the shortened training period compared to traditional apprenticeships, 35% of the trained youth did not meet the skill qualifications for a trade at the conclusion of the training program. This contrasts sharply with the high

number of youths who received national recognition for their qualifications in the early 1970s (Blanchflower & Lynch, 1991).

Business and Education Partnerships

School-to-work is not a top-down mandate from the federal government. It is a movement that is built from strong partnerships at the local community level. By working together, employers, educators, parents, labor unions, and others are provided with an avenue to design and implement systems tailored to their specific needs (Thomas, 1994). This is one of the unique features of the school-to-work PYAP model. All of the program stakeholders may contribute to the development and implementation process.

Employers, in partnership with labor, define the skill requirements for jobs, participate equally in the governance of the program, offer quality learning experiences for the students at the work site, and provide jobs for students and graduates. Businesses share technology-based information, management processes, business practices, and the structure of work in a modern organization. For school-to-work programs to be successful, all partners must work together to develop curricula that will prepare students for lifelong learning and employment in technologically complex work sites (U.S. Department of Education & U.S. Department of Labor, 1993).

The benefits of school-to-work partnerships were defined in many recent articles. The National Alliance of Business (1992), in a publication entitled, Real Jobs for Real People: An Employers' Guide to Youth Apprenticeship, listed several benefits of the partnership to employers, students, and educators. Employer benefits were defined as (a) a means to obtain an expanded pool of qualified applicants, (b) reduction in the turnover rate of entry-level employees, and (c) chance to influence curriculum development in order to meet business needs. Student benefits were defined as (a) receive a quality academic education, (b) paid work that can lead to high-paying, high-skill professions, (c) build self-confidence, and (d) broaden skill development. In turn, the school system benefits from (a) improved attendance, (b) higher academic achievement, (c) reduction in dropout rate, and (d) improved rates in program graduates which also improve community support for this program (p. 13).

A more recent perspective on technical education partnerships offered in the Jobs for the Future (1995) congressional briefing summary, reported:

> These partnerships are founded on three essential elements: (a) they merge academic and applied vocational curriculum at high standards so students benefit from learning by doing and see the relevancy of their education to future careers; (b) they integrate classroom-based instruction with work-based learning so that lessons in the classroom and at the work site reinforce each other and deepen the students'

> knowledge; and (c) they bridge high school and postsecondary education so that students can begin to earn college credits and form habits of lifelong learning that are critical to future economic success. (p. 1)

The federal legislation School-To-Work Opportunities Act of 1994 (STWOA), Public Law 103-239, as presented by Brustein and Mahler (1994), further defined the term partnership as:

> A local entity that is responsible for local School-To-Work Opportunities programs and that consists of employers, public secondary and postsecondary educational institutions or agencies, and labor organizations or employee representatives as defined in section 403(c)(1)(B) of the Goals 2000: Education America Act, and may include other entities, such as non-profit or community-based organizations, rehabilitation agencies and organizations, registered apprenticeship agencies, local vocational education entities, local government agencies, parent organizations and teacher organizations . . . . (p. D-4)

Sanders (1994) suggested that school restructuring efforts are predicated on strong community-wide partnerships. We need to let the partners or stakeholders hold the power to make effective decisions. We must constantly keep in mind that it takes the whole community to rear a child. Blake and Pfeifer (1993) contradicted Sanders' viewpoint on partnerships. They suggested that support for partnerships must begin at the board of education and superintendent level. "Leadership at the highest level will dictate priorities. In addition, one person should spearhead the partnership efforts" (p. 29).

According to Griffin (1989), "although partnerships

between educators and industry are growing in number and becoming more sophisticated, there has been limited indication to date that efforts will yield long-term and substantial impact" (p. 24). Admonishing a similar viewpoint, Stone (1991) described the restructuring of the school system with business assistance as a long-term task. Stone also added that the partnership is "an intensely political task" (p. 60).

Tax Incentives for Business and Industry

In Germany, all companies are required to pay a tax that is used for youth apprenticeship training programs (Hamilton, 1990). German firms enlist youth apprentices at an early age to instill in them productive skills and attitudes. Large German firms spend $10,000 or more per year to train their apprentices (Hamilton & Hamilton, 1992). In 1991, German industry spent $27 billion to train 1.6 million apprentices. Industry contribution amounted to $10 billion or an average of $10,500 per apprentice. German businesses also offered 22% more apprenticeship slots than there were applicants (Prewo, 1993). By contrast, U.S. employers spend between $30 billion and $44 billion annually on formal training programs. Only 100 to 200 U.S. companies spend more than 2% of their payroll on formal training programs (Stone, 1991).

Finegold (1993) emphasized the need for the United States government to use federal matching funds to create a

national network of manufacturing extension centers as a form of incentives for industry to assist with the massive task of training the workforce. An experimental work-based learning project took place in Oregon whereby businesses received a tax credit in exchange for students working at the companies up to 20 hours per week (Tifft, 1992). Recessions may also adversely affect financial support of the apprenticeship programs (Cantor, 1990). He also cautioned that increased governmental control may accompany government support of the apprenticeship programs. The National Alliance of Business (NAB) surveyed 3,000 small companies and found that 75% of the respondents would be willing to spend time and money in order to secure better prepared workers. Twenty percent additionally said they would be interested in youth apprenticeship programs if they were offered incentives to offset costs (Bertsche, 1993).

In Pennsylvania, since the inception of the youth apprenticeship initiative, the discussion of offering tax credit incentives to sponsoring businesses has yielded slow progress. Tax credits are one form of enticing additional sponsors to the program. In September of 1994, the first significant event occurred that offered an avenue for state government-sponsored tax credits to become reality. The Pennsylvania House of Representatives Education Committee issued a vocational education improvement report pursuant to House Resolution 50. This report, which was approved by the

Pennsylvania House of Representatives on September 28, 1994, listed 20 major improvements to be made to vocational education. Item 15 had direct implications to the tax credit offering for business and industry:

> The General Assembly should establish a program to provide tax credits to encourage businesses to make grants to school districts and vocational-technical schools for equipment acquisition, in-kind donations, and providing work-based learning opportunities, or other program enhancements. (Crowell, 1994, p. 7)

It is evident that the progress of providing tax credits for sponsoring business and industry on the local, state, or federal level will not be available for the short term. The literature portrays a need for tax credits to occur; thus future action is eminent.

Chapter 4

Methods

Solution Strategy

The North Montco Technical Career Center administration, technical teachers, and academic teachers, in conjunction with business representatives from the northern Montgomery County area, designed, developed, and implemented the center's school-to-work PYAP model. This model was a hybrid of proven research-based youth training models from four countries: Germany, England, Japan, and the United States. These models each had components that were applicable to the NMTCC training environment and to ultimately address the shortage of qualified entry level technically skilled workers in Montgomery County, Pennsylvania.

The German model of youth apprenticeship was selected as the basis for the center model because of the emphasis on technical skill training through a work-based training program offered at both the secondary and postsecondary level. Elford (1993) stated, "the American challenge is not to emulate the German system of youth apprenticeship, but to create an institutional environment that yields similar results" (p. 82).

The 2-year PYAP was available to students from the

center's five participating school districts who had completed the 10th grade and had completed the basic academic competencies that were recommended by the sponsoring industry. Actual program enrollment was contingent upon the student successfully interviewing and being hired by the sponsoring industry.

The PYAP was funded under a $90,000 state grant for the first 3 years of operation beginning with the 1993-1994 school year (see Table 8). The PYAP student enrollment was expected to be low during the first several years. The enrollment goal for the 1993-1994 school year was 15 students; however, only 5 students were initially enrolled due to receiving state-approved funding at the end of the 1992-1993 school year.

During the 1994-1995 school year, the PYAP enrollment increased 425% to 21 participants. As of April 1995, 52 students were enrolled in the PYAP for the start of the 1995-1996 school year. The program increased from 4 students to 52 students (1,200%) in 3 years. Hamilton (1990) stated "the essential elements of youth apprenticeship programs are scattered throughout the U.S. enrolling students in small numbers" (p. 153). Hamilton also referred to the birth of the youth apprenticeship programs as "seeds that will enable young apprentices to grasp experiences that are clearly connected to each other and to schooling" (p. 153).

Implementation Design

Following the German youth apprenticeship model, the PYAP was designed to be employer driven. The youth apprentices are totally absorbed in both the academics taught at NMTCC and the technical-skill environment taught at both the center and in the industrial environment.

The center administration selected eight major themes when designing the PYAP model. The themes were selected as key elements to address the shortage of technically skilled workers within Montgomery County. The eight themes were (a) full state funding for development and implementation, (b) integrated academic and technical skill training with a mandatory work-based skill training component, (c) business and industry governance of the academic and technical skill training, (d) technical skill training provided by mentors, (e) a paid work experience, (f) linkage between secondary and postsecondary technical skill training, (g) a means to assess the students and the program, and (h) a marketing plan designed to increase program participation.

The center's PYAP model differed from the traditional program of delivery in several significant ways. The following table depicts the differences in the two programs (see Table 10).

Table 10

NMTCC PYAP Contrasted with Traditional Program

PYAP	Traditional program
.program governed by business and industry	.program governed by state guidelines with industry validated curriculum
.available to students in Grades 11 and 12	.available to students in Grade 9 through 12
.academics and technical skills taught 3 days per week at the center, and technical skills taught in a work environment 2 full days per week	.academics taught at sending school half-day and technical skills taught at center half-day
.training primarily from a mentor in local industry	.training taught by teachers in a school environment
.paid work experience	.no pay
.integrated academic and technical project-based activities	.technical skills taught separate from academic skills
.portfolio assessment and traditional grading	.traditional grading
.linkage between course work at secondary level and postsecondary level	.no formal linkage between secondary and postsecondary training
.advanced standing in a registered apprenticeship program	.no advanced standing
.funded through a state grant for 3 years	.primarily funded through local tax base

Selected components of the Japanese youth training model, which has an emphasis on academics, citizenship, and postsecondary schooling, was implemented in the NMTCC model

(Hashimoto, 1991). The Japanese model also has a positive factor of worker loyalty to a sponsoring company (Lynch, 1993). This was extremely important to the PYAP sponsoring companies. A negative factor of the Japanese model was an emphasis on strong academic development at the postsecondary level while neglecting the secondary population (Lynch, 1993). Additionally, technical skill training was left solely to the sponsoring company, and did not occur until the academic development was completed (Lynch, 1993). The center's PYAP model encourages students to pursue postsecondary training. Linkages are being created between the technical curriculum and postsecondary institutions. The engineering technology associate's degree program at Pennsylvania State University, Abington Campus is an example. Upon completion of the PYAP, students who are employed in engineering-related apprenticeship training sites would be eligible for up to nine credits of advanced standing in the engineering program. The nine credits would be awarded for workplace training.

The British model of youth training addressed the 16-to-18-year-olds who were not in school or were not employed and were seeking further training (Blanchflower & Lynch, 1991). Although this model emphasized skill training during the teenage years, this model lacked a linkage to academic skill development. Furthermore, Lynch (1993), reported that by 1989, due to the shortened training period

compared to traditional apprenticeships, 35% of the trained youth did not meet the skill qualifications at the conclusion of this program. In order for the PYAP model to be successful, the students had to perform at a skill level that was deemed acceptable to business and industry.

The German dual system youth apprenticeship program model has a proven track record of blending two primary components: work-based technical skill training at the secondary level delivered by a workplace mentor at a sponsoring industry with academics taught in relation to the occupational skill training (Clinton, 1991; Hamilton, 1990; Harrington-Lueker, 1991; and Kiester, 1993). The German system challenges American leaders to build an effective, formal technical training system for high-skill/high-wage positions (Casey, 1986; Elford, 1993).

The German model for curriculum delivery can be summarized by three prevalent practices: multiyear grouping, community-based curriculum, and responsive teaching (Dichanz & Zahorik, 1994). These factors contribute to students' internal knowledge structures and build their metacognitive capacity.

Students in the center's PYAP are grouped together for the 2 years they are in the program. Multiyear grouping is borrowed from the German model whereby students spend up to 4 years in the same classes (Dichanz & Zahorik, 1994). The only exception to multiyear grouping in the PYAP model is

for students functioning at different mathematics levels.

Components of American youth training models were also used to develop the center's PYAP model. Hamilton (1990) described an exploratory apprenticeship model for students as early as the middle school years. The focus of this program was to introduce students to community roles and settings without a commitment to industry. The center's PYAP model included an exploratory program component in Grade 9 to introduce students to career opportunities. A clustering program was also implemented in September of 1994, to provide students with basic technical skill development prior to entry in the PYAP.

The academy or magnet school model was also examined for application as a viable part of the center's PYAP model. This model had the positive quality of blending academic and technical school training in the same facility (Cutler, 1992). It was also a proven effective model in geographic areas that did not have available business training sites. The major disadvantage of this model was the lack of work-based training experience. This school-based model utilized mentors for training in the school environment in lieu of paid work experience in business and industry. Field trips were also included as a means of providing students with exposure to the business environments. The integrated academic and vocational components taught in one building along with mentors and field trips were all

utilized in the NMTCC PYAP model.

The Hopkins/Dunbar Health Professions Program in Baltimore, Maryland is an example of a forerunner to the center's tech prep program. The Hopkins/Dunbar youth training model set high program standards for students in Grades 9 through 12. The strong linkage between secondary training and postsecondary schooling was the primary factor utilized as a lifelong learning option in the center model (Jobs for the Future, 1992).

The students who enroll in the center's PYAP must first interview with and be hired by a sponsoring employer. Additional Pennsylvania requirements for potential apprentices are (a) completion of the 10th grade, (b) a minimum age of 16, (c) passing academic grades, (d) a minimum of basic algebra, and (e) the recommendation from an administrator and counselor from the applicant's sending high school. Prior vocational trade experience is not required; however, the student should possess some mechanical aptitude. This is ascertained by receiving aptitude test scores from the students' sending school and the recommendation from the student's technical teacher at NMTCC. Part of the German model's success can be attributed to the high standards set for acceptance into the program. The center model will also incorporate high standards while at the same time not discriminating against any student, according to federal guidelines.

The students must work on the job site under a trained mentor 2 days per week and receive their academics at the center 3 days per week. This model differs from the traditional cooperative education program, which is a culminating training experience offered only to Grade 12 students. Students who are enrolled in the cooperative education program work for an employer five afternoons per week, receive a wage, and do not follow a detailed training plan. Academic skills are not integrated with the technical skill development. Another major difference is that cooperative education students are not trained by a designated company mentor.

All PYAP model academics were taught using a project-based approach. Bottoms et al. (1992) emphasized the process of integrating academic learning into vocational classes must go beyond the traditional approach to academic instruction. This model capitalized on the contextual learning movement. The contextual learning movement is based on the notion that individuals learn basic skills more effectively if they are taught in close relationship to their everyday activities (Sticht, 1989).

McCoy and Reed (1991) conducted a survey of 148 small businesses and found that schools need to teach the skills, attitudes, and understandings that are essential to successful employment in the world of work. The cognitive apprenticeship strategy is a pedagogic technique that can be

used in the classroom but is designed to create a learning environment that reproduces the technological, social, and motivational characteristics of real-world situations in which what is being learned will be used (Berryman & Bailey 1992).

All major academic content was taught from an industry perspective; for example, the PYAP students designed a total integration project to separate environmental waste. English, science, math, and hands-on technical skills were combined to plan, develop, and build the project. Bailey (1993) stated, "by incorporating education into real-world situations, apprenticeship bridges the cognitive gap between school and work" (p. 4). Bailey also suggested that this is a broader justification for work-based learning than the traditional viewpoint from vocational educators that academics do not teach marketable skills. The newer argument suggests that when the academic curriculum and the vocational curriculum are taught separately, the cognitive development of the student is impaired. This trend of thought has merit for teaching students in any vocational-technical school environment (Bailey, 1993).

Authentic assessment practices were also used in the PYAP model. Students are required to maintain a portfolio of their work. This includes both a collection of accomplishments on paper in a notebook and a videotape. Herman and Winters (1994) stated, "portfolios encourage

teachers and schools to focus on important student outcomes, provide parents and the community with credible evidence of student achievement, and inform policy and practice at every level of the educational system" (p. 48). This addition to the student assessment process was a means of documenting the student outcomes in addition to the Pennsylvania outcome-based education requirements. Portfolios are also a means of communicating the ability level and talents of youth apprentices in both academic and technical skill environments. Traditional grading practices were also used to assess the youth apprentices' academic and technical skills.

Marketing the PYAP was also an important part of the model. Unlike established youth training models in Germany, Japan, or England, apprenticeship training at the secondary level was virtually nonexistent. The greatest implementation challenge of the youth apprenticeship model was the acceptance of this new form of vocational training. According to Elford (1993), "it must be positively valued by students, faculty, parents, and other important segments of society to attract enough students to put it in the mainstream" (p. 78). The traditional education model in America views college programs as the only form of advanced training held in high esteem. "There is a growing consensus that the secondary school system in the United States is too oriented toward college" (Bailey, 1993, p. 5). The job of

marketing the PYAP to the right audience was a difficult task because of the credibility factor of the program being delivered through the vocational setting.

At the conclusion of the 2 years of technical preparation at NMTCC, the youth apprentices are encouraged to continue their training with the sponsoring employer while taking course work which satisfies their journeyperson's paper (certificate) requirements. To receive this honor, the student apprentices and their sponsoring company must register with the regional branch of the Department of Labor. Students must complete a total of 8,000 hours of trade experience and 144 hours of approved technical training per year for 4 years.

Another major difference with the PYAP model was that the PYAP was jointly funded and governed by the Department of Labor, Department of Commerce, and the Department of Education, whereas the traditional program is primarily funded through the local tax base. The Department of Labor oversees the operation of the program through three regional centers in Pennsylvania and a newly created director's position in the State Secretary of Education's Office at the Pennsylvania Department of Education.

Prior to the passage of the School-To-Work Opportunities Act in May of 1994, the United States was the only industrialized nation in the world that did not have an established school-to-work transition system (Brustein &

Mahler, 1994). Pennsylvania piloted five youth apprenticeship sites beginning in 1991 (Casey, 1993). In 1993, the center received a 3-year state grant to develop and implement a school-to-work PYAP model (see Table 8). This seed money was utilized to hire four academic teachers on a part-time basis.

In Germany, companies established relationships with financial institutions to help finance the training of youth (Finegold, 1993). In Japan, 97% of the companies that employed 1,000 or more employees provided training to their workforce (Hashimoto, 1991). However, training of youth in Japan did not begin until students were out of secondary school (Hashimoto, 1991). In England, levies were placed on employers to raise training funds to support an extensive apprenticeship system (Blanchflower & Lynch, 1991). The PYAP model technical training was the responsibility of the sponsoring company. Tax incentives for sponsoring companies and external funding sources were not included in this model due to their unavailability.

The administration at NMTCC wanted to involve key people from the local businesses in the governance of the academic and skill portion of the center's PYAP model. This component was also designed after the German model.

The plight of workers near the bottom of the earnings distribution, plus dislocated workers, and the reduction of global effectiveness of our industries provide a strong case

for a national employment policy (Batt & Osterman, 1993). All three of these departments of government--Department of Commerce, Department of Labor, and Department of Education--have a vested interest in the success of the apprenticeship model.

Outcomes

Terminal Objectives

1. As a result of the PYAP implementation at NMTCC as of April 1995, 21 of the 21 (100%) Grades 11 and 12 PYAP students will be working in a related occupation to their field of technical training and will be pursuing a postsecondary technical preparatory course of study. This will compare sharply with the 56 of the 107 (52.3%) 1994 NMTCC graduates from the traditional technical delivery system who were employed in a related occupation to their field of technical training and the 20 (18.7%) of the 107 graduates who were pursuing postsecondary technical training as of October 1994.

2. As a result of the PYAP marketing efforts, by April 1995, the Grades 11 and 12 1995-1996 school year PYAP enrollment will increase by 18 students (100%) over the 1994-1995 PYAP enrollment of students.

3. As a result of the PYAP implementation at the center, the first-year and second-year PYAP students will have an attendance record average of 1.0 days absent per marking period compared to an attendance record average of 3.0 days

absent per marking period for the first- and second-year traditional Grades 11 and 12 center program students.

Process Objectives

1. A Stakeholders Committee will be developed to oversee the development and implementation of the center's PYAP.
2. A school-to-work transition coordinator will be hired to coordinate all meeting schedules, market the program, and maintain all supportive data.
3. The PYAP students will be employed at a sponsoring company throughout the duration of the MARP.
4. The sponsoring company will assign a mentor to the PYAP student; this mentor will oversee the implementation of the training plan.
5. Mentor workplace academic and technical curriculum committees will be secured to develop the curriculum for the PYAP students.
6. Social studies, physics, English, mathematics, and health and physical education academic teachers will be hired to satisfy the academic delivery component of the PYAP.
7. The PYAP students will provide input into the delivery of the PYAP curriculum and assessment through establishing specific topics and procedures.
8. The PYAP students and their academic teachers will participate in the total process of integrating interdisciplinary group projects as they relate to the

PYAP curriculum.

9. The PYAP students and their academic teachers will develop and implement an authentic learning portfolio assessment system that represents their academic and technical skill accomplishments.

10. A marketing committee will be formed to develop a marketing plan to promote the PYAP through the sending schools, parents, business and industry, and the community.

11. All PYAP grade reports will be developed with the assistance of the sponsoring company. The mentor from the sponsoring company will hand the grade reports to the youth apprentices and provide the students with performance feedback.

12. All PYAP students will be administered pre- and postsurvey instruments to determine the students' perceptions and recommendations to improving the PYAP.

Side Effects

The youth apprenticeship career training program concept has only been in existence in Pennsylvania vocational schools since 1991. Because the PYAPs as a statewide initiative are so new, the major side effect will be the threat of a low number of program participants during the first 2 years. PYAP students must divorce themselves from their peers at their sending schools in order to participate in the programs offered at NMTCC.

Another side effect will be overcoming the communities'

perceptions of the center as a school that offers only traditional vocational course offerings. A large-scale marketing approach will be needed to provide the community with a fresh perception of the high-skill and high-wage occupational opportunities available through the PYAP.

Evaluation Instruments

Evaluation was a formal part of the PYAP development and implementation process. The evaluation results were of interest to the NMTCC administration, program teachers, and stakeholders in order to continue to make program modifications. Rossi and Freeman (1989) offered sound advice for evaluators when designing and planning new programs. Programs most often emerge from a complex blend of political considerations involving key stakeholders, economic constraints, and the availability of program staff and technology. The authors went on to say that evaluation research is only one of the considerations that are important to program planning and design. A caution is given that many programs are planned and implemented without the help of evaluation research and the result is a detriment to the success of the program.

Several means were used to evaluate the PYAP. Recruitment efforts were evaluated using a marketing research firm's professionally developed survey instruments, which were administered to the current center students.

The PYAP's implementation was evaluated in the spring

of 1994, fall of 1994, and early spring of 1995, using the Jobs for the Future (1993) Youth Apprenticeship Program, Charting Your Program's Progress: A Diagnostic Checklist. This professionally developed instrument was administered to PYAP students, technical teachers, academic teachers, and training site mentor trainers. The parents of the PYAP students evaluated the program through telephone surveys conducted by the center's academic teachers during late summer of 1994 and early spring of 1995. The PYAP students also evaluated the program during the spring of 1994 and early spring of 1995. Finally, the Pennsylvania school-to-work facilitator conducted a thorough program evaluation with recommendations for improvement in December of 1994. This voluntary evaluation team was comprised of the state facilitator and administrative curriculum supervisors from the five participating sending schools to the center.

Historical Perspective

The Pennsylvania Youth Apprenticeship Program began as a statewide pilot initiative in 1991. Initially, five sites received funding through competitive grants administered through the state. Pennsylvania was one of the 41 states undergoing the process of developing a unique delivery of technical education to fill the void in adult apprenticeships within the manufacturing industry. Western Montgomery County Area Vocational-Technical School, located

12 miles from the Career Center, was one of the initial sites starting in 1992. Montgomery County was a prime location for this statewide initiative because the county leads the commonwealth in volume of manufacturing-related jobs.

The NMTCC administration received information from the Pennsylvania Department of Education's Bureau of Vocation and Adult Education of the availability of state competitive funding for the development and implementation of youth apprenticeship programs. Within 2 weeks of this announcement, a program feasibility study was initiated by the center's administration. Letters were sent to manufacturing-related industries throughout Montgomery County to solicit support of the PYAP concept. The return rate was less than satisfactory. Out of approximately 50 letters that were sent, only 2 were returned. Although somewhat discouraged, the administration decided to pursue a different approach to solicit support of the concept. The center's machine trades instructor and two cooperative education teachers visited key manufacturing sites and were successful in obtaining 14 initial industry supporters. Meanwhile, the project manager secured labor market data from the Pennsylvania Occupational Information Coordinating Committee which demonstrated the need for qualified high-skill youth apprentices (see Table 3).

The conceptual information was shared with the

Professional Advisory Committee (PAC), which is comprised of participating sending school district superintendents, as well as the JOC. Unanimous support was given by both the PAC and the JOC. The grant proposal was written in March of 1993 and submitted to the Department of Education for approval.

In April of 1993, the Stakeholders Committee was formed (see Table 9). This committee, which was comprised of the key players in the PYAP development and implementation process, immediately went to work in developing subcommittees with specific responsibilities. The two primary goals of the PYAP were also set forth. The goals were: to secure sponsoring companies for potential youth apprentices and to recruit students prior to the end of the 1992-1993 school year (NMTCC, 1994e).

The recruitment committee was formed and a recruitment strategy was formulated and implemented. The plan included (a) hold an informational night for parents of potential students, (b) hold informational meetings at each of the sending schools, (c) set speaking engagements with local service organizations, and (d) develop recruitment materials. The plan could not be enacted until late in May of 1993 because the governor's office did not announce the state grant recipients until that time. At the May board meeting, the center's JOC formally voted and accepted the grant totaling $90,000 over 3 years. Without wasting time,

the center counselor and machine trades instructor made PYAP presentations at all five of the participating sending schools during the last week in May.

During the month of June 1993, following the recruitment phase, an organizational meeting and tour were held at Moore Products. Eight prospective students participated in this event. Also during this month, a meeting was held with the parents of these students to explain PYAP in detail. Industry visitations were also ongoing during the months of May through August. The machine trades instructor was successful in finding sponsoring manufacturing companies for up to 14 PYAP participants.

Additional recruitment instruments developed over the summer months included PYAP logo, colors, hats, t-shirts, notebooks, and brochures. The PYAP coordinator, who was also the machine trades instructor, was retained during the summer to continue to seek PYAP machine trades sponsorships.

In order to begin the curriculum integration process, the machine trades instructor and full-time center math teacher attended a week-long conference at Shippensburg, Pennsylvania. This conference, which was sponsored by the Pennsylvania Department of Education, provided hands-on training related to integrating technical and academic course content.

The sending school principals and center administrators convened in August of 1993 to determine the PYAP academic course offerings. In order to meet state graduation requirements, the following subjects were to be offered: (a) English, (b) social studies, (c) science, (d) mathematics, and (e) health and physical education. The PYAP grant provided for the option of obtaining a waiver for the health and physical education graduation requirement. The principals insisted on retaining the health and physical education requirement. The NMTCC PYAP was the only program of the 16 sites funded in Pennsylvania that did not seek a waiver for health and physical education.

The titles of the courses were listed as follows: (a) applied communications-PYAP; (b) social studies-PYAP; (c) physics-PYAP; (d) applied math-, algebra-, geometry-, or calculus-PYAP; and (e) health and physical education-PYAP. The PYAP acronym was affixed to the course titles to indicate the course location. The courses and grades appear on the sending school student records.

The English, social studies, and science teachers taught in the same classroom during the 1993-1994 school year. During the 1994-1995 school year, each teacher had their own classroom. Integration activities were jointly developed and implemented with input from the PYAP academic teachers, center technical teachers, and the PYAP students. This project-based approach to teaching was new to NMTCC.

The process of curriculum development required the teachers to use a combination of reference materials, brainstorming sessions, and many hours of planning. Thematic units of study were developed to blend academic course content with technical skill career development. A sample of the units included safety in the workplace, tool time, and environmental waste. For each of these units PYAP students were required to do research on the topic, design a project, build the project, and formally describe the project in a presentation format. The projects were built in teams to represent the total effort of accomplishing a task in an industrial environment.

The new PYAP academic teachers were hired near the end of August 1993. In order to work within the $30,000 budget, a dual-certified science and social studies teacher was hired to work 12 hours per week. Additionally, an English teacher was hired to work 12 hours per week. In October of 1993, a health and physical education teacher was employed to work 4 hours per week (see Table 8). The part-time, dual-certified teacher, as well as the English teacher, secured employment elsewhere at the end of August 1994. Three new teachers were hired--English, social studies, and science--to replace the former teachers. This proved to be a positive move as the new PYAP physics instructor, who was finishing out his employment obligation as an engineer, had recently been laid off by his employer. The PYAP English

teacher was also hired with industry experience. She had worked at a local pharmaceutical company as a customer representative for 14 years. The third new teacher, who taught PYAP social studies, graduated from a college in Vermont and was extremely knowledgeable of integrated curriculum and portfolio assessment.

Curriculum Development and Implementation

The conceptual framework for PYAP was developed based upon the needs of the PYAP student sponsors. The curriculum blends strong academic skills with technical skills necessary to function in the high-skill marketplace. The skills that were taught throughout this project were those identified by the PYAP sponsors as being significant to the success of the student in an industrial environment as well as having relevance to the lifelong-learning process. Another major factor in the development of the curriculum was the realization that technical skills of the 1990s and beyond will need to be transferable from one branch of an occupation to another. This is predicated on the fact that jobs will continue to evolve as technology changes.

The PYAP students had and will continue to have differing career objectives. Some will continue their technical training in an associate's degree program, others will enter the military or continue to work toward a journeyperson's certificate.

The PYAP did not follow a set textbook-driven

curriculum. The curriculum was developed as the program progressed. A meeting was held with the sending school principals in August 1993 to secure approval of the curriculum outline and provide recommendations. The course titles and credit-awarding structure were also discussed.

The center's PYAP requirements differed from the other 16 programs in the commonwealth in two significant ways. First, the student-acceptance process required each student to secure employment at a sponsoring industry prior to a student's acceptance into the PYAP. This requirement placed the responsibility of screening candidates on the sponsoring employers. The administration did not want to enroll students who could not fulfill the program's training requirements (see Appendix D). The center's administration could not assure the employee that the new youth apprentice would fulfill the training requirements. A commitment from the youth apprentices that they would indeed make a concerted effort to succeed was all that was asked. Another safeguard was the fact that the youth apprentices were prior center traditional program students, they had a proven track record of sufficient performance. This assurance system did work throughout this project. Only one student in 1993-1994 was returned to his sending school. This student was not enrolled at the center prior to enrolling in the PYAP. All 52 of the 1995-1996 PYAP students were prior traditional program center students.

Surprisingly, a state report of all PYAP training sites in Pennsylvania issued in March of 1994 revealed that greater than 50% of the 16 PYAP sites did not have a sponsoring company. Although the 1993-1994 through 1994-1995 school year participant numbers were low, NMTCC maintained a 100% on-the-job training placement record.

The second significant curriculum difference between the center's PYAP and the other 15 sites was the fact that all students received health and physical education instruction. As a result, in October of 1993, the center administration hired a part-time health and physical education instructor with industry-relevant experience. The curriculum was designed to improve upon employment performance as measured by PYAP student attendance records. The records are discussed in detail in chapter 5. Subject areas included proper lifting techniques, nutrition, exercise, and an infusion with many of the physics course requirements.

The students were also evaluated by other means. The employers graded the students on a quarterly basis (see Appendix E). The academic and technical teachers also graded the students using both traditional grading methods, (i.e., tests, homework, etc.) and portfolio assessment. Because the portfolio assessment was a new concept, traditional grading practices continued throughout this project.

Because of the time constraints placed on instruction, the PYAP students did not have time available in their schedules to take elective courses. All of the students' time was placed on the skills necessary for their occupational field.

Meetings were held with the PYAP academic teachers on a weekly basis to discuss curriculum matters. Thereby, ongoing student evaluation was also part of the dialogue. Because the teachers all taught during the same time frame and in many cases in the same classroom, instructional times varied. Much of the meeting time was spent planning integrated curriculum activities. Additional activities planned by the academic and technical teachers included student portfolios, integrated units of study, projects, field trips, guest speakers, and industrial site visitations.

The Mentor Workplace Committee met quarterly throughout the 1993-1994 and 1994-1995 school years for the primary purpose of discussing the training the students would receive while on the job site 3 days per week. Three Mentor Workplace Committee meetings were held within the first quarter of the 1993-1994 school year in order to develop the initial training plan format, content, and means of assessing student performance. The project manager and machine trades instructor spent many hours developing a draft training plan format that could double as an official

transcript of the students' accomplishments (see Appendix F).

In December of 1993 and again in December 1994, the PYAP students visited the Hagley Museum in Delaware. This unique experience provided the PYAP students with the opportunity to study the Industrial Revolution in America. They also had the opportunity to work in a replica of an 1870s machine shop as a youth apprentice. This experience was directly related to a historical perspective of the apprenticeship training significance to the industrial movement in America.

Assessment

In August of 1993, the newly hired PYAP academic teachers met with the NMTCC administration to develop a viable student assessment system. Following the assessment model recommended by the PYAP statewide initiative, several assessment means were determined to be appropriate. This group determined portfolio assessment would be the predominant form of assessment. In order to develop a meaningful instrument, the group decided to have the PYAP students determine the categories of items that should be included in the portfolio.

Additionally, because the curriculum delivery was project based, team grades would also be given. This popular cooperative learning model was needed to assimilate the teamwork utilized in industrial projects. Standard

testing means were also used to measure cognitive skills and retention of knowledge.

An achievement pretest was administered in September of 1993 to determine baseline match data. The Wide-Range Achievement Test (WRAT) was selected for its ease of administration, its cost, and its reliability. These data were then used to develop the appropriate math-level curriculum materials.

Throughout September and October of 1993, the PYAP grading policy and procedures were developed in conjunction with the PYAP academic teachers, machine trades instructor, and Mentor Workplace Committee. This committee determined that 50% of the PYAP students' grades should be based on performance at the job site, and the technical course work at the center comprised the other 50%. The job site evaluation of the PYAP student was the responsibility of the mentor. Each mentor was provided with an evaluation form which was to be completed, reviewed with the youth apprentice, and returned to the school-to-work coordinator. The school-to-work coordinator was responsible for obtaining the technical teacher evaluation and calculating the marking period grade. The job-site evaluation form was designed by the Mentor Workplace Committee to be representative of the major components of successful employment (see Appendix E). All mentors received mentor training to be able to evaluate the students.

In April of 1994, WRAT math posttests were administered to the pilot group of four PYAP students. These results were to be used as baseline data, however, the test was readministered during September of 1994 to all 18 students because of the larger sampling.

Also in April of 1994, the Southern Region Educational Board (SREB) High-Schools-That-Work Evaluation Team evaluated the status of the center's SREB and tech prep initiatives. This was a 3-day process, which started with a kick-off dinner at North Penn High School and concluded with an exit conference on the last of the 3 evaluation days. The primary purpose of the evaluation was to determine the effectiveness of the academic and technical tech prep curriculum model between the center and North Penn High School. The results of this evaluation yielded a strong commitment between the staff of both schools to foster a viable integration model. The only area of concern was the need for work-based training experience for all tech prep students. This could include internships, field trips, cooperative education, or youth apprenticeship. Approximately half of the North Penn High School students who were enrolled in the tech prep program did not attend the center or participate in a work-based experience. This evaluation was also important as it provided a means to assess the tech prep course work of potential PYAP students in Grade 10, while it also gave national recognition to the

current PYAP.

The center's administration was informed of a useful battery of work-related student tests while attending a state vocational conference during the summer of 1994. The American College Testing (1994) Work Keys instrument was determined to have bearing on determining the profile of successful PYAP students. Due to the high costs of the tests, two tests from the seven available were selected to have greatest merit. The Applied Technology test and the Locating Information test were administered to all PYAP students in the fall of 1995. The tests took 40 minutes to complete and were mailed to American College Testing for scoring. The results were used to determine the usefulness of the test data to the work site and academic instruction.

Throughout the spring of 1994, the newly formed center Student Assessment Committee (SAC) met bimonthly to establish a school-wide grading policy. Following the PYAP model, this committee devised a school-wide grading policy that placed a strong emphasis on work habits. Although each of the seven center cluster areas determined to have slightly different grade weightings, the school-wide average for work habits equated to 30% of each student's grade per marking period. Examples of work habits by policy definition included proper trade attire, dependability, neatness, organizational skills and time on task.

Unique to the PYAP was the means by which the PYAP

students received their grade reports. The Mentor Workplace Committee determined the procedure for delivering the quarterly grade reports would involve the PYAP coordinator visiting the job site. The mentor or sponsor in turn would meet with the student apprentice and present the grade report in discussion format. The purpose of this activity was determined by the Mentor Workplace Committee to infuse the relationship between strong academics and on-the-job technical skills.

The portfolio assessment concept was new to the instructional environment at the center. The criteria for portfolio content were developed with both teacher and student input. Guidelines for portfolio assessment were developed using a combination of Pennsylvania Department of Education guidelines, professional research, and prior teacher training. Paulson, Paulson, and Meyers' (1991) definition of portfolio assessment synthesizes the parameters of the center's PYAP portfolio assessment:

> A portfolio is a purposeful, interrelated collection of student work that exhibits the student's efforts, progress, and achievement in one or more areas. The collection includes: student participation in selecting contents, the criteria for selection, the criteria for judging merit, and evidence of student self-reflection. The portfolio communicates what is learned and why it is important (p. 65).

All student portfolios met four primary objectives: (a) they addressed the 52 state-defined learning outcomes necessary for the student to graduate, (b) they provided work-based training plan documentation, (c) they depicted

the relationship between learning activities in both business and industry, and (d) they depicted a correlation between the secondary and postsecondary lifelong learning process.

In June 1994, all four student apprentices defended their portfolios in a formal setting. Academic representatives from their sending school, as well as the center's director and technical teachers, served on the panel. All defenses were videotaped and shared with the center staff and JOC. The response from these two observing groups was encouraging. All witnesses to these tapes were extremely impressed with the professionalism displayed by the PYAP students.

In addition to the videotapes, each student was required to maintain a paper formatted portfolio. Samples of all student projects, tests, journals, and research assignments were included in the final evaluation. Because the construction of the portfolios was a yearly project, the PYAP teachers maintained high quality standards. The PYAP teachers checked the portfolios on a daily basis.

Recruitment

The Stakeholder Committee determined that because the PYAP was new and a truly unique means of delivering technical training, a strong recruitment initiative was imperative. In February of 1993, the Recruitment Committee was formed. The members consisted of the project manager,

school board chairperson, Parent-Teacher Committee chairperson, Director of Guidance from North Penn School, Superintendent of North Penn School District, and the Administrative Director NMTCC.

The primary charge of this subcommittee of the Stakeholders Committee was to inform the community about the PYAP in a timely manner. By March of 1994, seven service organizations, two parent groups, three Chambers of Commerce, and all five participating school district boards heard the speeches about the PYAP. All of these presentations included representation by at least one of the PYAP students. Colorful informational transparencies were developed to highlight the PYAP at all presentations to the target audience.

In September of 1993, a professional video was made depicting all of the center course offerings. The chairperson of the Parent-Teacher Committee was featured in the video heralding the need for technical training. The PYAP academic staff was also featured, along with students working in local sponsoring companies.

In October of 1993, the 1994-1995 program of studies booklet was designed, typeset, and printed at the center. A full page was devoted to the new PYAP. In January 1995, the booklet was completely revised to improve upon the professional image through the assistance of a local marketing firm. The major differences were the layout,

cover design, and upgraded paper stock. An outside printing firm was also used for the same reasons. All parents of 8th, 9th and 10th graders from all five participating school districts received these brochures by mail. This mailing equated to approximately 9,000 brochures mailed during January of 1995. Copies of all brochures were also delivered to the guidance offices of each participating sending school. An additional PYAP brochure was designed and printed by the same marketing firm during January 1995. This brochure was used with the many school and community presentations.

Recruitment of PYAP students was also the responsibility of the NMTCC guidance counselor and cooperative education coordinators. From October through February of both the 1993-1994 and the 1994-1995 school years, visitations were made to all sending schools. This phase of the recruitment process incorporated setting up a visitation schedule, ninth-grade assemblies with the new school video aired, follow-up visits, tours of the center, career expositions in the lobby of each of the sending schools, and representations at back-to-school nights and course-selection nights. Additionally, the machine trades instructor, guidance counselor, cooperative education teacher, and PYAP students spoke to all 10th-grade students in either math or social studies classes at each of the sending schools.

Utilizing the data from Tables 5 and 6, the center administration realized the importance of promoting PYAP with the sending school counselors. In response, on January 11, 1995, a Counselor Awareness Day was held at the center for all middle, junior, and senior high school counselors to find out more about PYAP. The response was greater than anticipated--20 counselors attended. The program consisted of a lunch prepared by the students, an overview of the curriculum changes at the center, a tour of the center, and an industrial visitation at a PYAP work site. The counselor interaction with a PYAP employer, mentor, and youth apprentice were highlights.

A PYAP video was professionally made during the fall of 1994 and aired over the local cable television in the form of an informative program. Several youth apprentices were filmed working at both the center and at their respective work sites. A copy of this video was obtained and used with several presentations, including the center Stakeholders Committee.

Several service organizations also heard the PYAP presentation during the 1993-1994 and 1994-1995 school years. The largest was a combined Kiwanis Club dinner meeting held at the center in January 1995. Over 70 people were in attendance. Three PYAP students and the school-to-work coordinator made presentations at that function.

Potential PYAP students contacted their sending school counselors to initiate the course-selection process. The 18 1994-1995 schcol year PYAP students enrolled in the program between February 1994 and August 1994. A parent night was held at the center in February 1994 and again in February 1995 for parents of all new students to tour the center and meet the instructors. In May of 1994, a separate parent meeting was held for parents of new PYAP students.

The center administration and the Marketing Committee utilized the student survey information from the Program Improvement Questionnaires (NMTCC, 1994d and NMTCC 1994c), that were administered at the beginning of September 1994 to ascertain the most effective means of marketing the PYAP to potential PYAP students during the 1994-1995 school year (see Appendices B and C). The marketing plan primarily addressed existing 10th-grade center students. This decision was predicated on the fact that 20 of the 21 1994-1995 PYAP students were recruited from the existing Grade 10 NMTCC population. Each of the seven clusters of 10th-grade students was exposed to a PYAP presentation held at the center. Each presentation consisted of a youth apprentice from the cluster area, a PYAP academic teacher, a PYAP technical teacher, and a representative from industry. Students had the opportunity to ask questions.

Following this presentation, all potential PYAP students were required to submit a typewritten letter of

intent to be considered as a PYAP applicant. The PYAP academic teachers worked with the applicants to produce a professional-appearing letter. This exercise served two purposes: first, to demonstrate the commitment on the part of the student and, second, to see if the applicants could produce a professional neatly organized document.

In November of 1994, the project manager had the unique opportunity of presenting a workshop entitled The Pennsylvania Youth Apprenticeship Program: A Tripartite Process at the Pennsylvania Department of Education's Integration of Academic and Vocational Education Conference held at Penn State University. This was the first Pennsylvania Department of Education workshop that focused on the PYAP process from recruitment through postsecondary opportunities. The panel consisted of a 2nd-year youth apprentice, his employer, a company engineer, and an associate professor of engineering (see Appendix G).

During January and February 1995, a professionally created center brochure was mailed directly to the 6,900 parents of all Grade 8, 9, and 10 parents from all five participating sending schools and the two parochial schools. This brochure highlighted all of the program opportunities at the center with special emphasis on PYAP.

A separate PYAP three-fold brochure was professionally created and printed in February 1995 to be used for promoting the PYAP. Included in this brochure was a new

program logo and pictures of students working in sponsoring training sites. The rationale was to give recognition to the sponsoring companies and entice the readers into finding out more about the program benefits (see Appendix H).

Project Evaluation

Several components from program evaluation models were utilized to develop, implement, monitor, and modify the center PYAP throughout the MARP process. Because the center served as one of 16 PYAP pilot sites for Pennsylvania, the successes of the programs will partly be determined by the evaluation information that is presented. The future vocational-technical education delivery system in Pennsylvania will also be determined in part by the success rate of the PYAPs. The ultimate determination of the PYAP's success will rest with the feedback obtained by the sponsoring industries over the course of time.

The center primarily follows the established program evaluation processes that are defined by the Pennsylvania Department of Education (PDE). The center received specific evaluation requirements when the PYAP grant was awarded in 1993. The PDE requirements specify that each school is to establish a stakeholders committee for the purpose of providing ownership to the program. This group must be directly involved in all phases of the program's development, implementation, and modifications. The center is required to provide a program coordinator who is

responsible for submitting to PDE a monthly progress report. This person also attends quarterly meetings at the project headquarters at the PDE building in Harrisburg, Pennsylvania, to discuss program regulation changes as they occur. This process is also utilized to maintain continuity to the programs through establishing dialogue between the PYAPs.

It is important to note that the PYAPs were under tight scrutiny by the center and sending school administration, the Joint Operating Committee, the PYAP Stakeholders Committee, the Delaware Valley Industrial Resource Center and the Pennsylvania Department of Education. The success of the program was primarily determined by these groups. The groups determined the success based upon increased student participation, requests for apprentices from local businesses, and general interest in the program from members of the community. The positive press coverage of the program also attributed its success (see Appendix I and Appendix J).

Throughout the implementation phase, several areas were tested to determine the successes of the programs. The WRAT was used to provide baseline math and reading scores. This information will continue to be used by the academic teachers when planning and delivering the curriculum. The WRAT test was also administered in September of 1994 and February of 1995 to determine the academic gains in math

and reading.

Student portfolios following the authentic learning model were used to determine the technical and academic accomplishments of the program and students. The PYAP students provided input regarding the components to the portfolio. The program completers were compared to the program completers in the machine trades, welding, and engineering-related technology students from the 1991 and 1993 school years to determine the increase in students pursuing their technical training and employment in a related profession to their PYAP studies. A substantial increase was noted. One hundred percent of the PYAP students had plans to further their education following graduation in a field directly related to their training (see Table 15).

During the fall of 1994, the center administration and PYAP Stakeholders Committee determined that a voluntary on-site visitation and evaluation of the academic portions of the program would provide useful feedback. The state coordinator of school-to-work programs headed a team of five academic administrators from the center's participating school district to conduct the evaluation. The findings of this voluntary team indicated the academics taught to the PYAP students were of high caliber and adequately prepared the PYAP students for postsecondary opportunities. The only suggestion was to provide a greater linkage between the

academic subjects taught and the needs of the PYAP sponsoring companies (NMTCC, 1994f).

The evaluation suggestions were used first to make modifications to the existing programs, as per Scriven's (1991) metacognition stage of program evaluation, and, second, to develop new PYAPs. Program statistics were used to promote PYAP through service club presentations, brochures, and news releases.

Relationship to Organizational Goals

The center is a part of the school reform movement sweeping the public school systems in Pennsylvania. All public schools in Pennsylvania are required to develop strategic plans that address the future of the school. The center is a Phase 3 school, which means the school must submit a strategic plan to the PDE during the 1996-1997 school year. The PYAPs have received approval from PDE and will be an integral component of the school goals as the center staff and administration prepare for the future curriculum delivery. The tech prep initiative, high-schools-that-work initiative, curriculum redesign initiative, clustering concept initiative, and PYAP Initiative were all under development and implementation at the center throughout the practicum process. These initiatives are directly related to each other and will provide greater career opportunities for the center students.

Summary

The proposed intervention activities surrounding the development and implementation of the PYAPs at the center were designed to meet the expectations of the program stakeholders. The main goal was and continues to be to provide the Montgomery County workforce with the caliber of academically and technically trained skilled workers that the local industry requires.

The Pennsylvania Youth Apprenticeship Program is facilitated utilizing the shared governance model that has been successfully implemented in European countries like Germany since World War II. The PYAP also is unique in that the curriculum delivery is determined with a cooperative arrangement with industry. The PYAP students also have a unique experience by determining the curriculum delivery.

Interdisciplinary projects are used to represent the cohesiveness of the group of PYAP teachers and students. A portfolio assessment system was implemented to assist with the marketability of the PYAP students' skills.

The program outcomes yielded highly skilled trained employees entering the Montgomery County workforce upon graduation or furthering their career training through postsecondary school programs. The PYAP graduates will continue to improve the image of vocational education at the center, resulting in increased student enrollments.

Chapter 5

Results

Overview of Problem and Setting

The school-to-work PYAP at the NMTCC has yielded significant growth since its inception in May of 1993. The program began as a pilot project funded through a 3-year state-initiated competitive grant. The center received $30,000 yearly for this grant. Funding began during the 1993-1994 school year and continued for 3 years. Nationally, this youth apprenticeship initiative represented the first educational venture jointly sponsored by the United States Department of Education, the Department of Labor, and the Department of Commerce.

Terminal Objective 1

The PYAP model of program delivery differed from the traditional vocational delivery model that existed at the center since 1966. Traditional vocational programs were offered in a 3-year sequence. The traditional center students spent a half day at their sending high school receiving academic course work; the other half of their day was spent at the center receiving technical training. The major disadvantage of the traditional vocational delivery was that only 1,040 (62.58%) of the 1,662 center graduates from the 1985 through 1993 graduating classes worked in a

related field or continued on to further their education (see Table 1). By contrast, this first terminal objective was satisfied when 21 (100%) of the PYAP participants were employed in technical skill occupations throughout the duration of this project. All 21 PYAP students satisfied this terminal objective by planning to pursue postsecondary technical training upon graduation from NMTCC.

The first process objective addressed the creation of a PYAP Stakeholders Committee to oversee the development, implementation, and monitoring of the program. This committee was comprised of industry, sending high school faculty, postsecondary school faculty, and center faculty (see Table 9). The Stakeholder's Committee provided the impetus that made the PYAP model a viable program alternative for center students.

An associate professor from the Pennsylvania State University, Abington Campus, served on this committee and assisted with developing an Associates Degree Engineering Technology Program option for the PYAP graduates. This effort "paid off" when a 1995 PYAP graduate entered this postsecondary program with advanced standing beginning with the 1995 school year. The advanced course work was the result of hands-on training received at the work site coupled with theory-based technical training.

The second process objective was satisfied by hiring a school-to-work transition coordinator. The primary purpose

of this staff member was to oversee the work-based component of the program. This transition coordinator had a great program impact: sponsoring companies were secured, training plans developed and monitored, site visitations conducted every 2 weeks, parent communications were increased, and subcommittees were held to their tasks. The increased involvement with the students left little opportunity for students to be led astray. These factors contributed to the success of the work-based placements and ultimately led to the high placement rate of students working in their technical trades.

The third process objective required that all PYAP students would be employed at a sponsoring company throughout the duration of the project. This requirement was realized at the inception of the PYAP student placement. All PYAP sponsors were committed to training the students over a 4-year period. In turn, the PYAP students made a serious career decision prior to graduation. This win-win arrangement between employer and youth apprentice was attributed to the employment placement success.

The fourth process objective focused on the assignment of a mentor to the PYAP students by the sponsoring company. The mentor was responsible for overseeing the implementation of the training plan. The success of this objective can also be attributed to the high placement rate as a result of the professional relationship formed between the mentor and

the PYAP student. An analogy can be drawn between this training methodology and individual teaching instruction. The individualized attention yielded more mentor-to-student training instruction than the traditional vocational shop environment. For the 21 mentors, this experience provided a chance to pass down their skill knowledge to the next generation of technically skilled workers.

The PYAP student training plans were customized to the work environment and the student's career aspirations (see Appendix F). The plans were developed through a combined effort of the technical teachers, training mentors, and PYAP students. The mentors submitted quarterly performance reports to the school-to-work coordinator for inclusion into the students' marking period grade (see Appendix E).

The fifth process objective required the development of a Mentor Workplace Committee. Once created, this subcommittee of the Stakeholders Committee was comprised of training mentors, technical teachers, academic teachers, and the project manager. Critical curriculum issues were addressed at this committee level. The primary focus throughout the first year of the committee's existence was to define and refine the curriculum development and monitoring procedures.

In the fall of 1993 and 1994, the Delaware Valley Industrial Resource Council representative provided an evening training seminar for training mentors. The Mentor

Workplace Committee was the host committee for these activities. This support mechanism led to strengthening the program and, in turn, provided continuity for the work-based training component.

The sixth process objective mandated the hiring of academic teachers to satisfy the academic delivery component of the program. A unique feature of the center PYAP model was that all of the academic teachers had qualifications that provided support and program growth. The three teachers who taught health/physical education, applied communications, and principles of technology were hired directly from industry positions. This hiring practice provided the PYAP students with an industry-based academic training experience. The social studies teacher also had a unique background because she completed her student teaching in an interdisciplinary environment with several subject teachers. She also had formal experience with portfolio assessment training. Through this effort new expertise was brought to the PYAP.

The seventh process objective was intended to provide student input into the creation of PYAP curriculum and assessment through establishing specific topics and procedures. This accomplishment documented a unique feature of the PYAP and resulted in increased program enrollment and employment placement success. Students provided input into curriculum delivery, in-class projects, and portfolio

assessment.

The numerous teacher traits described above continued to provide an educational environment conducive to successful student placement in the work environment and academic preparedness for postsecondary technical training. The academic teachers treated the PYAP students like players on a team. This relationship resulted in an educational environment wherein all students functioned as spokes of the wheel. This spirit of collegiality enhanced the attainment of this objective.

The ninth process objective required that students develop and implement an authentic learning portfolio assessment system that reflected their personal academic and technical training experience. This objective was satisfied in the early stages of PYAP development. Students also defended their portfolio in a panel format at the end of the 1994 school year. The portfolio experience provided the students with an experience to speak and to be videotaped in response to the panel. Panel composition included sending school teachers and PYAP academic teachers. All PYAP students were presented with a copy of their portfolio videotape at the conclusion of their program.

Terminal Objective 2

The most difficult aspect of implementing PYAP was selling the concept to students, parents, and sending school guidance counselors. The research design focused on these

populations and the marketing efforts to increase program participation. As a result of these efforts, the PYAP grew 425% or from 4 students during the 1993-1994 school year to 21 students as of February 1, 1995. The program grew to 52 students for the 1995-1996 school year, representing a 188.9% increase over the 18 students enrolled in the program at the beginning of the 1994-1995 school year.

The accomplishments listed above led to the satisfaction of the second project terminal objective. It is also noteworthy to document that this terminal objective was realized during the February 1995 registration period. This rate of growth exceeded the MARP terminal objective of 100% growth in program enrollment determined by the PYAP Stakeholder's Committee in May of 1993 (NMTCC, 1993b).

A related process objective resulted in the development of a Marketing Committee that developed a marketing plan to promote the PYAPs. The Marketing Committee was formed as a subcommittee of the Stakeholders Committee.

The Marketing Committee promoted the PYAP through the sending schools, parents, business and industry, and the community. Wide-scale activities included service-club presentations, speaking to both large-group and classroom audiences at the sending schools, development of brochures and transparencies, bulk mailings to parents and students, and open-house functions.

Two marketing questionnaires (NMTCC, 1994d and NMTCC,

1994c) were developed with the assistance of a marketing research firm to ascertain the best means to market the PYAP (see Appendixes B and C). This occurred during the summer of 1994. Both traditional program center students and current PYAP students were surveyed with these instruments prior to refining the marketing plan. Based upon the results of the Student Program Improvement Marketing Questionnaire, the program manager determined that sending-school guidance counselors significantly influenced the student's decision to attend the center and participate in the PYAP (see Tables 6 and 7). A Counselor Awareness Day was held on January 11, 1995, to expand the knowledge base of the counselors from the five sending schools. These counselors arrived at the center for an informational luncheon. Following the luncheon, several PYAP students, PYAP academic teachers, and technical teachers conversed with the counselors about the program. A bus trip to B & G Manufacturing followed with a tour of this youth apprentice training site. The sending school guidance counselors were then surveyed to ascertain their knowledge of the PYAP (see Table 11).

The low PYAP enrollment of four students at the beginning of the 1993-1994 school year was a concern of the center administration and PYAP Stakeholders Committee. Although job-training opportunities were secured, marketing the program to meet the workforce demands was a great

challenge. At the start of the 1994-1995 school year, the PYAP enrollment reached a high of 19 students, the enrollment goal was secured, and the program was beginning to gain recognition. One student returned to his sending school in October 1994 to pursue a different program. Three students were added in December 1994 to bring the total enrollment to 21 students.

Table 11

Results of the PYAP Counselor Survey of Program, Fall 1994

Question	Mean score
Sending school counselors (n = 20)	
1. The following have been clearly communicated:	
- Program mission and goals	4.9
- Placement criteria	3.7
- Student schedules	4.5
- Academic course work	4.1
- Length of program	4.4
- Registered apprenticeship requirements	3.9
- Postsecondary options for PYAP students	4.5
2. I understand PYAP is	
- A work-based learning program	4.9
- A drop-out prevention program	3.7
- Productive employment	4.8
- Exposure to all aspects of an industry	4.3

(table continues)

Question	Mean score
2. (cont.)	
- A program for students interested in postsecondary education	4.4
- A viable school-to-work model for center students	4.9
3. Suggestions to better inform students, parents and the public about this center option:	
- Develop identification of potential PYAP students at an earlier age.	
- Intense one-on-one family counseling sessions	
- Parent evening information sessions targeted at Grade 7 and 8 students	
- Grade 7 and 8 student tours	
- Involve the middle-school parent group	
- Have current PYAP students speak to peers	
- Offer work site tours to potential students and parents	

Note. A Likert Scale was used: 1 = definitely disagree, 2 = somewhat disagree, 3 = not sure, 4 = somewhat agree, and 5 = definitely agree.

In February 1995, the center administration and Stakeholders Committee was elated to hear the recruitment news that the marketing achieved their anticipated results. The anticipated enrollment for the start of the 1995-1996 school year exceeded the initial goal of 36 students. Fifty-two students were registered, which represents an increase of 125% over the targeted goal (see Table 12).

Table 12

NMTCC PYAP Participants by Occupational Areas, 1993-1994, 1994-1995, and 1995-1996 School Years

Occupation	1993-1994	1994-1995	1995-1996
Metal trades	4	5	8
Engineering	-	2	7
Power and transportation	-	5	8
Building trades	-	4	13
Visual communications	-	4	6
Culinary arts	-	1	4
Health and human services	-	-	6

The culinary arts technology participant was the only PYAP female student during the 1994-1995 school year. Nine females were admitted into the PYAP for the 1995-1996 school year. Three were in culinary technology, three were in visual communications technology, and three were in health and human services technology. The PYAP brochure highlighted both male and female students in the program. The marketing efforts emphasized the options for all nontraditional students.

Terminal Objective 3

The third MARP terminal objective of attaining a combined 1st-year and 2nd-year PYAP student attendance average of only 1.0 days of absence per marking period, compared to traditional program Grade 11 and 12 Career

Center average of 3.0 days of absence per marking period. This objective was not fully attained during the 1994-1995 school year. The PYAP students averaged 2.0 days of absence per marking period during the first semester of the 1994-1995 school year, compared to the traditional program Grade 11 and 12 students who were absent an average of 5.7 days per marking period during the same time period (see Table 13).

Table 13

NMTCC PYAP and Traditional Program Attendance Comparison, Fall Semester 1994

Program delivery type	No.	Average days absent per marking period
Traditional program	689	5.7
PYAP	21	2.0

Note. The traditional program was comprised of all center students, Grades 9 through 12.

The attendance record of the PYAP students was, however, significantly better than the traditional program Grade 11 and 12 students for two main reasons. First, the PYAP students were earning a wage during the 2 days per week when they were at the work site. Second, the students received their academics in an instructional environment conducive to greater teacher-to-student interaction. The self-esteem of the students was also raised, and the students made a strong commitment to their career-training

experience.

The attendance pattern for the PYAP students did indicate a stronger commitment to the sponsoring company than to the academic environment. The average marking period absence for the PYAP students during the work site portion of the first semester of 1994-1995 was only .3 days of absence over a 45-day marking period, compared to 1.7 days of absence during the same marking period 3-day-per-week academic time frame.

A conclusion can be drawn that the paid work experience did reduce the number of school absences when contrasting the PYAP work site and academic attendance patterns. Similarly, the PYAP attendance data indicated the PYAP students had an overall school absence record that was 3.7 days less per marking period than the traditional program Grade 11 and 12 Career Center students. The paid work experience constituted a contributing factor to improving the attendance record of PYAP students, as substantiated through the project manager's discussions with PYAP students concerning the need to "show up" at work if they would like to be paid. This also was a contributing factor to the success of the major goal, which was to increase the graduation student placement rate to 100%.

A further process objective targeted the development of student grade reports with the assistance of the sponsoring company. In addition, the training mentors would be

responsible for distributing the grade reports to the PYAP students.

The Mentor Workplace Committee spent two evenings in the fall of 1993 developing the grade-report format and procedures for the technical portion of the program. Once the format was established, each sponsoring company mentor evaluated the students' performance quarterly. The 9-week grading periods corresponded with the center's grade-report periods.

One of the unique aspects of the distribution of grades was the employers' involvement in the distribution process. This provision was adapted from the German model wherein employers were an important part of the students' academic and technical skill performance. The center's grades were compiled from the mentors and academic teachers into a computerized report format. The school-to-work coordinator distributed the grade reports to the mentors. Each mentor then met with the PYAP student and discussed all of the quarterly grades. This process demonstrated to the PYAP students the relationship between academic and technical skill development. Good attendance was also emphasized. Quarterly and cumulative attendance data were furnished on the grade reports.

Finally, Process Objective 12 stated the PYAP students would be administered presurvey and postsurvey instruments to determine the students' perceptions and recommendations

to improve the PYAP. This objective was not only satisfied, but also was expanded to include program performance ratings from parents of PYAP students, counselors, work site mentors, and academic and technical PYAP teachers.

The NMTCC administration was concerned about plotting the development of the PYAP throughout its implementation period. As a result of the research data collected throughout this MARP, this administrative goal was attained. The following section depicts the results of PYAP performance surveys conducted throughout this project.

The four 1993-1994 PYAP students were administered an identical program performance rating survey in the spring of 1994. The same survey was also used with the 21 PYAP students in the winter of 1995 (see Table 14). The results of this comparison survey indicated the program met its goals. Recommendations for program improvement were also proposed. The first of the three recommendations provided the PYAP students with sending school information. This was realized during the 1994-1995 school year by including daily announcements from the PYAP students' sending schools faxed to the center each day. The second recommendation expanded the academic curriculum to include more integrated academic and technical skill projects. The last recommendation also expanded the marketing of this program to increase student participation.

Table 14

Comparison of the PYAP Student Survey of Program, Spring 1994 and Winter 1995

	Question	Mean score 1994 (n = 4)	1995 (n = 21)
	Work Environment		
1.	Students are engaged in real, productive work	4.3	4.1
2.	Students are exposed to all aspects of an industry	4.3	4.0
3.	Students are paid a fair wage	3.0	3.7
4.	Employers provide opportunity for advancement based on student's knowledge and skill	3.8	3.7
5.	Highly skilled workers are assigned to teach student workers	5.0	4.1
6.	Students are provided a safe learning environment at their workplace	5.0	4.3
	Academic Environment		
1.	Student's academic learning is driven by workplace learning	4.0	3.5
2.	Academic courses reinforce vocational and technical skills	4.0	3.4
3.	Technical/vocational courses reinforce academic learning	3.8	3.7
4.	Student learning is project driven	4.8	3.5
5.	The program adapts to meet the needs of students and employers	4.5	3.1
6.	The program supports competency-based learning	4.8	3.5

(table continues)

Question	Mean score	
	1994	1995
7. The program provides for generated portfolios	4.8	3.8
8. The program prepares students for the process of lifelong learning	4.0	4.0
9. The program stresses self-learning skills	4.3	3.8
10. The program allows students the opportunity to continue their education	4.5	3.9

Note. A Likert Scale was used: 1 = never, 2 = rarely, 3 = sometimes, 4 = usually, and 5 = always.

An end-of-the-year program report was also submitted to the Pennsylvania Department of Education Bureau of Vocational and Adult Education. This report, completed by one of the project observers, focused on the level of achievement in relation to the state's goals and objectives for all PYAPs. The center met all of the goals and objectives for the 1994-1995 school year.

To ascertain the PYAP parents' rating of the PYAP academic and technical instruction performance, a parental feedback survey instrument was developed (see Appendix K). The center's administration and PYAP academic teachers wanted to receive parental feedback and enhance the teacher and parent communication process. Both goals were accomplished by administering a telephone survey of the program that utilized a list of prepared questions. The PYAP social studies and communications teachers each

contacted 9 of the 18 PYAP students' parents by telephone and recorded their responses to seven questions (see Table 15).

Table 15

Results of the PYAP Parent Survey of Program, Fall 1994

Question	No.	%	Responses
PYAP Parent Responses (n = 18)			
1. What do you like most about PYAP?	2	11.0	.school and work schedule
	8	44.4	.learning real-world skills
	1	5.6	.small class size
	4	22.0	.student's interest in school has improved
	1	5.6	.student's input is valued
	1	5.6	.good student/ employer relationships
	1	5.6	.not familiar enough with program
2. Are we meeting your expectations?	18	100.0	.yes
	0	0.0	.no
3. Is your child satisfied with their academic component?	18	100.0	.yes
	0	0.0	.no
4. Is your child satisfied with the work-based component?	18	100.0	.yes
	0	0.0	.no

(table continues)

	Question	No.	%	Responses
5.	At this time, what is your child's future career plan?	3	16.7	.work full-time at the sponsoring company (registered apprenticeship program)
		8	44.4	.work at sponsoring company, postsecondary course work, and registered youth apprenticeship
		3	16.7	.go to college full-time
		2	11.1	.military
		2	11.1	.undecided
6.	Are there any major issues that we should address to improve this program?	6	33.3	.yes - greater communication between sending schools and the Center - curriculum should emphasize innovative ideas - students need to associate with one administrator - heavier emphasis on PYAP at counselor level
		12	66.7	.no
7.	How did you first hear about the PYAP program?	3	16.7	.open house
		1	5.6	.Back-To-School Night at sending school

(table continues)

Question	No.	%	Responses
7. (cont.)	10	55.6	.center's daytime informative program
	2	11.1	.counselor at sending school
	1	5.6	.from student's employer
	5	27.8	.from son or daughter

Survey results indicated high parental satisfaction with both the academic and technical portions of the program. Forty-four percent of the parents responded that the most beneficial aspect of the PYAP was the emphasis on students' learning of real-world skills. Four (22%) of the parents believed their students' interest in school improved since they entered the program. This was also evidenced by a PYAP parent article that appeared in a local newspaper (see Appendix J).

Eight of the 18 parents (44.4%) indicated their son or daughter would, upon high school graduation, work at the sponsoring company in a registered adult apprenticeship program while pursuing postsecondary course work. Another three parents (16.7%) indicated their son or daughter would attend college full-time. Three additional parents (16.7%) stated their son or daughter would work full-time at the sponsoring company while working in a registered adult apprenticeship program.

Six of the 18 (33.7%) parents offered suggestions to improve the program. These included expanding the communications between sending schools and the center, emphasizing innovative ideas within the curriculum, having one program supervisor, and placing a heavier emphasis on PYAP at the counselor level. The latter information was addressed in the marketing plan and was rectified through the Counselor Awareness Day held on January 11, 1995 (see Terminal Objective 2).

The PYAP training-site mentors were also surveyed in early fall 1994 to provide PYAP performance feedback. A modified version of the Jobs For The Future (1993) Charting Your Program's Progress: A Diagnostic Checklist instrument was used to provide this information (see Appendix L).

Fifteen of the 17 different PYAP mentors responded to this survey (see Table 16). The two areas covered by the survey were communications between the center and the training site and the services provided at the training site. The mean scores of all responses were ranked between the somewhat agree and definitely agree categories. This information indicated the effectiveness of these two areas.

Table 16

Results of the PYAP Mentor Survey of Program, Fall 1994

Question	Mean score
PYAP Mentors (n = 15)	
1. The following have been clearly communicated:	
- program mission	4.9
- roles and responsibilities	4.9
- training plan	4.5
- student evaluations	4.8
- student schedules	4.8
- support from site coordinator and technical instructor	4.8
2. As an apprenticeship employer providing work site learning and paid work experience, I have been able to provide:	
- a mentor to oversee and support workplace activities	4.7
- highly skilled workers to te ch apprentices	4.7
- real and productive work for student apprentice	4.7
- Exposure to all aspects of industry	4.1

Note. A Likert Scale was used: 1 = definitely disagree, 2 = somewhat disagree, 3 = not sure, 4 = somewhat agree, and 5 = definitely agree.

The input from the PYAP academic and technical teachers was also critical to the success of the program. These internal assessments of the program were conducted using the Jobs For The Future (1993) instrument titled Charting Your Program's Progress: A Diagnostic Checklist (see Table 17).

Table 17

PYAP Status Survey Comparison of Academic and Technical Instructors

Survey sections	Spring 1994 (n = 5)	Fall 1994 (n = 9)
Programs are governed by broad coalitions of community partners	3.8	3.4
Employers provide structured work site learning and paid work experience	3.6	3.7
Schools integrate academic and vocational learning	3.5	3.6
Schools and workplace learning are coordinated and integrated	3.1	3.2
Programs connect high school and postsecondary learning	3.1	3.0
Completing students receive widely recognized certification of both academic and workplace skill mastery	3.0	3.3

Note. From Jobs For The Future (1993) Charting Your Program's Progress: A Diagnostic Checklist. Adapted with

permission of author. The assessment utilized a Likert Scale: 1 = not yet considered, 2 = planning, 3 = early implementation, 4 = functional, and 5 = institutionalized.

Due to the length of this survey instrument, the major sections of information were reported in this table as the mean score of all subcategories under the reported section. The first and second assessments yielded an overall technical-teacher response that the program was operating between the early implementation and functional stages. These results were anticipated because three of the four PYAP academic teachers were new at the beginning of the 1994-1995 school year and three new PYAP technical teachers' responses were included in the fall 1994 data as reported.

The employers of center students frequently communicated with the PYAP academic teachers about the academic skill level required to function in their technical field. Communications between the PYAP employers and academic teachers primarily occurred through monthly training-site visitations. The school-to-work coordinator also visited the sites once every 2 weeks and relayed information between the student, the employers, and the academic teachers.

Committee members representing three of the four sponsoring companies expressed a concern that academic entrance standards be maintained for growth of the center's PYAP (NMTCC, 1994e). In response to this concern, the

center's administration developed a student application process that left the decision of whether or not a student could participate in the program with the sponsoring employer. If a student could not pass the job interview and hiring process at the sponsoring company, he or she could not participate in the PYAP. This procedure provided the only reliable means to relieve the center from determining the academic and technical expectation level of the employers. This was a center decision and was unique to the operation of the center's PYAP; at the other 15 PYAP sites the decision about student admission was made at the school level (D. Thomas, personal communication, January 23, 1994). The greatest disadvantage of this practice was the fact that students could be enrolled in the program without the linkage to a sponsoring company. Program participation without the work-based component defeated the purpose of the program.

During the 1993-1994 school year, the WRAT math component was administered to all five PYAP students. Data from this test were not included in this project because of the low initial participation in the program. During September of 1994, the WRAT of reading and math was administered to all 18 participants (see Table 18).

Table 18

PYAP Student Pretest Results, Summer 1994 Wide Range Achievement Test (WRAT)

(n = 18)

Subject	Reading		Math	
	Standard Scores	Grade Equivalents	Standard Scores	Grade Equivalents
01	106	PHS	92	8
02	97	HS	93	7
03	109	PHS	116	PHS
04	88	7	88	6
05	101	HS	114	PHS
06	103	HS	114	PHS
07	105	HS	107	HS
08	110	PHS	99	HS
09	108	PHS	102	HS
10	89	8	85	6
11	91	8	99	HS
12	100	HS	101	HS
13	100	HS	92	8
14	102	HS	82	6
15	106	PHS	101	HS
16	106	PHS	94	HS
17	108	PHS	101	HS
18	108	PHS	97	HS

Note. H = high school; PHS = post-high school.
Reading $\bar{X}$ = 102.1; Math $\bar{X}$ = 98.7.

Of the 18 students tested, 17 were new to the program. Of the 18, 16 were in their junior year. Also, 8 students performed at the post-high-school level in reading and 3 students performed at the post-high-school level in math.

Another instrument was employed in the fall of 1994 to measure work-related skills. This instrument, Work Keys, is produced by the American College Testing Program (1994).

Locating Information and Applied Technology were tests selected for administration as these were as the most applicable of Work Keys tests to the PYAP work environment. This was the first time a Work Keys (American College Testing Program [ACT], 1994) instrument was used. The PYAP academic teachers administered the tests and the American College Testing Program in Iowa City, Iowa, scored and reported the tests.

The Work Keys assessment, (ACT, 1994) Locating Information, was administered to all 18 participants. The greatest number of scores, 8 (44.4%), were in the Level 4 category (see Table 19). The test results indicated most of the PYAP students were able to access information in a satisfactory manner to meet the expectation level of their work sites.

Table 19

PYAP Student Work Keys Assessment Instrument Results, Locating Information, Fall 1994

(n = 18)

	No.	%
Level 6 - based upon complex workplace graphics; very challenging	0	0
Level 5 - based upon complicated workplace graphics; detailed forms, tables, graphs, and diagrams	5	27.7
Level 4 - based upon straightforward workplace graphics; order forms, line graphs, instrument gauges, maps, and diagrams	8	44.4
Level 3 - based upon elementary workplace graphics; order forms, bar graphs, tables, and flow charts	4	22.2
Below Level 3 -	1	5.5

Note. Work Keys is a work-related assessment instrument scored by the American College Testing Program (ACT, 1994).

This factor was determined by sharing the Work Keys (ACT, 1994) test results with the PYAP mentors. Following the reporting of these results, the PYAP English teacher designed several instructional activities to build upon the Locating Information skills section of the test. The technical teachers also emphasized the importance of locating information in their technical occupations. Reading and interpreting a blueprint, schematic diagram, and

culinary recipes are examples of where these skills are utilized.

The second Work Keys (ACT, 1994) assessment instrument, Applied Technology, was also administered to the 18 students. This instrument yielded the highest participant scores. In the Level 4 category 7 students could apply elementary physical principles and evaluate alternative solutions to a moderately complex problem (see Table 20). The 6 students who scored in the Below Level 3 category were of particular interest to the PYAP math and applied physics teachers because of the technical nature of the PYAP academic subjects. This meant that the PYAP academic teachers had to modify their curricula to match the appropriate learning level of these students while emphasizing the technical nature of their lessons. These were the same students who ranked in the Grade 6 through 8 level when taking the WRAT math test as depicted in Table 18. In response to this concern, the PYAP mathematics and PYAP physics teachers infused instructional activities within the curriculum to reinforce the applied technology principles. This was facilitated by the project-based curriculum which was unique to the PYAP.

Table 20

PYAP Student Work Keys Assessment Instrument Results, Applied Technology, Fall 1994

(n = 18)

	No.	%
Level 6 - problems with a wide range of complexity: mechanics, electricity, thermodynamics, fluid dynamics and complex machines	1	5.5
Level 5 - understand and apply moderately difficult principles of mechanics, electricity, thermodynamics, and fluid dynamics	0	0
Level 4 - apply elementary physical principles, and evaluate alternative solutions to a moderately complex problem	7	38.8
Level 3 - elementary problem solving using physical principles with one uncomplicated system or tool	4	22.2
Below Level 3 -	6	33.3

Note. Work Keys is a work-related assessment instrument scored by the American College Testing Program (ACT, 1994).

Summary

The NMTCC PYAP was developed and implemented with strong linkages between business and education. Many firsts in the 29-year history of the center were accomplished along the way. These included (a) business and industry became an integral part of every aspect of the program's content and delivery, (b) industry played a vital role in providing the

actual training experience, (c) high-school-aged students began attaining hours towards their 8,000-hour registered apprenticeship training requirement, (d) this was the first time students received their academics in a project-based interdisciplinary environment, and (e) students experienced training that blended academic and technical preparation at the secondary level with postsecondary options and meaningful high-skill employment.

The sponsoring companies had much at stake, but quickly saw the fruits of their labor as evidenced by the quarterly student progress reports and site visitations every other week. The average German company spends $10,500 to train a youth apprentice (Stone, 1991). By comparison, the center PYAP sponsoring companies do not pay a training tax to train their youth apprentices. They do, however, pay the students to work for their company while the student receives his or her training.

During the 1994-1995 school year, the average PYAP student earned $5.64 per hour while on the job site. The hourly wages paid to the youth apprentices differed by occupational clusters. This determination was predicated on the level of technical skill required in this profession. Every employer had input to setting the minimum wage scale for their respective occupational cluster (see Table 21).

Table 21

PYAP Student Wage Comparison by Occupational Clusters, 1994-1995 School Year

Occupational cluster	No.	Average wage per hour
Metal trades	5	$6.00
Power and transportation	5	$6.00
Building trades	4	$6.00
Culinary arts	1	$5.50
Engineering	2	$5.50
Visual communications	4	$5.25

Since the average PYAP student worked 24 hours per week and was employed an average of 52 weeks per year, the average employer paid $7,038 to the PYAP student. If a PYAP student would work a 40-hour work week during Years 3 and 4 following graduation, this would equate to $37,538 over 4 years at the $5.64 per hour rate. Each sponsoring company invested in their students, hoping they would continue on with the company past high school graduation. As of February 1995, all 21 PYAP students planned to continue with their sponsoring company past graduation. This represents a remarkable feat!

All project goals and objectives were fulfilled by the end of the implementation period. This was not surprising as the PYAP academic teachers were working diligently to see

the program grow and to be hired as full-time teachers beginning with the 1995-1996 school year. All four of the PYAP academic part-time teachers were hired with the understanding that their positions would become full-time if the program enrollment exceeded 50 students. The PYAP students also knew many eyes would be focused on them as they could either "make" or "break" the future of the program.

It is noteworthy that the program grew at a greater rate than originally anticipated by the Stakeholders Committee in May of 1993 (NMTCC, 1993b). This can be primarily attributed to the positive manner in which the program was received. Complimentary feedback was obtained from students, parents, mentors, counselors, and both academic and technical instructors.

The project research design focused on effective marketing strategies needed to build the program into a viable and widely accepted school-to-work model. This was accomplished through massive public relations efforts that focused on the marketing plan. These included (a) lectures at a state conference, (b) lectures at civic organizations, (c) parent and teacher meetings, (d) parent night at the center, (e) sending school back-to-school nights, (f) course selection nights, (g) meetings with academic classes at the sending schools, and (h) meetings in the seven center occupational clusters. A $3,000 state grant was also

secured to facilitate the marketing plan. Both a school-wide program brochure and a separate PYAP brochure assisted in improving the quality of the program and informed the public of the many PYAP opportunities.

Precautions for Replication

The center's PYAP served as a new model for technical training in Pennsylvania. As with any new program, many areas of implementation could have been approached differently and would be recommended to any person contemplating replicating the program.

This model, without exception, was the program that turned the center around. During the 1991-1992 school year the center enrollment plummeted to an all-time low of 492 students. Throughout the duration of this project the school-wide enrollment increased from 580 students in 1993-1994 to a projected enrollment of 800 students in the 1995-1996 school year. This overall increase was partially attributed to the increase in PYAP enrollment and students in Grade 9 and 10 who had the option of participating in the PYAP during their junior and senior years.

A primary recommendation resulting from this project is to secure funding for the program at least one year BEFORE implementation begins. The center administration applied for the state-offered grant in February of 1993; however, the governor's office approved the grant after most student schedules were already set for the following school year. A

neighboring county-wide PYAP chose to use the first-year funding to develop the program before implementation. This is highly recommended because of the logistics necessary to develop and implement this unique program model in a traditional vocational-technical school environment.

Another suggestion is to combine resources to offer a county-wide program in lieu of an individual school program. This would assist with obtaining the number of students necessary to hire full-time teachers in lieu of part-time teachers. The biggest disadvantage with part-time teachers was that they were separated from the rest of the faculty. In order to justify additional hours of employment, the center's administration determined the PYAP part-time academic teachers could work an additional two mornings per week as cluster facilitators to the visual communications cluster. This administrative decision led to exposing the PYAP teachers to prospective PYAP students in the visual communications cluster. Limited financial resources and low salary levels for part-time teachers at the center prompted the part-time teachers to obtain additional employment opportunities.

A further suggestion is to allow sufficient time for curriculum writing prior to the start of the school year. The center teachers were hired at the end of the summer of 1993 and 1994. Thus, they only had 2 weeks to prepare for the start of school.

A caution to consider is to guarantee the program is offered in conjunction with the center location. The technical teachers need to be an integral component to the program. This involves training plan development, open communication channels between the mentor and the technical teacher, and the reassurance that the work site is an extension of their classroom. For the technical teachers with low enrollment, this also means the work site is not a complete replacement of the technical teacher. They also need to visit the students at the industry location to insure the training plan is being followed.

Another suggestion is to offer the academic course work on a postsecondary school campus. By the end of the junior year, the PYAP students should visit several postsecondary technical schools. The students would also be eligible to take the college-placement tests, which would give an indication as to the students' academic preparation. Students need to see a clear linkage between school, work, and postsecondary training.

Because the instructional delivery of this program breaks from the traditional teacher-preparation models, the colleges and universities that prepare vocational teachers must assist new teachers with teacher preparation in the areas of project-based curriculum, portfolio assessment, and work-based learning. This also means providing inservice training to current academic and technical teachers.

The curriculum also needs to be monitored closely. This involves a commitment on the part of the administration, academic teachers, technical teachers, and the school-to-work coordinator. Administrators must involve sending school personnel in the development and evaluation of all curricular materials. An academic committee could also assist with this objective. The center involved a representative from the Pennsylvania State Department of Education to head up a voluntary on-site evaluation of the academic portion of the program. Sending school personnel should assist with the evaluation.

Recruitment efforts need to be focused in several directions. Parent groups, service clubs, sending school students and staff, center students and staff, and the public need to know about the program. Utilize current students to sell the program. Also, survey the students, parents, mentors and counselors to obtain useful information in order to plan and execute a successful marketing plan. Most important, the development and implementation will not yield a high number of program participants in the first several years of operation, nor should it be expected to do so. Realistically, new program ideas are not always readily accepted by parents and students. The PYAP requires a commitment by students at a very early age to embark on a lifelong training career path. Unlike many European countries, the students in American schools are typically

not ready to make firm career commitments. The technical-skill employment shortages of the future will result in greater interest in the PYAP model. Careful planning and patience will have benefits to any vocational-technical school program seeking to move the delivery of technical-skill training from the past into the future.

Discussion

The PYAP was initiated as a statewide school-to-work initiative in 1991. A program was offered at the center beginning with the 1993-1994 school year. This was the first school-to-work transition model to involve business and industry in the entire development and implementation process. Industry involvement led to shared governance, which ultimately provided for the training needs of all program sponsors.

Although the program grew more rapidly than originally anticipated, there was a continual concern voiced by the Stakeholders Committee that this program will never meet the vast technical-training needs this country will face in the 21st century. A whole new mind-set must occur that depicts youth apprenticeship training as a viable preparation for making a successful living. The vocational-technical school can no longer afford to exist in its present form because the traditional delivery of vocation-technical education is not cost effective and does not provide real on-the-job

training experiences that link academics with technical training.

Additional postsecondary opportunities must be developed to provide the advanced-level training that is in demand by the technically skilled workforce. Advanced-level academics, offered at both the junior and senior high schools, must be taught along with technical skills to assist our students with job opportunities in the global marketplace.

Within 2 to 4 years, the national skill standards will be developed and implemented for many apprenticable occupations. This system will be linked with a national skill standards examination similar to the German model Hamilton (1993) described. Credentials awarded through a nationally recognized test will draw attention to the youth apprenticeship model as a means toward preparing for the nationally recognized certificate. The registered adult apprenticeship programs will also become more prevalent as the standards are implemented. Technical skill training will then receive the recognition it deserves.

A comprehensive kindergarten through postsecondary school guidance plan must be developed to prepare students at an earlier age for lifelong learning. The counselors at the sending schools must also continually be involved in training programs to keep abreast of the rapidly changing workplace.

An introductory apprenticeship course offered at the middle- or junior-high-school level would serve the primary purpose of informing potential youth apprentices about work environments. Students would gain practical knowledge and begin the appropriate sequence of academic courses. This program would also be a means of assessing the students' aptitudes and interests prior to enrolling in PYAP.

One unique aspect of the center's PYAP is the establishment of a German-American Partnership Program (GAPP). This program will begin in May 1995. This will be a student-exchange program that offers NMTCC youth apprentices an opportunity to attend a youth apprenticeship program in Germany. In exchange, German youth apprentices will attend the PYAP at the center. This partnership will open the doors to international relations. Once established, the center will be the first American vocational-technical school to offer this career-training opportunity.

The PYAP has assisted with the center's administrative goal of improving the image of the program offerings and vocational-technical education in general. Much work lies ahead to continue to build on what has been accomplished through this MARP project. The stringent program requirements and increased school enrollment will result in a competitive atmosphere and a higher expectation level on the part of the program, teachers, and students. Industry

will continue to play an active role in the entire school-to-work training process and will reap the benefit of receiving the caliber of employees that has been needed for years.

Dissemination

NMTCC is in the midst of implementing several recent state and national initiatives aimed at supplying the workforce with a more technically competent employee. The recognition provided to the center through these initiatives will benefit both academic and vocational-technical education.

In May of 1993, NMTCC was selected by Pennsylvania Governor Robert P. Casey as 1 of 16 schools to receive funding to develop and implement a PYAP. As a part of the funding process, the center's PYAP is under continuous observation. Quarterly reports must be submitted to the Pennsylvania Department of Education, which outline the progress of the PYAP. Additionally, the center's school-to-work transition coordinator attends four state-sponsored PYAP meetings per year in addition to the annual Cooperative Education Association Conference.

The findings of this study will be disseminated at the annual Pennsylvania Vocational Education Association Conference in June of 1995. The conference theme is School-To-Work, a relevant topic to this project. While attending this conference the project manager will present

the project findings to an audience of secondary and postsecondary educators.

As a requirement of fulfilling the $3,000 minigrant, a copy of this project will be submitted to the Bureau of Vocational and Adult Education, Pennsylvania Department of Education in Harrisburg, Pennsylvania. Any person may obtain access to this project by contacting the Pennsylvania Department of Education, Bureau of Vocational and Adult Education.

The center's youth apprenticeship project evolved into a successful school-to-work model. Through the efforts of this project (a) local businesses were beginning to receive technically-skilled workers to fill the workforce shortage; (b) the center school enrollment increased as a result of the project implementation strategies; (c) a German American Partnership which is a student-exchange program, was initiated, a first for vocational education; and (d) innovative teaching approaches were utilized--project-based interdisciplinary team teaching, performance-based assessment, flexible scheduling, paid training, and an industry-validated academic and technical skill curriculum.

The center's PYAP school-to-work model will continue to evolve as student participation increases and businesses join the partnership. Vocational-technical skill training at the center is rapidly transforming from the 1960s traditional delivery system of job-specific occupational

training, to work-based technical skill training for the careers of the future. The narrow focus of treating academic and technical curricula as nonrelated entities in two different facilities will also soon disappear. Through the efforts of this major applied research project, the NMTCC youth apprenticeship program will be a viable school-to-work model well into the 21st century.

Human Subjects Statement

All project research was administered and reported in accordance with the exemption requirements of the Institutional Review Board (IRB) of Nova Southeastern University's Committee for the Protection of Human Subjects (see Appendix M).

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Appendixes

North Montco Technical Career Center

Actual and Projected Enrollment Comparison: 1990 through 2000

DISTRICT	1990-91 DISTRICT AVTS	1991-92 DISTRICT AVTS	1992-93 DISTRICT AVTS	1993-94 DISTRICT AVTS	1994-95 DISTRICT AVTS	1995-96 DISTRICT AVTS	1996-97 DISTRICT AVTS	1997-98 DISTRICT AVTS	1998-99 DISTRICT AVTS	1999-00 DISTRICT AVTS	2000-01 DISTRICT AVTS
METHACTON - Home	1005	997	962	957	1002	1089	1028	1073	1149	1208	Unavail.
AVTS	98-10%	97-10%	96-10%	95-10%	100-10%	100-9%	101-10%	106-10%	113-10%	121-10%	Unavail.
NORTH PENN - Home	2127	2170	2156	2179	2301	2537	2766	2865	2996	3074	Unavail.
AVTS	243-11%	246-11%	259-12%	247-11%	262-11%	289-11%	304-11%	315-11%	330-11%	338-11%	Unavail.
PERKIOMEN VALLEY - Home	505	504	483	480	502	522	556	597	613	637	595
AVTS	92-18%	90-18%	98-20%	93-19%	90-18%	92-18%	96-18%	60-10%	96-16%	99-16%	60-10%
SOUDERTON - Home	877	894	901	946	1019	1097	1195	1276	1352	1392	Unavail.
AVTS	141-16%	151-17%	153-17%	160-17%	174-17%	184-17%	203-17%	217-17%	230-17%	237-17%	Unavail.
MISSAHICKON - Home	590	592	712	708	729	773	815	824	847	852	896
AVTS	142-24%	142-24%	151-21%	150-21%	154-21%	155-20%	158-19%	159-19%	160-19%	160-19%	164-18%
TOTALS - Home	5104	5157	5214	5270	5553	6018	6360	6635	6957	7163	Unavail.
AVTS	596-12%	586-11%	607-12%	595-11%	691-11%	680-11%	824-13%	856-13%	929-13%	1010-14%	Unavail.

Appendix B

NORTH MONTCO TECHNICAL CAREER CENTER

Program Delivery
Improvement Questionnaire

Throughout the 1993-1994 school year the Career Center staff used several new approaches to promote the Center's programs and activities. In order to plan for future efforts we are seeking your assistance by answering the following questions.

Directions: Please read and answer all questions that apply to you.

1.) **What is your present grade level?**
(Circle One)

9 10 11 12

2.) **Which type of North Montco program are you taking?**
(Check One)

___ One of the career clusters at North Montco (ie. Health and Human Services, Power and Transportation, etc.)
___ Pennsylvania Youth Apprenticeship Program (PYAP)
___ Work-Based Learning Program (WBL)
___ Career Enrichment Program

3.) **Are you taking Tech Prep courses at your high school and/or North Montco?**
(Circle One)

YES NO

If not, why aren't you taking Tech Prep courses? (Check One)

___ Courses are too hard
___ Preparing for college prep
___ Courses are not offered
___ I do not know about Tech Prep
___ Other (please explain)_____

4.) **If you are in Grade 11 or 12 and did not enroll in the Pennsylvania Youth Apprenticeship Program (PYAP), please indicate the reason:** (Check One)

___ My grades were not good enough
___ I am planning to enroll next year
___ I was not informed about the program
___ Other _____

5.) **The following is a list of activities/events that were used by the Career Center's staff to promote our programs during the 1993-1994 school year. Following each of the items listed, circle either YES or NO in response to whether or not you or your parent(s) participated in the Career Center activity/event.**

	Activity/Event	(Circle One) YES	NO
a.	Seeing the Career Clustering Concepts brochure,	YES	NO
b.	Seeing the North Montco video, "Discover a Future That Works"	YES	NO
c.	Attending Course Selection Night at your sending school	YES	NO
d.	Parent's night at North Montco	YES	NO
e.	Attending Pennsylvania Youth Apprenticeship Program (PYAP) in high school auditorium	YES	NO
f.	Seeing the PYAP presentation in scheduled academic classes	YES	NO
g.	Reading articles in newspapers	YES	NO
h.	Talking with sending school guidance counselor	YES	NO
i.	Touring North Montco Career Center	YES	NO
j.	Follow up in each High School by North Montco Guidance Counselor	YES	NO
k.	Talking to friends or relatives	YES	NO
l.	Other _____	YES	NO

6.) **Please list by letter the three activities/events from the list above that were most helpful in informing you about the Career Center's programs.**

1. _____ 2._____ 3._____

7.) **Please list suggestions to better inform students, staff, and the community about the new Career Center's programs and services:**

_____

_____

Appendix C

NORTH MONTCO TECHNICAL CAREER CENTER

Pennsylvania Youth Apprenticeship Program
Improvement Questionnaire

Throughout the 1993-1994 school year the Career Center staff used several new approaches to promote the new Pennsylvania Youth Apprenticeship Program. In order to further promote this program, we are seeking your assistance by answering the following questions.

Directions: After completing this questionnaire please return it to your PYAP teacher.

1.) What is your present grade level?
(Circle One)
11 12

2.) Is this your first or second year in the program? (Check One)
___ First year
___ Second year

3.) Did you take Tech Prep courses at your high school prior to coming to North Montco?

(Circle One)
YES NO

4.) If not, why didn't you enroll in Tech Prep courses?
(Check One)

___ Courses were too hard
___ I was preparing for college prep
___ The courses were not offered at my school
___ I was not informed about Tech Prep
___ Other (please explain)_____

5.) After graduation from high school, what do you hope to do with the training you receive through your PYAP program?
(Check the answer that is closest to career pursuits)

___ Work full-time with my sponsoring employer
___ Continue with the adult apprenticeship program through my sponsoring employer
___ Further my technical training at a postsecondary technical school
___ Attend a four year college
___ Continue with my sponsoring employer while furthering my schooling at a postsecondary technical school or college.
___ Go into the armed forces
___ Other (please explain)_____

6.) **The following is a list of education efforts that were used by Career Center staff to promote the new PYAP program during the 1993-1994 school year. Following each of the items listed, circle either YES or NO in response to whether or not you or your parent(s) participated in the Career Center activity/event.**

		(Circle One)	
Activity/Event		YES	NO
a.	Seeing the Career Clustering Concepts brochure	YES	NO
b.	Seeing the North Montco video, "Discover a Future That Works"	YES	NO
c.	Attending course selection night at your high school	YES	NO
d.	Parent's night at North Montco	YES	NO
e.	Attending Pennsylvania Youth Apprenticeship Program (PYAP) in high school auditorium	YES	NO
f.	Seeing the PYAP presentation in scheduled academic classes	YES	NO
g.	Reading articles in newspapers	YES	NO
h.	Talking with sending school guidance counselor	YES	NO
i.	Touring North Montco Career Center	YES	NO
j.	Follow up in each High School by North Montco Guidance Counselor	YES	NO
k.	Talking to friends or relatives	YES	NO
l.	Other _____	YES	NO

7.) **Please list by letter the three activities/events from the list above that were most helpful to inform you about the Career Center's programs.**

1._____ 2._____ 3._____

8.) **Please list suggestions to better inform students, staff, and the community about the new Career Center's programs and services**

_____
_____
_____

Appendix D

North Montco Technical Career Center

PYAP Student Application

PLEASE PRINT OR TYPE

Name:_____

Address:_____

City:_____State:_____Zip Code:_____

Social Security No:___-___-____Telephone No:(___)___-____

Age:____ Birthdate:_____

School District:_____Lab:_____

#1 Parent/Guardian Name:_____

Address:_____Phone:_____

Occupation:_____Work Phone No:(___)___-____

#2 Parent/Guardian Name:_____

Address:_____Phone:(___)___-____

Occupation:_____Work Phone No:(___)___-____

EMPLOYMENT HISTORY

Employer:_____Address:_____

Position Held:_____Dates Employed:_____

Reason for Leaving:_____Supervisor:_____

Employer:_____Address:_____

Position Held:_____Dates Employed:_____

Reason for Leaving:_____Supervisor:_____

PLEASE ANSWER THE FOLLOWING QUESTIONS AS COMPLETELY AS POSSIBLE.

1. What is your career goal?_____

2. What are your postsecondary training plans?_____

3. Give three reasons why you feel you are suited to participate in the apprenticeship program?

1.)

2.)

3.)

4. Please explain your commitment to the academic portion of the Pennsylvania Youth Apprenticeship Program.

5. What extracurricular activities or volunteer experiences have you pursued to date? What impact has it had on your life?

Appendix E

North Montco Technical Career Center

PYAP Grading Criteria

Grading:

Each youth apprentice will receive a quarterly grade for his/her performance (every nine weeks). The grade will appear on the sending school grade reports and the students' permanent school record. The grade will be equally determined by input from the P.Y.A.P. Instructor (50%) and Mentor Evaluations (50% Training Site Work). The following categories will be utilized for grade determination consistent with job performance to industry standards:

P.Y.A.P. STUDENT QUARTERLY GRADE REPORT

1. Attitude toward job
2. Attitude toward supervisors
3. Attitude toward workers
4. Punctuality
5. Learning speed
6. Accuracy, job performance
7. Safety
8. Follows directions
9. Performs assignment
10. Accepts responsibility
11. Exercises good judgement
12. Asks questions if unsure
13. Appearance (dresses appropriately)

Grading Criteria:

5. Excellent
4. Above Average
3. Average
2. Fair
1. Poor

TOTAL

Total each column; add the five columns together, then divide by 13 = _____. This represents 50% of the student's overall grade for the quarter.

Appendix F

North Montco Technical Career Center

PYAP Training Plan Sample

APPRENTICE

COMPANY

MENTOR

QUALITY CONTROL

COMPETENCY CATEGORY

#	COMPETENCY	TEACHER SIGN-OFF	MENTOR SIGN-OFF (INITIAL) 19 -19 YEAR				19- 19 YEAR			
		INITIALS/ DATE	QUARTER 1	2	3	4	QUARTER 1	2	3	4
1	Understands the concept of tolerances associated with the dimensioning of blueprints for machine parts. a. Linear tolerances b. Angular tolerances c. Concentricity d. Parallelism e. Perpendicularity									
2	Understands the size range of a given dimension with a plus and minus tolerance.									
	Accurately uses basic inspection measuring tools. a. Outside micrometer b. Inside micrometer c. Depth micrometer d. Dial calipers e. Gauge blocks f. Plug gauges g. Comparator									
4	Performs inspection techniques on machined parts to determine compliance with blueprint specs.									
5	Identifies a problem area within a manufacturing process.									
6	Isolates the problem procedure within the manufacturing process.									
7	Develops methods by which to correct the problem.									
8	Statical process									

EMPLOYMENT START DATE

*PYAP COORDINATOR SIGNATURE

DATE

Appendix G

PA Department of Education

Conference Presentation

Appreciation Letter

November 29, 1994

Mr. James Kraft
Assistant Director
North Montco Technical
Career Center
1265 Sumneytown Pike
Lansdale, PA 19446

Dear Mr. Kraft:

The 1994 Conference on the Integration of Academic and Vocational-Technical Education is history, and by all reasonable criteria it was a "smashing" success.

After many years of attending and planning educational workshops and conferences, I am convinced that no conference can receive an excellent rating unless the presentations consistently meet the needs of the conferees; and your presentation definitely made a positive contribution.

I am sure that your preparation and performance was appreciated by the conferees who participated in your session. Your willingness to share ideas and experiences with colleagues is what is needed to facilitate the restructuring of education throughout the Commonwealth.

Many thanks for your professional contribution, and best wishes for continuing success.

Sincerely,

Kenneth A. Swatt

Kenneth A. Swatt
Conference Coordinator

What are the Benefits?

Students benefit from a well-rounded learning experience that is relevant to what employers are requiring for the future. Beyond earning a salary while in school, students gain a head start on a life-long career path.

Employers benefit from shaping students' educational experience in ways that relate directly to their business needs. Employers also gain skilled technicians, in less time than is possible with traditional programs.

Parents benefit from knowing that their child's education has meaning and direction. Their child's mentored training may lead to postsecondary study or certified apprenticeship program.

Schools benefit through the partnership with business that will provide feedback and suggestions for practical applications in the classroom.

Together, we are working to provide our youth with every opportunity for success in the future.

For more information contact

Your Guidance Counselor

or

Suzanne M. Kachelries
School-to-Work Coordinator

North Montco
Technical Career Center
215-368-1177

Equity Statement
North Montgomery County Technical Career Center does not discriminate in regard to race, color, age, national origin, sex, handicap, or any applicable Federal Statute. Inquiries should be made to the Assistant Director, North Montco TCC.

NORTH MONTCO
NORTHERN MONTGOMERY COUNTY TECHNICAL CAREER CENTER

PENNSYLVANIA YOUTH APPRENTICESHIP PROGRAM

Participating School Districts

METHACTON

NORTH PENN

PERKIOMEN VALLEY

SOUDERTON

WISSAHICKON

1265 Sumneytown Pike, Lansdale, PA 19446
(215) 368-1177

Appendix H

North Montco Technical Career Center

PYAP Brochure

What is the Pennsylvania Youth Apprenticeship Program?

A school-to-work learning model similar in design to youth apprenticeship offered in many European countries.

Program Goals

This work-based learning program combines quality education with worksite learning, so our youth can learn and apply valuable skills to earn an excellent living.

How Does the Model Work?

- PYAP is an employer driven program. Employers work in partnership with educators to develop and monitor the curriculum and standards.
- Youth apprentices must have completed 10th grade and have met employer qualifications.
- Students attend North Montco Technical Career Center for three days and work two full days per week.
- Academic and technical learning is integrated and applicable to the youth apprentices career objective.
- Employers provide broad-based, paid work experience and mentored training at the worksite.
- PYAP is designed to be a four year program, with youth apprenticeship occurring in the junior and senior year.
- Students complete high school and may enter into the following postsecondary programs: adult registered apprenticeship, certificate program or associate technical degree program.

What Are the Major Objectives of the Program?

Preparation of the workforce of the future to meet the demands of a high quality, competitive, global economy.

Utilization of the work place as a learning environment and to provide for the application of all skills both academic and technical.

Helping students attain high academic and occupational standards.

Providing a smooth transition from school-to-work and postsecondary education.

In order for our country to remain competitive, we must meet the growing shortage of skilled workers.

Appendix I

North Montco Technical Career Center

Newspaper Article, October 26, 1994

Dan Gephart, Business Editor,

THE REPORTER WEDNESDAY, OCTOBER 26, 1994

Vo-tech enters business venture

By DAN GEPHART
Business Editor

TOWAMENCIN — Forget the Oldsmobile. It's not your father's *vo-tech* anymore, either.

The North Montco Technical Career Center has undergone sweeping changes since Michael Erwin became administrative director almost two years ago.

The latest changes, discussed at an open house Tuesday morning, are based on what school officials call a "partnership with industry."

"Business and industry in general are being forced to go through quite a bit of change," said Robert Kropp, director of training for Ford Electronics.

According to the Bureau of Labor, skilled workers once made up 20 percent of the work force. They are expected to account for 65 percent by the year 2000. And they're not the same skilled jobs.

"The old hands-on jobs are pretty much a thing of the past," Kropp said.

Employers need skilled workers.

And North Montco needs students.

So the two have decided to work together.

The new programs also coincide with $30,000 of renovations at the school.

While teachers in the North Penn School District remained on strike Tuesday, North Montco officals talked about some of their programs:

■ **The Pennsylvania Youth Apprenticeship Program:** This four-year program begins during students' junior year. Students will spend two days a week at a participating employer working with a mentor.

After graduation, a student can pursue post-secondary education or apply for an adult apprenticeship with the sponsoring company.

This is just one of a few of North Montco's school-to-work programs.

■ **Tech prep:** Think of it as college prep for technical skills. This program offers students the technical skills they need to help them in secondary and post-secondary school.

■ **Career clusters:** Once North Montco offered 23 programs. Now it offers seven career clusters, which give students an opportunity to learn about different occupations within each cluster. The clusters: power and transportation; building trades; engineering; visual communications; health and human services; culinary arts; and metal trades.

■ **Adult classes:** According to coordinator of adult education Marsha R. Hurda, adult enrollment has grown to 400. Some are signing up because they've recently been laid off and need to learn new skills. Employers are telling others to learn a certain skill, such as computers.

The basic student population has also grown from 400 a few years ago to about 800. But the school still has plenty of room for growth, said School-to-Work coordinator Suszanne Kacheiries.

"We do not have enough people to fill the jobs out there," she said.

Appendix J

North Montco Technical Career Center

Newspaper Article, January 11, 1995

THE REPORTER

OPINION

WEDNESDAY, JANUARY 11, 1995

READERS WRITE

What's Important To You

Boosts mentor program

There are many wonderful programs offered to students in education today. I'd like to tell you about one very effective and very innovative program which is offered to students at the North Montco Technical Career Center — the Pennsylvania Apprenticeship Program (PYAP).

PYAP is a program which students, parents, guidance counselors and school districts cannot afford to ignore. That is why I have chosen to write this letter now — at the time when most high schools, students and parents are poring over course selection guides to choose options for the next school year.

PYAP is a school-work related program which addresses the education and career needs of many of today's young learners. It is a high school course of study which integrates traditional academic subject matter with real life learning. Students in the program benefit from the best of both worlds.

First, they receive their academics from a highly dedicated and creative staff of teachers. Now, being a teacher myself, I know that every school and every program touts such a staff, but this group is uniquely caring and different. Second, they have the opportunity to investigate, learn, apply and demonstrate the skills (both technical and academic) that they learn in their chosen fields while working alongside highly respected mentors in the work force.

I know so much about this program because my son is a student in the program. In the few months that he has been in the program, he has become a more responsible student and worker.

Someone has noticed him and the special abilities that he has and they said, "You are really good at what you do, and the world needs people like you." They have confidence in him, they respect him and his abilities, and every day they meet him where he is and try to stretch him and motivate him to achieve even more.

This is a program that really deserves a good look. If you are a high school student or the parent of a high school student, I encourage you to learn more about this program.

KATHY LEVERING
Collegeville

Appendix K

North Montco Technical Career Center

Fall 1994 PYAP Parent Survey

1. What do you like about the program?

2. Are we meeting your expectations?

3. Is your child satisfied with their academic component?

4. Is your child satisfied with the work-based component?

5. At this time, what is your child's future career plans?

   - Work full time at sponsoring company (adult apprentice program)
   - Work at sponsoring company and continue schooling at a postsecondary community college or technical school
   - Enter college on a full time basis

     Major:_____

   - Other

6. Are there any major issues that we should address to improve this program?

7. How did you first hear about the PYAP program -

   _____Open House

   _____Back-To-School Night at Sending Schools

   _____Course Selection Night at Sending School

   _____Other

Appendix L

North Montco Technical Career Center

PYAP Fall 1994 Mentor Workplace Survey

Please assist us in charting our program's progress by completing the following questions. This survey will be used to evaluate and improve upon our Youth Apprenticeship Program.

Please circle the closest answer to your opinion.

1. Definately Agree
2. Somewhat Agree
3. Not sure
4. Somewhat Disagree
5. Definately Disagree

1.) The following have been clearly communicated:

A. Program mission	1	2	3	4	5
B. Roles and responsibilities	1	2	3	4	5
C. Training Plan	1	2	3	4	5
D. Student evaluations	1	2	3	4	5
E. Student schedules	1	2	3	4	5
F. Support from site coordinator and technical instructor	1	2	3	4	5

2.) As an apprenticeship employer providing worksite learning and paid work experience, I have been able to provide:

A. A mentor to oversee and support workplace activities	1	2	3	4	5
B. Highly skilled workers to teach apprentice	1	2	3	4	5
C. Real and productive work for student apprentice	1	2	3	4	5
D. Exposure to all aspects of industry	1	2	3	4	5

THANK YOU FOR YOUR ASSISTANCE IN OUR EVALUATION PROCESS.

(Optional)

Name_____

3.) I feel it would be helpful if:

_____

Appendix M

Human Subjects Statement

This research meets the following exemption requirements of the Institutional Review Board (IRB) of Nova Southeastern University's Committee for the protection of Human Subjects:

"1. Research conducted in educational settings, involving normal educational practices; 2. Research involving the use of educational tests, survey procedures, interview procedures, or observation of public behavior; 3. Research involving the collection or study of existing data so that subjects cannot be identified."

Further, this research does not meet any of the exceptions to exemption: 1. It does not directly identify subjects, 2. Responses do not reasonably place subjects at risk of civil liability or damage their financial standing, employability or reputation; and 3. Subjects are not elected nor are they appointed public officials or candidates for public office.

James G. Kraft — Researcher

April 23, 1995 — Date

JOBS FOR THE FUTURE

One Bowdoin Square
Boston, MA 02114
(617) 742-5995
FAX 742-5767

May 18, 1995

To whom it may concern:

Jobs for the Future grants permission to James A. Kraft of the North Montco Technical Career Center, 1265 Sumneytown Pike, Lansdale, PA 19446 to use Jobs for the Future's "Charting Your Program's Progress: A Diagnostic Checklist" in part or in its entirety in his paper, "The Development and Implementation of a School-to-Work Apprenticeship Model at a Technical Career Center," provided that the source is cited as: Jobs for the Future. "Charting Your Program's Progress: A Diagnostic Checklist." Boston, MA: Jobs for the Future.

Sincerely,

Mary Ellen Bavaro
Director of Communications

JOBS FOR THE FUTURE

One Bowdoin Square
Boston, MA 02114
(617) 742-5995
FAX 742-5767

Facsimile Transmission Sheet

To:	James Kraft	
FAX:	215/855-7929	
From:	Jennifer Costa	
Date:	May 18, 1995	Pages: 2

Hard copy to follow by mail.