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ABSTRACT

A study assessed the feasibility and attractiveness of youth apprenticeship in Arkansas in over 80 interviews with employers in 5 key Arkansas industries and occupations. They were allied health, food processing (equipment repair and maintenance and lab technician/quality control), information services, metalworking, and self-employment and options for rural areas. Findings indicated a tremendous need for youth apprenticeship in the growing allied health services industry and a need for electronic industrial machinery maintenance and repair technicians to work on equipment being adopted in food processing and to fill shortages in a range of manufacturing firms. Particularly in rural areas, a youth apprenticeship program in small-scale retail management seemed an option. With some design changes, an existing metalworking apprenticeship could be a valuable experiment in apprenticeship in rural areas. Good career advancement and learning opportunities existed for youth apprentices in food service management. Undetermined design options were teaching team, classroom location, optional postsecondary years, program start in Grade 11 or 12, and opportunities for adult workers. (An executive summary that begins the report is followed by a summary of results of focus groups to gauge student and parent interest in youth apprenticeship. Appendixes include a list of interviewees; maps of county business patterns; and two papers--"Integrated Work and Learning" and "Youth Apprenticeship in Health Services for Arkansas.") (YLB)

A Feasibility Study

Of Youth Apprenticeship In Arkansas

VoTech

Conducted by
Jobs for the Future, Inc.

For the Arkansas Vocational and Technical Education Division

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A Feasibility Study of
Youth Apprenticeship in Arkansas

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Executive Summary

This study was commissioned by the Arkansas Vocational and Technical Education Division during a time of mounting interest in youth apprenticeship across the country. Its purpose was to assess the feasibility and attractiveness of youth apprenticeship in Arkansas as an alternative course of preparation for young people and as a way of strengthening the state's base of high skill, high wage jobs.

The study addresses the following questions:

- What are opportunities and barriers towards the establishment of youth apprenticeship programs in a few key Arkansas industries and occupations?
- Can youth apprenticeship build on the state's efforts to develop self-employment and entrepreneurship among high school students?
- What modifications in the youth apprenticeship model would better meet the needs of Arkansas' young people and employers?
- And, how can youth apprenticeship build on and enhance other programs and education reform initiatives underway, and what can the state do to systematize it?

For several of the occupations and industries explored, youth apprenticeship appears to be an attractive option for both meeting employer needs for highly skilled and well-rounded workers and young people's needs for access to good jobs and learning opportunities. Arkansas has major strengths on which to build a work-based learning system. The most important of these is the comprehensive plan for an expanded Tech Prep program. A great deal of genuine innovation in education is occurring in the state. It will be important to structure a relationship between the educational leaders already involved with education reform and work-based learning. Both the restructuring of post-secondary vocational technical education and innovations in the state standards setting process can support the development of youth apprenticeship.

Based on this investigation, we view a flagship multi-site youth apprenticeship program and four smaller programs as the best projects to pursue further, as outlined below.

A flagship program in health services. There is tremendous need and promise for youth apprenticeship in allied health services. The industry is growing, areas of the state suffer from shortages of skilled workers, and a "Rural Health Corps" youth apprenticeship program in rural areas could help reduce high infant mortality rates—performing a human service as well as economic development and training function. If Arkansas wanted to develop a multi-site flagship youth apprenticeship program, this would be its best candidate.

Industrial machinery maintenance and repair. The state has a need for electronic industrial machinery maintenance and repair technicians to work on the new equipment being adopted in food processing and to fill skills shortages in a diverse range of manufacturing firms in the northwest and the northeast. A youth apprenticeship in industrial machinery maintenance and repair could prepare young people for well-paid work and facilitate the smooth adoption of new technologies.

Small-scale retail management. Particularly in rural areas, where few concentrations of trades and industries exist, a youth apprenticeship program in small-scale retail management might be an option. It could build on emerging entrepreneurship and self-employment coursework in high schools. Below minimum wage stipends might be necessary, however, to generate sufficient interest from very small entrepreneurs.

Metalworking. With some design changes, a metalworking apprenticeship in Camden with the Metalworking Connection could build on some of the work already underway and would be a second valuable experiment in apprenticeship in rural areas. Discussions should also be pursued with the Northeast Arkansas Apprenticeship Committee in Jonesboro.

Food service management. National trends suggest an increasing shortage of skilled chefs to manage food service operations. In principle, good career advancement and learning opportunities exist for youth apprentices, and Little Rock holds a concentration of high quality hotel and restaurant operations. Further discussions with Little Rock chefs and hotel and restaurant managers and owners should be pursued to gauge interest in youth apprenticeship.

The other industries that we investigated, **information services** and **food processing**, appear to hold less initial promise for a youth apprenticeship program beginning in high school. The information services industry in Little Rock has little interest in graduates with less than a B.A. degree and is facing minimal labor shortages. Opportunities for work-based learning at the high school and college level do exist, but would probably be most effectively pursued in a 2+4 program outside the youth apprenticeship model. Lab technician and quality control jobs within food processing would not provide an adequate base for youth apprenticeship, although some employers suggested that an exposure to work in labs and offices would be a good idea for an industrial machinery maintenance and repair youth apprentice.

A word of caution. The occupations and industries explored in this study were selected on the basis of selected labor market information. Other equally or more attractive youth apprenticeship opportunities may exist. Finally, the conditions described in this study have created some interest in youth apprenticeship. But actually creating youth apprenticeship will require that employers and schools move from interest to action. That is the next step.

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Summary of Focus Group Findings

Summary of Focus Group Findings: Key Attitudes Toward Youth Apprenticeship

(based on eight focus groups with parents and students)

Many students and parents around the state are enthusiastic about the youth apprenticeship concept. In it, students see meaningful work experience and adult guidance, an improvement over their current jobs which give them little satisfaction and few learning opportunities. They also see a more reasonable work schedule than the long evening and weekend hours asked of them in fast food and grocery store work. And they see college credits, which is attractive as many worry about how they will pay for college, or whether they will attend at all. Finally, they see a chance to develop the interpersonal skills that they view as key to success in any workplace. Reactions to the word "apprenticeship" are very positive.

Parents who do not expect their children to pursue a B.A. degree directly would like to see them get an Associate degree, depending on the reputation of the local community college. (Youth apprenticeship was presented as a way to earn credits towards an A.A. or A.S. degree.) But many of these parents seem uncertain about whether their child will make it to any post-secondary education. Parents in the rural Delta expect their children to leave and not come back, mostly because of the lack of jobs.

Both students and parents would want to see the following elements included in a youth apprenticeship program.

- **Credit towards an A.A. transferable to a B.A.** Students and parents believe that ultimately a B.A. wins out in the labor market. They want to keep open the option to pursue the B.A.
- Exit points. Students want to be able to leave the program believe strongly that expecting most 16 year olds to make a several year commitment is unrealistic.
- **Integration with peers and extra-curricular activities.** Students worry about the variety of fellow students with whom they will be able to socialize. Parents want a program which does not separate their children from their high school peer group and regular classes. They associate "separate" with "second rate." And if classes were held away from the regular high school, some students and parents fear they would miss out on important extra-curricular activities as "broadening" experiences.

Parents and students want reassurance that the quality of on-the-job apprenticeship training will be high. They disagree over whether grades should be used as the selection criterion for students, for the reasons of fairness, access, and the maintenance of standards. Some are afraid they, or their child, would be screened out due to low grades or high parent income. Some students see this as a program for the non-college bound.

Across the state, students and parents feel similarly about the prospects of youth apprenticeship programs in particular industries

and occupations. The most favored are computer and health-related occupations. The least favored are jobs in the food processing industry (which many in eastern Arkansas confuse with fast food service and grocery stores) and in machining. Students are largely unfamiliar with career opportunities in either industry. Some parents' views on opportunities in industrial machinery maintenance and repair are slightly more positive.

Given the strong attractiveness of a youth apprenticeship in the allied health fields, a focus group was held with nursing students. Nursing students are very enthusiastic about the youth apprenticeship concept, at least through high school. They believe there should be an easy exit point after high school and question the value of working part time while getting an Associate degree. They are also concerned that exposure to some kinds of work could be disturbing to young people. Few wish to work in geriatrics, which is viewed as emotionally taxing. They question whether young people could handle working in nursing homes. They strongly recommend that a key design feature of the program be several relatively brief rotations through different types of work within the allied health fields. Nursing students, many of whom are parents, believe a rural Youth Health Corps could address the problem of teen pregnancy.

Responses on travel logistics and pay requirements were inconclusive. Travel to a worksite would be a problem for some, particularly in rural areas. Students have mixed opinions on the wages they would need to earn in order to find youth apprenticeship attractive, although most find low pay insulting. Students look to counselors and teachers for information. They would be interested in hearing directly from employers and workers about the nature of the occupation and the workplace.

Recommendations

Once again, it should be stressed that these recommendations come out of a limited number of discussion groups. More discussion groups will need to be held to confirm the observations of these parents and students and the validity of the following recommendations. The focus group findings suggest the following recommendations.

- **Present youth apprenticeship as a different way of getting both school. Feature the commitment of employers to train and mentor, and the development of both specific and general skills.**

- **Ensure that the college credits students earn in youth apprenticeship are transferable to at least one four-year school.**

- **Build in clear exit points so that students do not feel trapped.**

- Include a range of employers, not just food processors, in exploring a youth apprenticeship program in equipment repair. Provide educational opportunities for students and parents who will need to be informed about industrial machinery repair and metalworking as occupations.

- Make the development of a youth apprenticeship program in the allied health fields a high priority, since it holds considerable interest among students and parents. The program's design and marketing should help reduce barriers to young men and women in health fields in which they are under-represented. Program design should include rotations.

- Make the development of a rural Youth Health Corps in the Delta region a priority.

- Further investigate small retail management as a broadly applicable rural apprenticeship possibility.

- Aim to recruit employers who are willing to pay minimum wage or above. Below-minimum wage weekly stipends will be insulting to some, not viable for others. However, since many students have few work options, consider below-minimum wage stipends, if they are required for employer participation.

- Build extra-curricular activities into the program. Facilitate socializing with non-youth apprenticeship students. Communicate this aspect to students and parents.

- Consider travel logistics carefully at the local level.

- Develop multi-faceted student selection criteria. Ensure that these criteria respond to student and parent concerns about an elite program which excludes students on the basis of lower grades.

- During the start-up of a youth apprenticeship program, hold small student and parent information sessions which feature teachers, counselors, employers, and workers.

- Associate youth apprenticeship with high quality higher education in every way possible.

1. Introduction

Between half and three quarters of high school students in this country do not successfully complete college. Many students around Arkansas spend long hours in part-time jobs that bear little relationship to what they are learning in school. And when they graduate, they spend years floundering from job to job before finding meaningful employment.

Youth apprenticeship is a strategy for improving the transition from high school to high-skill employment for these young people. Providing an opportunity to advance both academically and occupationally, youth apprenticeship is a model of learning and skill development based on the evidence that many young people learn more and are better prepared for productive employment and continued learning when school and work are closely integrated and when learning is both abstract and experiential.

In some of the world's leading industrial nations, including Germany and Denmark, youth apprenticeship is the cornerstone of extremely successful systems for preparing young people for careers in a broad range of high-skill occupations.

In the youth apprenticeship model proposed most commonly in this country, participants would enter a three- to four-year program at the end of the tenth grade that straddles the last two years of high school and a year or two of post-secondary learning. They would be paid a stipend by their employer while in the program, which would prepare them for high-skill occupations while enabling them to advance academically.

Young people who complete the program would receive both academic and occupational credentials: a high school diploma; up to two years of college credit; and certification of technical competencies in their chosen field.

This feasibility study is a first step in assessing the need and interest in Arkansas for youth apprenticeship in an array of diverse sectors and occupational areas. In allocating funds to the development of demonstration sites, Arkansas is one of the first states to seriously pursue this concept.

This report addresses the following questions:

- What are opportunities and barriers towards the establishment of youth apprenticeship programs in five key Arkansas industries and occupations, including allied health, food processing (equipment repair and maintenance and lab technician/quality control positions), metalworking, information services, food service management, and small retail management? (Section 3)

- Can youth apprenticeship work in the area of self-employment, and if so, how? (Section 3)

- What modifications in the youth apprenticeship model would better meet the needs of Arkansas young people and employers? (addressed in Sections 3 and 5)

- How can youth apprenticeship build on and enhance other programs and education reform initiatives underway, and what can the state do to systematize it? (Section 4)

2. Methodology

As requested by the Division, the goal of JFF's feasibility work in Arkansas was to conduct a preliminary analysis of the potential for apprenticeship across a broad range of occupations and industries, rather than to conduct more in-depth analysis and constituency-building within one industry or area. As a result, the findings should be used as "pointers," rather than as definitive.

Some quantitative information was collected. Labor demand and supply statistics and the Directory of Manufacturers were consulted to identify labor shortages and geographic clusters of employers in the industries and regions of interest.

Due to the limitations of quantitative data for our purposes, however, most of the information collected is qualitative. Over 80 interviews were conducted, both by phone and in-person. We started with four occupations/industries and self-employment, as suggested by the Division. For each occupational/industrial area, we sought interviews with diverse members of the employer community, including but not limited to leading firms. Interviews aimed to collect relevant information about the industry and occupation and about the employer's perception of his or her current and future skill needs. Interviews also aimed to gauge the objective and subjective conditions which might create opportunities for youth apprenticeship, such as work-based learning opportunities, the role of training and mentoring, advancement opportunities, and employer attitudes.

Two regional employer meetings were held, one for information service firms in the Little Rock area, and one for food processors in Fort Smith. These meetings aimed to generate interest in youth apprenticeship among employers and engage them in a discussion about their interest in it.

In order to gauge student and parent interest in the youth apprenticeship concept in general, and in specific occupational areas, six student focus groups and two parent focus groups were held around the state. Results are included in the attached report and are also integrated into this report as relevant. A summary precedes this section.

3. Findings

3.1. Allied Health Occupations

Allied health services appears to offer good opportunities for the establishment of a youth apprenticeship program in Arkansas. It is a large and growing industry. There is wide-scale agreement on the existence of a health personnel shortage that the current system is not solving. Most employers and many educators seem prepared to experiment with new approaches to meeting these skilled worker shortfalls. Health services has a general positive image among young people in Arkansas. Strong career ladders exist and wage and salary levels are increasingly consistent with the high skill requirements. Secondary educators in Arkansas have a tradition of innovation and risk-taking

There are some problems. There will be some limits on the ability of health providers to accommodate to young people in the workplace because of certification requirements. Some providers do not offer as wide a range of health care experiences as might be desirable for this program. Many of the post-secondary programs are reluctant to consider re-structuring their current programs of professional preparation because of accreditation barriers and scheduling problems. Training programs in health sciences do not begin from as much of a common core as might be the case in other occupational clusters. Health care employers do not seek a more broadly skilled, flexible worker who could be re-deployed across a wider span of jobs as technology and demand shift. Further, there may be problems of accessibility of post-secondary training programs in geographic areas of most severe personnel shortages and health care needs.

On balance, however, there appear to be the right conditions, objective and subjective, in Arkansas for the establishment of a nationally significant demonstration project of youth apprenticeship in health care. Since there are apprenticeship placement opportunities in most urban centers and personnel needs in all areas of the state, a demonstration project in this area could have relatively immediate state-wide transferability. This could be a "flagship" project for youth apprenticeship in Arkansas. The program could also be tailored to some special needs in the Delta region of the state. For these reasons, a preliminary concept paper outlining how such a project might be established is attached to this report in Appendix VII .

Overview of Issues and Trends in Health Care Employment

One of the dominant characteristics of the health care industry in Arkansas is the relatively skewed distribution of facilities and available personnel toward urban centers. A high percentage of Arkansas' population lives in rural counties. About 1.2 million people live in the 17 urban counties while another 1.2 million live in the 58 rural counties. But, in 1989, only 38% of Arkansas' doctors

Findings

practiced in these rural counties (only 23% of licensed physicians less that 60 years of age). The Governor's Rural Hospital Task Force found medical schools are having greater difficulty recruiting applicants from rural areas and that efforts to encourage more doctors to practice in rural areas have not been successful. The demise of the National Health Service Corps has exacerbated the problem.

There are 102 acute care hospitals in Arkansas with a total of 11, 321 beds. Eight of these hospitals and 26% of the beds are in Pulaski County. Fifty-one of the hospitals are located in the rural counties where half the population resides, but these are smaller hospitals accounting for only about one-quarter of total hospital beds.

Among the individuals interviewed and reports reviewed, there is a great deal of concern about the viability of many of the small rural hospitals. In the 1980s eight small rural hospitals were forced to close. There is concern that several more will not be able to survive the next ten years. The Arkansas Department of Health's 1989 analysis of Health Manpower in Arkansas reported that 38 rural hospitals had experienced consistent financial losses for the preceding two years. While personnel shortages are not the only problem facing these hospitals, this was the most frequently cited problem.

The 1989 Manpower report of the Department of Health also suggested that it is difficult to encourage many rural youngsters to enter the health professions when there are inadequate role models within their communities to provide advice and encouragement.

In many of the poorer counties in Arkansas, there are very few practicing physicians. Many of these don't take Medicaid patients or don't provide OB/GYN care. Nineteen counties are without obstetric coverage. This places an unusual reliance on public facilities, especially health clinics located at 24 sites in Eastern and Southern Arkansas. These clinics and other local health units in rural areas frequently cannot hire RNs because they simply aren't available or because public health salaries are uncompetitive. Every public health region in Arkansas reports difficulty in filling vacancies in nursing positions.

About two thirds of Arkansas' registered nurses work in the seven largest counties of the state. Only 24% of active registered nurses practice in the state's 58 rural counties. Almost 80% of the RNs are employed in hospitals.

Home health care throughout rural Arkansas is severely hampered by a shortage of physical therapists, speech therapists, occupational therapists and social workers, especially in the poorer counties of Eastern and Southern Arkansas.

Arkansas ranks 27th among the states in the number of its inhabitants over the age of 65, but second (to Florida) in the nation in the percent of elderly to the total population. Moreover,

Arkansas' mild climate and relatively low cost of living are proving to be attractive to retirees from other states. This addition to Arkansas' indigenous elderly population will contribute to greater need for health professionals in occupations related to geriatric care.

Representatives of the Arkansas Health Care Association report that the nursing care sector of the state is hampered by shortages of health personnel. Particular shortages exist in the supply of registered nurses, activity directors, dieticians and therapists, especially physical therapists.

There is a special concern about rural counties (as in the Delta region) where nursing homes have difficulty attracting and retaining certified nurse aides. Because these are relatively low paid positions occupied by individuals who may not have the educational foundation to move into higher levels of nursing, these positions are seen as jobs, not careers. When a slightly better job comes along in some other area, nurse aides have little reason not to move on.

The health personnel shortage is more than just a rural problem, however. Most observers indicate that there is a general shortage of skilled personnel in virtually all areas of health care. There is special concern about the scarcity of nurses in Arkansas. Only four other states have a lower ratio of registered nurses to total population.

The Arkansas Hospital Association points to a crucial shortage of registered nurses in almost all areas of the state. In a 1989 survey the Association found about 1,000 budgeted RN positions in Arkansas hospitals which were vacant. The Hospital Association also reported a significant shortage of physical therapists as well as serious problems in recruiting medical technologists, occupational therapists, respiratory therapists and medical laboratory technicians. A 1988 survey by the University of Arkansas in Medical Sciences (UAMS) found 140 vacancies for medical technologists and estimates an additional 465 positions be created by the end of 1993.

Health Services Education in Arkansas

Seven post-secondary institutions in Arkansas offer baccalaureate degree nursing programs. In 1990 they graduated 184. Twelve institutions offering associate degree nursing programs graduated 407. Enrollment levels were down from 1989 but still somewhat above the average of the preceding several years. In terms of degrees conferred, however, there is little appreciable difference at either the associate or the baccalaureate levels from previous years.

A similar situation prevails on the rate of graduation of other allied health service personnel, even in those categories where significant shortages were reported.

Findings

The reasons for the continuing shortfall between the apparent need and the new supply of health professionals are certainly complex, more so than this quick review can attempt to sort out. Some of the issues cited in the interviews and background research have to do with a shortage of space in some programs that in turn results from inadequate funds to employ faculty, a lack of prepared faculty and limited space in clinical experience locations. One observer believes that Arkansas' two Masters in Nursing programs have not produced sufficient graduates to meet the needs of service and education of nurses for advanced preparation. Some point to the need for better budgets for training programs, tuition support for students and more creative scheduling to meet student needs and use of limited clinical experience areas.

In considerable part, the shortfall of supply against need is the consequence of the increased complexity of the jobs and therefore of training. Positions in nursing and allied health fields require a technical competence for which some young people are not well prepared. This would support the rationale for an apprenticeship system which could attract young people committed to learning and give them the special and intensive preparation they will require for success in their further academic preparation and in their health care jobs.

Nursing and allied health preparation programs tend to be concentrated in the urban areas where the universities and large hospitals are located. This concentration might limit access to students from rural areas who often can not live at home while pursuing their credentials. However, there is evidence of a willingness of some institutions to extend programs in order to create new access. In 1989, UAMS established a new respiratory therapy program through its Area Health Education Center in Pine Bluff and in 1990 a similar program was developed through the Texarkana AHEC. Plans for new programs in medical records technology and ultrasonography by UAMS further point to a willingness to develop new programs and new ways to deliver those programs.

Key health care educators interviewed for this project indicate that the problems of health care education are issues of access, not quality. There is some concern that responding to the challenge of access not be at the cost of sacrificing that quality.

One of the most attractive aspects of the youth apprenticeship concept for post-secondary administrators of health care preparation programs is its potential to bring into health care young people with good work habits who are motivated to learn. They believe this will be successful to the extent that this program is not seen as a second-rate option, but as an academic program with status. To some, this means that the program should be explicitly disassociated from traditional vocational education which many young people and their parents see as non-college related.

To the extent it was possible to raise the issue, there seems to be little current concern in Arkansas about opportunities for cross training in the health industry. It seems generally assumed that the accreditation requirements of national professional groups and state licensing standards would preclude or severely constrain any significant effort to cross certify professionals through the broadening of training programs.

Attitudes About the Youth Apprenticeship Concept

The notion of applying the youth apprenticeship concept to nursing and allied health services generally met with favor among the individuals interviewed for this project. Responses ranged from polite if skeptical acceptance of the value of an experiment to sincere enthusiasm. As reported here, these reactions should be viewed as informal and tentative. All those interviewed requested an opportunity to review and comment on a written concept paper.

The Arkansas Health Care Association (the AHCA, an association of nursing homes) expressed considerable interest in the concept of youth apprenticeship in health care, citing needs in all areas of the state that the program could help meet, but mentioning special needs in rural areas. Such a program could serve to familiarize young people with opportunities in the geriatric care sector and recruit more young people in nursing and allied health services generally. It could have the added benefit for the nursing homes of providing a new supply of young workers who would see health care as a career (and their work in nursing homes as part of that career) and therefore not be so disposed to quit when a slightly better paying but limited future job became available.

The AHCA representatives believe that there would be good training positions in nursing homes if potential problems of certification (as certified nurse aides) could be worked out. There was some discussion of designing the program in such a way as to rapidly certify the first year apprentices as nurse aides so that their services could be reimbursable by Medicaid and third party insurers. They expressed a willingness to present the concept to members for their reaction and advice.

The Arkansas Hospital Association underscored that there are worker shortages in member hospitals that are not being met by current education and training programs. That would suggest that hospitals would be interested in cooperating in the design of new programs that helped to reduce those shortages. It was suggested that Central Arkansas might offer the best opportunity to test this approach because there was a broad understanding of a major problem and there are a large number of hospitals that might offer apprenticeship positions. At the same time, considerable concern was expressed about the plight of rural hospitals. The Hospital Association indicated a willingness to facilitate discussion of this idea with member hospitals.

Findings

Officials at the Arkansas Department of Health are interested in how this program could contribute to the health care and health professions preparation needs of rural areas, especially in the Delta. It is not clear whether there would be apprenticeship placement opportunities in public health facilities.

At the University of Arkansas at Little Rock, there is considerable interest in the concept of youth apprenticeship generally, and its application to nursing specifically. Discussion about a demonstration program touched on issues of whether it would be possible to compress into the first two years of the program some of the core competencies and general education requirements of post-secondary programs. This would require very careful study as part of a curriculum development process. There does appear to be, however, some clear potential to articulate the secondary portion of the apprenticeship directly into the two year associate degree nursing program. There is also interest in exploring the apprenticeship concept as a way to give older (out of school) adults the educational foundation and health sciences training that might enable them to enter high-skill and high-wage nursing and allied health occupations.

Discussions with officials of the College of Health Related Professions at UAMS indicate that there could be problems in linking the apprenticeship concept to some of the professional training programs offered at that institution. It was observed that accreditation standards and scheduling obstacles might constrain any effort to "telescope" the programs into the apprenticeship model. There apparently is not as much flexibility at the level of these accredited programs as there might be at the level of the credentialed programs. There may not be much genuine opportunity to shift parts of the preparation for accredited associate degree programs to an on-the-job approach.

UAMS officials believe, however, that the apprenticeship concept, even if applied only at the secondary level, would bring to the UAMS associate degree programs a good supply of very well prepared students. There was also encouragement that a post-secondary program could be linked to the pre-professional education typically done at other institutions. That could strengthen preparation for the professional training provided at UAMS.

UAMS officials also observed that this program could feed nicely into training at that institution for EMTs, respiratory therapy technicians and surgical technologists, providing a three year exit point for those students who might elect not to pursue an Associate degree.

Both UALR and UAMS officials express interest in the idea that students working toward their professional degrees and certifications in health care could combine that study with related work. Most post-secondary students pursuing health occupations also work part-time. Some probably work in health care, but many have jobs in unrelated fields.

There did not appear to be much opportunity for a close connection between the apprenticeship notion and the baccalaureate programs in allied health professions or the nursing programs operated by the College of Nursing at UAMS.

Few discussions were held with hospital administrators in Arkansas. However, a meeting with human resources officials at UAMS tends to confirm that careful planning could lead to the placement of youth apprentices in a hospital setting. There is some apprehension about how first or second year apprentices could be involved in "invasive patient care" but there appears to be room to work out arrangements that meet legitimate training objectives while safeguarding patient interests. Also, it was pointed out that there are a wide variety of jobs in a health care setting that do not involve patient care.

It will be important to structure youth apprenticeship such that the work placement of young people is not confined to relatively low level jobs as unskilled service workers, clerks and aide/assistant positions requiring relatively limited decision-making and problem-solving and offering limited exposure to complex technology.

Representatives of the secondary school system, at least in the Little Rock area, seem favorably disposed to test the model of youth apprenticeship in health care. The experience of Parkview High School, a science magnet school, in helping their students to see the occupational and technical application of academic subjects has been very positive. Representatives of the secondary school system acknowledge that apprenticeship would not be equally attractive to all high school students. However they agree that a significant number of students might find this program very appealing for different reasons; i.e., earning a wage while in school, participating in an unconventional learning environment, working with adult role models, getting a jump start on career preparation, seeing a faster track to college, starting a "helping career," etc.

There was recognition that court supervision of the school districts in Pulaski County might affect the Districts' ability to establish innovative new programs, but there was no sense that this would be an insurmountable barrier. The Vo-Tech system in Little Rock Schools has already had positive experience with apprenticeship-like placements and acknowledged that tying the program to associate degrees would enhance its attractiveness to students, parents, guidance counselors and school administrators.

Discussions with officials of the Arkansas Industrial Development Commission indicate strong support of the concept of youth apprenticeship in general and its application in health care. There is concern about the availability of skilled workers in all sectors of the economy, especially in manufacturing. The lack of rural health services in Arkansas is seen as a barrier to economic development in the rural counties.

The following positions in health care are the most frequently mentioned as good career objectives for a young person in health care:

- registered nurse
- respiratory therapist
- occupational therapist
- medical technician
- radiological technician
- physical therapist

It was consistently pointed out that there are "stopping off points" on the way to the highest level of preparation in each of the areas listed above that would be good jobs for many young people. (Appendix VI is a more in-depth occupational analysis of the industry in Boston conducted as part of a youth apprenticeship feasibility study there last year. The report was the basis for an award to the Boston Private Industry Council from the US Department of Labor in September 1990 to fund the design and implementation of "Project ProTech.")

Allied Health Services in the Delta Area

A large number of students interviewed in Lee High School had a parent in the health care field and a larger number were considering it themselves. This is not surprising given the plethora of jobs available in Little Rock and Memphis, for example, and given the availability of training at relatively nearby institutions such as Phillips Community College in Helena.

A youth apprenticeship program in health in the Delta might be a kind of "Youth Health Corps." It would expose students to work in the field, provide them with hands on learning, and smooth their way into technical positions. (See Appendix VIII for more detail.) But in addition, it could meet some of the area's pressing health needs:

(1) Youth apprentices could act as peer educators with the aim to reduce teenage pregnancy.

(2) Youth apprentices could conduct preventative measures to reduce the area's high infant mortality rate. Costa Rica's highly recognized low-tech but labor-intensive model for reducing infant mortality might be instructive. There, rural health workers visit mothers in their homes to discuss peri- and post-natal care, conduct basic weight and other tests, identify potential problems for referral, and keep family records.

(3) Exposure to critical local needs and local health service operations could inspire a few to pursue medical doctor degrees and return to the area.

According to health practitioners in the Delta, there is a shortage of physicians. The Lee County Cooperative Clinic, for example, is

unable to fill one of the four staff physician positions. This position has worsened with the Reagan administration's elimination of the National Health Service Corp. The NHS, which is being reactivated, helped repay nurse and physician loans in exchange for their work in poor areas. Area clinics also suffer from the fact that they have few specialists on staff. Medical students from area schools often want to specialize rather than stay in family medicine, and seek to serve their internships with a licensed specialist.

The Director of the East Arkansas Family Health Center in West Memphis, reports that the infant mortality rate in the four Delta counties of Phillips, Lee, St. Francis, and Crittenden was brought down from 21% (21 per thousand births) to 8.5% in 1983-84 when a small team of midwives and OB/GYNs was assigned in the area. When funds were cut and the positions eliminated, the infant mortality rate surged back up to its present 21.5% level.

As people who have spent many years grappling with health issues in the region affirm, the principal obstacle is money. But many Delta students would be interested, as determined from focus groups, if they were paid a $50 stipend per week, for example, and viewed the program as a prestigious and good training opportunity.

The presence of a health services program at Phillips Community College in Helena, which is a commutable distance for some Delta students and has organized public transportation to and from, is a plus. There is already an agreement between Lee High School and Phillips that enables seniors to take college level courses there.

Other training organizations in the Delta area that could be involved include Crowley's Ridge Vo-Tech in Forrest City (with an LPN program) which has a training agreement with a local hospital. Funding was allegedly recently received by the Delta Health Center to conduct some forms of training. The East Arkansas Family Health Clinic trains JTPA recipients in medical records and billing.

The only current connection between high school studies in health occupations (a course) and workplaces is "shadowing." Students at Lee High School spend 2 1/2 hours per day for an entire semester "shadowing" their sponsor. In Marianna, six seniors shadow at the local nursing home, the Lee County Cooperative Clinic, and at local pharmacies.

Factors in Favor of Youth Apprenticeship in Health Care

- There is an immediate need for more health care personnel in Arkansas and a general recognition that the current system of producing such personnel needs to be strengthened and augmented with new approaches.

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- Allied health services and nursing education lend themselves well to the concept of integrated working and learning that is at the core of the student apprenticeship concept. The notion of work experience as a condition of academic certification is well-established.

- More than in many occupations, skills or outcome competencies can be established fairly precisely.

- There are a wide variety of training opportunities for young people in hospitals, nursing homes, laboratories and large group practices. These training opportunities can produce "real work" for which employers are willing to pay.

- There are a wide variety of well-paying job opportunities that branch off a basic health education.

- Apprenticeship opportunities are available in rural areas. Getting young people involved in skill development before they leave high school may help to reduce the migration of youth out of the rural areas, a critical threat to primary and secondary health care in rural Arkansas.

- An apprenticeship for allied health services might help to explore the potential for establishing a broader foundation of skills, promoting greater mobility of workers across different jobs in response to technology and market changes.

Barriers to Youth Apprenticeship In Health Care

- Accreditation requirements of post-secondary programs might limit flexibility in integrating post-secondary and secondary education. They might also restrict the potential to shift more of the training program to an on-the-job approach that would maximize the potential of youth apprenticeship.

- Scheduling of post-secondary programs and their concentration in urban centers will hamper access.

- Certification requirements will limit the range of work assignment of apprentices in some institutions, especially in patient care.

- While nursing homes may be very interested in placing apprentices, many will not be able to provide the range of work/training opportunities that might be desirable. Also, many young people may find geriatric care to be stressful.

- There is a greater divergence of skill requirements among the health care occupations than is characteristic of other occupational clusters that are experimenting with youth apprenticeship.

◆ There is not much apparent concern in the Arkansas health care industry for a more flexible, cross-trained health care technician. This reduces one of the most attractive aspects of apprenticeship-style training.

3.2. Lab Technician, Quality Control and Industrial Machinery Maintenance and Repair in Food Processing

The Industry. The food processing industry is the state's larges sector. It includes a range of firms, from large integrated poultry processors like Tyson's with 48 plants around the state, to one-room operations like Arkansas Catfish in the Delta area. Employment is highest in the four Northwesternmost counties: Benton (3,000 employed), Washington (4,000), Crawford (1,700) and Sebastian (3,500). The industry includes a few very large processors such as Tyson's, O.K. Foods, Gerber, Planter's, and Riceland Foods. Riceland mills 20% of all U.S. rice and half of all rice produced in Arkansas. (See Appendix IV for geographic distribution.)

Two geographic areas were investigated for being possible sites for youth apprenticeship: Fort Smith and the Delta region.

Occupational Description. Unless it is highly automated, food processing requires large numbers of unskilled workers. Working conditions for line workers are generally unattractive and dangerous. The poultry industry in the Northwestern part of the state, for example, employs scores of low-skilled immigrants who have few other options. Catfish processing, a nascent industry in the Delta area, offers little better—though at least it offers some jobs. In response to a shortage of labor and other labor problems such as high turnover and injuries, some poultry processing firms are automating away some of the more hazardous jobs.

There are three areas of semi-skilled to highly skilled work in food processing: the laboratory (in larger, more advanced shops), quality control, and industrial machinery maintenance and repair. These were explored for potential interest in youth apprenticeship.

Lab Technician. Only the larger more advanced plants that develop new products—such as Gerber—have labs. But in terms of skill level and education background required, this is an attractive occupation for training through apprenticeship. Lab technicians generally have 2 years of post-secondary education. Laboratory supervisors or directors usually have a B.A. degree. According to the national Institute of Food Technologists, food chemists and other lab positions are in high demand around the country as food companies seek to diversify their product offerings and fill market niches. Wages: high teens - low twenties.

Quality Control Technician. With the exception of the smallest processors, all plants have a small quality control team (e.g. 3 in a

40-person plant). In addition, some large, automated processors such as Planters and Riceland have implemented statistical process control (SPC) for in-process quality control. Quality Control offices are usually staffed by line workers who have been promoted. The skill level required probably varies somewhat, but overall employers do not view it as requiring post-secondary education, although the QC supervisor often has a college degree. Job skills include knowledge of products (size, shape, weight), the ability to read a scale and ruler exactly, record on paper, and gauge moisture content and Ph balance. As SPC quality assurance measures spread among the big processors (e.g. providers of chicken to Kentucky Fried Chicken and Wendy's which are tightening their specifications), QC Technicians will need to learn these techniques. Wages are generally slightly higher than line work and working conditions are significantly better. Wages: $5.00 - $7.00, up to $8.50 in some plants (low to high teens).

Industrial Machinery Maintenance and Repair Technician. Some small processors perform relatively little industrial machinery maintenance and repair, and use equipment that requires few advanced skills to maintain and repair. But an increasing number of food processors, particularly in the Northwestern part of the state, are automating and bringing in electronic equipment with significantly different maintenance and repair needs. Maintenance and repair positions are the higher paying non-management positions in the industry. Wages: hourly positions: $7.00 - $9.50 (high teens); salaried positions: low to mid twenties.

In a meeting held in Fort Smith attended by high level representatives from four of the state's major food processors, representatives of two major food processing firms expressed considerable interest in a youth apprenticeship program in industrial machinery maintenance and repair. As Tyson and other plants bring in the next generation of industrial machinery, maintenance and repair tasks require a new set of skills and problem-solving abilities. Down-time is increasingly costly. According to one source, a local firm had to send for a technician from Germany when their new German industrial machinery broke down. Similar needs are being felt across the state in Jonesboro, where seven manufacturers have recently grouped together to develop an apprenticeship program in industrial machinery maintenance and repair.

Factors in Favor of Youth Apprenticeship

Industrial machinery maintenance and repair would be an attractive youth apprenticeship opportunity for several reasons: jobs pay good wages; technicians can advance into supervisory, plant management, and engineering positions; and with the spread of automated electronic equipment, demand for these skills is likely to remain high.

There is some evidence that employers would have some interest in developing a youth apprenticeship program: representatives of two of the larger firms agree on a current labor shortage in this area

which could be remedied through apprenticeship. Another large employer is enthusiastic about youth apprenticeship—mostly as a community service and as a "morale booster" for current workers. His plant has decreased in size through attrition over the years as automated equipment was brought in, and he does not anticipate hiring. So in an unusual twist, he would like to train students, but not hire them afterward.

The presence of the Ozark Food Processors Association, an industry association including close to a dozen members in the northwest part of the state, and the Northeast Arkansas Apprenticeship Committee, could be very useful organizing forces if they were to support a youth apprenticeship initiative. (See Appendix III for the OFPA Board of Directors.)

The existence of electronics and automated manufacturing labs at Arkansas Valley Vo-Tech in Ozark is likely to provide an excellent training resource.

A youth apprenticeship in industrial machinery maintenance and repair might also include exposure to and training in quality control and lab techniques. This would expand the options of graduates and contribute to the apprentice's understanding of the connection between industrial machinery maintenance and repair and product quality. The plant manager at Fort Biscuit commented on this connection when he wished that QC people understood the equipment so that they could not only identify changes in the Ph level of cracker dough, but figure out what to do about it. As in-process quality control is adopted more broadly, technicians with this kind of holistic understanding are likely to become increasingly valuable.

Barriers to Youth Apprenticeship

There would be considerable barriers to establishing youth apprenticeship programs for Lab or Quality Control Technicians. Few area companies have research and development laboratories. Often all laboratory work is conducted at corporate headquarters.With the exception of Gerber's 20-person lab, these labs are small, and several training programs in lab technology already exist and appear to meet the labor demand. (Westark's new Associate in Food Technology graduated 20 students this year, and projects 25 next year. Arkansas Valley Vo-Tech School graduated 12 last year with a certificate in Food). Quality control positions are generally not sufficiently skilled for youth apprenticeship. In addition, youth apprentices would be taking away a popular advancement opportunity for line workers.

There would also be considerable barriers to establishing a food processing youth apprenticeship in the Delta area, although this should be investigated in more depth with the Existing Industries Association, a group of 50 Jonesboro businesses. Food processing in the Delta consists mainly of rice milling and a few small catfish processors. Top management at many rice milling operations does not emphasize training.

Another barrier to establishing youth apprenticeship in food processing is the image that high school students and parents hold of the industry. Focus groups of students and parents elicit strong negative reactions. Many students in the Delta think of either poultry processing line work or low-skill grocery store and fast food jobs.

3.3. Information Services (Little Rock)

The Industry. The information services industry in Arkansas is composed principally of a small number of medium-sized companies, and departments within larger firms, in the Little Rock area.

For our purposes, information services includes firms such as Axciom, which designs computer programs to develop targeted mailing lists for Fortune 500 companies, and Arkansas Systems and 5,000-employee Systematics, which design software for financial institutions. It also includes such firms as Arkansas Blue Cross and Blue Shield which develops software to meet the needs of health insurers across the country in addition to conducting the bulk of its work (processing the claims of its local clients), Datatronics, a 150-employee wholly owned subsidiary of Arkansas Best, which manages the information service needs of freight companies, IBM, First Commercial Corporation, Arkansas Power & Light, and Southwestern Bell.

Occupational Description. Most jobs in information service firms require a high level of education. At one firm, all but a couple of its 350-400 employees have a B.A. degree. Firms such as Axciom, Systematics, and Arkansas Systems conduct heavy recruitment efforts at area 4-year colleges and universities for their entry-level programmers and systems analysts. Some firms will hire 2-year community college graduates, but more for data processing tasks than for programming.

Occupational categories vary somewhat by firm. In general, however, many firms employ a small number of Computer Operators for the less skilled work, and a larger number of Computer Programmers/Systems Analysts for the more skilled work.

*Data Entry Specialist.*This position only exists in firms which perform data-entry services in addition to developing software. Although a high school degree is not required for the job, one firm reports that usually people hold the high school degree, and that some even have college-level education. There is little movement between this position and the next ones up. Wages: high teens.

Computer Operator. This position supports the Programmers and Systems Analysts. It involves running equipment, distributing output, and inputting information. The level of skill required is

estimated by some as low and by others as fairly substantial. Although a B.A. is not required, many Operators have a college degree of some kind. The number of Operators in any operation is usually small compared to the number of programmers. One firm, for example, has 35 Operators compared to 85 Systems Analysts/ Programmers. Arkansas Systems has only 2 operators out of 115 employees. Wages: high teens - low twenties.

Computer Programmer/Systems Analyst/Software Engineer. These positions are the heart of information services. Some firms differentiate between Programmers and Analysts, others do not. Programmer-Analysts determine solutions to the business needs of clients, often by meeting with them, writing the applications, and then sometimes working with the client to ensure smooth start-up. Wages: Programmer Trainee: high teens; Programmer: low twenties to thirties; Lead Programmer/Systems Analyst: forties - fifties (with at least five years experience).

Repair Technician. Most companies contract out repair work. One firm trains its own team of 20 out of 350-400 employees. It takes 6 months for a trainee to "be useful," and 12 months to be "really useful," according to a firm representative. Usually this is a second or third job for trainees, and they are in their mid 20s. "This is unfortunate. If they came to us earlier, they might learn faster." This firm reports no difficulty recruiting for these positions. In part this may be because the company expects to have to train all recruits.

Lately, one firm has hired Operators with advancement into Systems in mind—which is "good for morale." At another company about 20% of Operators advance into programming after getting a degree in computer science at night. In the industry as a whole, though, Operators do not often move up into Programmer positions. Even with tuition reimbursement offers at a third company, movement is minimal. As in other industries, more skilled workers are most likely to be offered and to take advantage of training opportunities. Because the industry is so young, veterans currently in management positions may be self-taught with little or no college background. One example is Steve Hammons of Blue Cross & Blue Shield, who started delivering reports in Computer Operations after high school. In the 1960s, shortages of programmers created an opening for experience-based credentialing. Now, however, firms increasingly seek to hire graduates of 4-year college programs. According to one placement person at an area college, "the B.A. has become an image thing in the industry."

There are two views on the value of the B.A. degree, but without exception everyone cites increasing interest in hiring holders of B.A.s. One view is that the B.A. in computer science (or a business degree with a minor in data processing) has familiarized the person sufficiently with the theory, that they can start working with relatively little supervision. The learning curve in programming is considered sufficiently long that companies value training which lays a foundation in theory.

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The second view is that being able to think, learn, reason, and adopt the perspective of a client in order to understand their needs and be able to translate them is more important than technical knowledge, and that the B.A. degree is a screen for someone who can do these things. As one industry observer at the University of Arkansas at Little Rock affirms, "Most businesses are thinking: If we're going to invest in someone, we would rather invest in someone with a B.A., mostly because specific skills are not as valuable as general skills." (As a result, the University's 2-year Associate in Computer Programming is inoperative.) Indeed, two area companies are alleged to *prefer* accounting and liberal arts graduates to computer science graduates. A spokesperson at one company affirms this sense of the inadequacy of simple technical training: "We need people with B.A.s. Vo-Tech school graduates in programming make good operators, they can write code, but they don't have a sense of the bigger picture. The college degree is a filter."

Companies engage in heavy and highly competitive recruiting for these positions among area universities. Some offer summer positions and internships during the senior year. One firm takes 2-3 interns per year, hoping they will stay after graduating. The company has just recently gotten involved in college-level coop programs with the University of Arkansas and South West Missouri State University. Senior year internships at the college level are the only current linkage between learning at school and at work, and "few are set up for intensive supervision," according to one university spokesperson.

There is some divergence of opinion within the industry as to whether or not there is a shortage of programmer/analysts. If there is a shortage, it is probably more in "quality" than in "quantity."* Despite the departure of up to 78% of graduating computer science seniors for more lucrative out-of-state jobs (some of these return after getting some experience), only one firm reports a shortage of computer science graduates which is forcing them to take math and science graduates. No one complains of being unable to fill vacant positions, nor of being unable to take advantage of more business due to labor constraints. Nonetheless, the industry association—ASCIT (Arkansas Society for Computer and Information Technology)—is producing a video and looking for ways to interest students in the industry at the high school level. This is viewed as an investment in the future, and a way to attract students who would otherwise consider more traditional fields.

Despite somewhat differing perceptions of the labor market, employers agree on the need for greater communication skills. According to one manager, people need to be able to talk and listen to others in a business setting. They need to be able to ask the right questions. Technical writing skills are often weak. He differentiates this type of writing skill from programming, which students often learn in college. Technical writing requires you to put yourself in the learner's shoes, to think more creatively about how to explain something in a user-friendly way. According to one university-

* This is confirmed by The Arkansas Employment Security Division's Labor Supply/Demand Report which indicates that the current supply of computer systems analysts and programmers is expected to exceed openings by 77 per year through the year 2000. In general, we hesitate to be guided by this source, however, since the projection methodology leads to questionably accurate projections.

based industry observer, employers are disappointed that graduates do not understand all aspects of the industry: business, accounting and communications versus programming. A manager cites the skills lacking in graduates of 4-year programs—the same skills needed for advancement in the field: good interpersonal skills, an understanding of how to work with customers (whether in other departments within the firm or external to the firm), and a "head for business,"—meaning an understanding of how programming relates to accounting, statistics and claims adjudication, for example. A manager at a second company (and an ASCIT board member) re-affirms the need for better inter-personal skills, and adds the need for more leadership and personal initiative. To this list, the vice president of a third firm adds problem-solving and teamwork.

The industry's current experience with work-based learning is with college seniors in internships (paid or unpaid depending on the employer) and in summer work. By all accounts, the level of supervision and coaching is relatively low. The only other two examples of work-based learning at an earlier age are at one area firm. The first is the 6-week unpaid internships at at the company for students from two area vocational technical schools. These also involve little formal training, but according to a company representative do provide opportunities for some skill development in problem-solving. The second is that "from time to time" the company has brought in high school students. Those with a math or accounting background are given clerical work; those with a shop background are placed in maintenance. Then students go off for a 4-year degree and may come back to work in the summers.

What apprenticeship could look like in information services. There are several design options for creating work-based learning opportunities in this field.

(1) 2+4. Start youth apprenticeship in high school, involving a significant number of hours learning at work (10-15/week) during high school, and extending some work-based learning through the 4 years of college towards a B.A. degree. This option would be the most ambitious. The Computer Operator position, enhanced by rotations in a variety of departments and project assistance work, could provide a meaningful learning experience to the high school student and contribute to the company's productivity. One firm can imagine using high school students to support the Programmers—doing the first level of checking and testing of programs and making changes in programs. Currently, there is very little support, and staff do these things themselves. But the trainee would have to have a good probability of finishing a 4-year degree. The principal barrier to establishing this type of program would be a shortage of apprenticeship slots; given the intensive training required of employers and the large number of hours on the job, it is unclear whether a small group of employers would be willing to create the 25-30 slots required to justify a teaching team.

(2) 2+2+2. Similar to (1) above, but enabling apprentices to pursue an Associate which can then apply towards a B.A. degree. Although this is more similar to the model of apprenticeship discussed on a national level to meet the skill requirements of "technician" jobs, it is unlikely to meet with much interest from information service employers. They are convinced that their work requires the general skills held by graduates of B.A. programs, and they are moving increasingly in that direction.

(3) *College Level Youth Apprenticeship.* Many college students hold jobs that have little relationship to the work they intend to pursue. Gaining insight into the information services workplace before their senior year, combined with school-based efforts to build on that learning, would be likely to develop some of the skills employers identify as lacking. If, for example, a student had to write part of a technical manual as a work project, and this project was linked to a college-level English class, the student might be more interested in the English class and learn better writing skills. This option would be less ambitious than option (1): it would probably be less difficult, but it would also not address the needs of high school students.

Northeastern University in Boston, Massachusetts has pioneered work-based learning at the college level. According to the university representative in charge of placing students in computer science coop placements, the employers who line up to take students as college sophomores do so for several reasons. Companies have many assignments of interest to college students (such as program testing) which would be unprofitable to have programmers perform. Employers feel they benefit by being able to mold young students' early work experiences, and the potential exists for students to return during three or four more coop placements. Finally, college coops give employers a chance to assess the quality of a potential hire's work.

(4) *High School Project Work With Summer Jobs.* This would involve creating information service and computer-related projects for high school students to expose them to the nature of work in the field and to develop problem-solving and other skills. Summer jobs in the industry would give students more experience and exposure, while requiring less employer commitment than the other options. This would clearly be the least ambitious option, would not qualify as a "youth apprenticeship" program as we have defined it, but would nonetheless improve learning and work options for high school students.

Factors in Favor of Youth Apprenticeship

Several factors suggest that the information service sector would be an attractive site for youth apprenticeship: programmer and systems analyst jobs offer good wages and working conditions with opportunities for advancement into management, and several important local firms are demonstrating strong growth.

There is some evidence that employers would have some interest in developing a youth apprenticeship program: employers agree on skill deficits which could be remedied through apprenticeship; some employers perceive a future shortage of programmers; and several major information service employers state an explicit interest in community service. Managers who worked their way up in the field with little formal education are natural supporters of the youth apprenticeship concept since they may have experienced the value of work-based learning at an early age.

The presence of the Arkansas Society for Computer and Information Technology (ASCIT), an industry association formed by the largest information service firms, could be a very useful organizing force if it were to support a youth apprenticeship initiative. (See Appendix II for Board of Directors.)

Barriers To Youth Apprenticeship

It is unclear that there will be a sufficient number of jobs for youth apprenticeship graduates, or that the local industry can create a sufficient number of slots to make a program feasible (40 to 50). Despite growth in some firms over the last 10 years, it is difficult to project out over the next decade. Some firms, such as Southwestern Bell and Arkansas Power & Light, both of which employ people with computer programming and operating expertise, are in the midst of restructuring and do not expect much hiring over the coming years. IBM is down-sizing. Also, many firms do not have large hiring needs. For example, Arkansas Power & Light's Information Services Department employs only 30, out of total employment of 3,700. With low turn-over, hiring is low.

The industry is facing no extreme skills shortage of any kind. Current labor market conditions are satisfactory to most employers. Hence, many employers are likely to be reticent to make significant changes or to try something which involves more risk than usual. Many would view the investment of training in a high school student as very risky compared to hiring a college graduate.

3.4. Metalworking

The Industry. The size of the metalworking sector in Arkansas is difficult to measure, as is often the case in other states. Standard industrial classification does not distinguish well among firms that exclusively make machines, tools, dies, patterns and molds on one hand and firms that machine parts that form part of the assembly of other products on the other hand. Moreover, many firms that manufacture final goods or sub-assemblies may also have a tool and die section employing several machinists.

There appears to be somewhere in the range of 300 to 400 establishments in Arkansas that hire machine operators, machinists, tool and die makers or manufacturing technicians who may operate

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machines or machining cells. There appear to be about 100 - 125 firms specifically engaged in the making of machinery that cuts, shapes or otherwise works metal and another 75 - 100 firms that make machines for other applications. While these firms may employ from 10,000 - 15,000 workers, well under half of them probably would not need machining skills. (See Appendix V for geographic distribution.)

Many of these firms are clustered around Little Rock, Fort Smith and Fayetteville with smaller clusters around Jonesboro, Pine Bluff and Hot Springs.

Trends Affecting Skill Needs in the Industry

In Arkansas, as in several other states, the metalworking industry is hampered by a shortage of skilled workers, especially machinists and tool and die makers. While the metalworking industry is not generally as advanced as may be the case in more traditionally industrialized states like Michigan, Ohio and Pennsylvania, there are a number of very advanced metalworking firms with customers throughout the U.S. and the rest of the world.

Arkansas metalworking firms are shifting from reliance on manually operated machines to numerically controlled and computer numerically controlled machines. They are using more precision oriented machines and systems and are far more concerned about quality.

Skill requirements are changing along with the machinery and the technology. Most firms have relied on machine operators who may not have the technical preparation to effectively use micro-electronically controlled machines and who rarely possess the flexibility to operate several different machines as would a skilled machinist.

Discussions with officials of the Arkansas Industrial Development Commission underscore the importance of skill advancements in the metalworking sector. These advancements are needed at two levels. First, the preparation of many employees in this sector has left them without the foundation for acquiring the technical and communication skills their employers need. Secondly, there is the need to develop "skilled workers" at the journeyworker level in machining and in tool and die making.

It appears that the state is devoting the major share of its attention to this first issue — upgrading the skills of existing workers in programs short of formal apprenticeship. This is quite appropriate, but it underscores the need for employers to search for new solutions to meet their increasing need for a larger cadre of highly skilled new workers with the advanced technical preparation demanded by contemporary technology and a quality oriented market.

Most of the metalworking sector has relied on the conventional apprenticeship system to produce skilled machinists and tool and die makers. However, there is not as strong a tradition of apprenticeship in the metalworking firms of Arkansas as in the midwest and northeast. There is no state association of metalworking firms in Arkansas, and there are no local chapters of the National Tooling and Machining Association.

There is, however, a newly organized association of metalworking firms in the southwest region. The Metalworking Connection, Inc. is a non-profit corporation comprised of existing firms in a nineteen county region in Southwestern Arkansas. Currently the association has fifty-four member firms. This is a remarkable organization of firms given that there is no significant geographical clustering and the firms are widely dispersed across such a large area.

In Jonesboro, a group of seven of the larger area firms calling itself the Northeast Arkansas Apprenticeship Committee, is designing curriculum for two apprenticeship programs: Tool & Die, and Equipment Maintenance (which will include mechanical and electrical specializations). In the past, each plant did its own training, but employers have become increasingly interested in common certification. Internal informal training has also proven inadequate to meet changing needs. The group plans to seek accreditation under federal apprenticeship guidelines. Although youth apprenticeship has not been discussed, there is some interest in it.

The Metalworking Connection Inc.

The Metalworking Connection Inc. was organized in part as a result of the efforts of the Southern Technology Council to promote the emergence of flexible manufacturing networks that have received much attention in Italy and other parts of Europe. These firms have come together to pursue common objectives such as insurance. Among other recent initiatives, the Metalworking Connection proposed to establish an apprenticeship program on the MecTech model, i.e., the association will employ the apprentices and they will rotate among the member firms to gain their work experience.

This is seen as a four year machining program modelled on the "regular" apprenticeship training as developed by the NTMA (8,000 hours). Those who wish to pursue the tool and die maker program will require five years (10,000 hours). The first year apprentices will be high school students with "sufficient skills to master the trade," at least 16 years old and on schedule to receive their high school diplomas. Until the apprentices graduate from high school, they will be required to attend classes regularly and they will be paid only for the hours they spend working.

It is not clear from the preliminary design how the apprentice will attend regular classes and still manage to gain the work experience necessary to achieve journeyworker status. Nor is it clear that the program involves work-based learning to the extent that it is being

developed for metalworking in other youth apprenticeship schemes in Pennsylvania, Wisconsin, Maryland and a few other locations.

Another major issue may be the attractiveness of this program to those achievement oriented young people whose educational proficiencies and willingness to apply themselves to learning should make them particularly attractive to metalworking employers. It is uncertain if this level of student will be attracted to a program that does not appear to lead to a post-secondary degree, as it may not seem to have the potential to connect them with enough career choice.

Potential For Youth Apprenticeship in Metalworking

Discussions should be pursued with the Northeast Arkansas Apprenticeship Committee in order to gage employer interest in youth apprenticeship.

Largely because of the preliminary work done by the Metalworking Connection, there is potential for the establishment of a pilot youth apprenticeship project in metalworking. The Metalworking Connection needs money to implement this program. The group requires funds to hire a full-time project manager to complete the design and to sell the program to all the employers, to participating school districts and to young people and their parents.

The Metalworking Connection's initiative should be encouraged. There are some important questions about the design, and there is no post-secondary degree now envisioned. Still, the group might be able to incorporate some of the ideas from the youth apprenticeship initiatives in Pennsylvania and other states. With a little help, this could be a valuable youth apprenticeship experiment in a rural manufacturing sector.

This is now seen as a program where young people still in school would continue to receive their academic instruction from their home high school until they meet all diploma requirements. The involvement of vocational school machine shop programs is not yet clear. It appears that the employers see the workplace as the primary (or perhaps even exclusive) site of the occupational/technical education.

We recommend that a youth apprenticeship in metalworking be designed with the participation of metalworking firms from other parts of the state. The pilot effort might start in Southwestern Arkansas, but it should seek to address in its design some of the need as seen by metalworking firms throughout the state. Moreover, it will be important to the concept of youth apprenticeship that occupational credentials that might emerge from the program be generally transferable throughout the state. The only way to get more firms interested in investing in training programs like youth apprenticeship and to get young people interested inparticipating in them is to establish good systems of mobility for workers and transferability of skills from one employer to another.

Barriers to Youth Apprenticeship

- The relatively small size of the metalworking industry in the state and the geographic dispersion of small firms may result in logistical problems and difficulty reaching sufficient scale.

- The level of employer interest in workers with post-secondary degrees is unclear.

- The tradition of apprenticeship in Arkansas' metalworking industry is relatively weak compared to some other states.

- Both the Metalworking Connection and the Northeast Arkansas Apprenticeship Committee are new efforts whose training initiatives will require considerable focus to succeed. These groups may view youth apprenticeship as an inopportune diversion from work already underway.

3.5. Food Service Management

The Industry. The food service industry includes a range of operations:

- independent restaurants
- country clubs
- hotel restaurants and food operations
- chain restaurants and fast food operations
- institutional operations, including hospitals, colleges, nursing homes, and corporate dining rooms

The Little Rock area appears to hold the highest concentration of high quality food service operations in the state. Although business is currently depressed in most areas of the country due to economic conditions, observers of the sector expect strong growth nationwide over the coming years. Explosive growth in the recent past has already caused a shortage of chefs and skilled cooks in most areas. This has led to interest around the country in strengthening training programs to develop skilled chefs.

Occupational Description. Food service operations are generally divided into front and back-of-the-house operations. Front-of-the-house jobs involve direct contact with customers. Back-of-the-house operations involve the preparation of food. The kitchen job hierarchy may run from dishwasher to Cook's Helper to Apprentice Cook to Sous Cook to Chef and Executive Chef.

A relatively skilled "cook," who may have advanced to the position of "chef" will be someone who has been through the industry's 3-year apprenticeship and has two to five years of work experience in addition. Wages for Journeyworker Cooks are likely to range from

$6.50 to $7.00 in Arkansas. Salaries for chefs range from $25,000 to $40,000 and more.

Generally, food service managers (which most chefs are), have worked their way up through the kitchen hierarchy of cooks and cook's helpers.

Probably the ideal employer for a youth apprentice (just as with an adult apprentice) would be a hotel operation, for its diversity. The range of learning opportunities might include coffee shops, fine dining, buffets, banquets, and cocktails. High quality country clubs might provide a good, less pressured, learning environment. Good restaurants with high check averages and a catering/banquet service could also provide good learning opportunities for youth apprentices.

Chain restaurants and institutional operations could also provide learning opportunities, but probably without the breadth or the careful attention to quality of the other operations described above. Focus group discussions with students and parents suggest that both are intensely unhappy with fast food work, so these operations should probably be ruled out. In any case, fast food experience is unlikely to develop the chef skills that are in demand.

Factors in Favor of Youth Apprenticeship

- There is wide agreement on the shortage of skilled workers (chefs). High school courses in culinary arts often fail to provide the foundation required and work experience in fast food chains repels young people rather than attracting them into food service as a career.

- There is broad agreement on the critical role of hands-on learning in food service.

- Currently the American Culinary Federation's Chef Apprenticeship does not include rotations to the front of the house. A youth apprenticeship program which exposed students to all aspects of food service, as is the case in Europe, would develop more well-rounded chefs and food service managers.

- Members of the industry are critical of post-secondary programs which aim to develop food service *managers*. Their view is that people become managers by working up through the ranks because hands-on learning and internal career ladders are important. Youth apprenticeship builds on that view by enabling classroom learning to support and extend the workplace learning experience, particularly in the post-secondary years.

Barriers to Youth Apprenticeship

- Training apprentices is a labor-intensive process which is made more difficult in the pressured environment of most food service operations. In part for this reason, some chefs are unenthusiastic about taking on trainees.

- The degree of interest in this concept among Little Rock chefs and hotel and restaurant owners and managers has yet to be determined.

- The content and nature of post-secondary learning and degree potential associated with this career path needs further exploration.

3.6. Self-employment and Options for Rural Areas

A school and work transition program like youth apprenticeship meets several needs that are particularly strong in rural areas and in Arkansas' Delta region in particular.

(1) Focus groups confirmed that in rural areas, getting a good job, or even any job, hinges very much on who you know. Programs which help students get into meaningful jobs can help break down certain inequities in access to good workplace experience.

(2) As educational leaders and rural developmental practitioners look to self-employment and entrepreneurship training to help young people create their own jobs, youth apprenticeship in small firms can provide meaningful real world experience in what it takes to run a small business.

(3) By engaging young people in meaningful local jobs at the age they begin to consider migrating away for work, we decrease the chances of out-migration before local opportunities are fully considered.

At the same time, rural areas in Arkansas, particularly the Delta region, present critical challenges to youth apprenticeship. One, existing industry is highly disperse. This makes it difficult to gain the scale required for technically-oriented youth apprenticeship programs. Two, few businesses require sophisticated technical skills. Most businesses in small rural towns are retail stores. This limits the type of apprenticeship possibilities. Three, most businesses are very small, which means that an employer's commitment in taking on an apprentice is quite significant.

Despite these difficulties, interviews with several small entrepreneurs in the region reveal some potential in a youth apprenticeship program in small business management. Gaining exposure to what it takes to run a small business could provide early training which could help develop future entrepreneurs and managers. This would build on the entrepreneurship training

available in some high schools and could contribute to building future managers by combining work-based learning with post-secondary business education. In addition, the apprenticeship could provide a badly needed role model in entrepreneurship and assertiveness for many young people. Many Delta business owners note the shortage of people with managerial skills.

One young owner of a start-up brokerage company observes that she has no one to answer phones or to work on the books, or to help set up the many systems needed. Having graduated from a local school not too long ago, and with a commitment to the area, she would be glad to take someone on part-time. If the company grew, they might even be able to become partners.

Management trainee opportunities are probably not limited to relatively new start-ups. According to one source, the out-migration of young people results in established family businesses that must be sold or closed because children have not trained to take over.

Many people working to create job opportunities in the Delta believe that small business management skills and entrepreneurial thinking can help students develop small service businesses (this may literally be self-employment) able to sustain themselves by meeting the needs of middle- and upper-income rural residents. The REAL Enterprises, Inc. approach to high school entrepreneurship training, in which students research community needs and establish community-based businesses, would complement youth apprenticeship in retail management well. Students could learn critical business skills before venturing out on their own. REAL has gained considerable expertise in Georgia, North Carolina and South Carolina and would be an excellent partner in a rural retail management youth apprenticeship initiative.

In considering this youth apprenticeship option for rural areas, it is worth noting that the children of parents who are business owners and managers often benefit from an informal youth apprenticeship experience. What is proposed here is an attempt to formalize this experience and to increase access to a broader group of young people.

Focus groups with students confirm that transportation to the workplace and back home would be an issue in rural areas, especially when few students own their own cars and little public transport exists. Clearly, students who live in, or close to, town would be better able to participate unless special transport was provided.

3.7. Other Possible Apprenticeable Occupations

Discussions during the study pointed to several youth apprenticeship possibilities that were not pursued as part of the study.

1◆ The Arkansas Builders and Contractors Association already has a fledgling apprenticeship program for high school students which they would be willing to expand. They see particular demand for electricians and plumbers. They think that Little Rock and Fort Smith could possibly support 25 apprentices a year among their membership companies.

2◆ Several magnet high schools are under development in Little Rock and work-based learning is attractive as a potential component of these schools. Bill Bowen and Freeman McKindra at the Winthrop Rockefeller Foundation suggested the Aviation School and Museum currently being planned in connection with youth apprenticeship.

3◆ The National Center for Toxicological Research: biochemical research. NCTR in Pine Bluff has dormitories, labs and a considerable number of PhD scientists. Students working in an apprenticeship there would need to be able to earn transferrable college credits. A program could perhaps be established as a one-year post high school program or to supplement high school and lead to an Associate degree. This could also be a post high-school option for students from an allied health services apprenticeship.

4. Integration With Other Efforts Underway

This feasibility study was conducted under two assumptions:

◆ the state wants to create a work-based learning system as a mainstream alternative for large numbers of young people and adults; it sees youth apprenticeship as a subcomponent of that overarching objective;

◆ whatever project is designed must be integrated with other ongoing efforts to improve education— the Tech Prep initiative and other efforts to restructure schools and strengthen math and science education.

This section therefore explores two issues: What would be required for the creation of a work-based learning system over time require? And how can work-based learning (in particular the early demonstrations for youth initiatives made possible under HB 1428) build on existing education reform efforts? About a dozen individuals in Arkansas, listed in Appendix I, were interviewed to gather this information.

Findings

Arkansas has major strengths on which to build a work-based learning system. The most important of the state's major strengths is the comprehensive plan for an expanded Tech Prep program. This would allow students to choose either an academic or a technical course of study in high school. Either course of study would consist

Integration

of academically rigorous and sound courses which would cover comparable subjects. Students in the technical courses would follow a more applied approach. But the necessary foundation coursework for college would have been covered.

The Division of Vocational and Technical Education has prepared a comprehensive framework for this kind of technical education. It would incorporate a 2+2 articulation between high school and post-secondary technical education. Work-based learning could easily be incorporated into this model in the last two years of high school and beyond.

Early in middle school, as the schematic drawn up by the Division indicates, students would receive various kinds of career education. In 11th grade, they would select a technical focus and enter an applied or academic course of study. Work-based learning opportunities could be structured to be available to students in either course of study, particularly if students had reached some broadly accepted level of competence by the end of 10th grade (which could be certified by a Certificate of Initial Mastery.)

For this to work, individuals planning the Tech Prep program in the General Education Division and the Vocational and Technical Education Division, and the State Board of Higher Education would have to work together to determine outcome standards for the work-based learning program that would equate with the academic outcomes required of students who stay in more school-based courses.

Arkansas has a history of openness to innovation and a great deal of genuine innovation in education is occurring in the state. This is, in some ways, a mixed blessing. On the one hand, there is a group of administrators, teachers and schools with experience in educational innovation. (Arkansas is a member of the National Center for Education and the Economy's school restructuring program. It is also a member of the Education Commission of the States' RE: Learning program. It has Coalition of Essential Schools schools and an innovative program to improve math and science education, Project MAST.) This body of experience and commitment to systemic change is an enormous asset. Individuals involved with these efforts and interviewed for this study were positively disposed to the idea of work-based learning and saw commonalities between many of their objectives for students and learning and those of work-based learning.

On the other hand, there is some feeling that the state is overwhelmed by innovation; that the same relatively small group of administrators, teachers and schools is stretched enough to keep up with the efforts that exist and would be unable to accommodate or participate adequately in a new initiative. Given the added competition for funds and political attention, the addition of yet another new program could be seen as distracting.

It will be important to structure a relationship between the educational leaders already involved with education reform and work-based learning. Possible strategies include: using some of the restructuring schools as sites for early "youth apprenticeship" initiatives; including people from the "restructuring movement" in the planning, project review and governance structures devised for work-based learning; and designing a teacher development program for work-based learning that uses some of the people currently involved in educational restructuring and that explicitly seeks to connect the two.

Project IMPAC and educational computer applications for vocational education have helped Arkansas rank fifth in the U.S. in the ratio of computers to students. Applications in business computing, basic skills and several technical areas of vocational training have resulted in increased use of computer technology in the classroom. Innovative software packages are being used to individualize learning (flexible enough to be used for both remedial and accelerated learning). A math and science program, MAST, is using and adapting them already. Thus some of the "hardware" exists for training in computer programming, data processing and possibly computerized repair and maintenance.

Finally, budding initiatives to foster entrepreneurship in high schools and the vo-tech schools could extend logically into youth apprenticeship opportunities in small business management. Currently 25 high schools teach Junior Executive Training (JET) and Southwestern Bell recently provided training in teaching entrepreneurship to about two dozen vo-tech teachers. Youth Entrepreneurship Seminars held on college campuses, and Arkansas Power & Light's Executive Business Game, may provide an opening for further post-secondary involvement in work-based learning in entrepreneurship. JET teachers could be valuable participants in any kind of youth apprenticeship program, particularly in their ability to help youth apprentices learn about all aspects of a trade and industry.

Points of Leverage

Two points of leverage can be used to promote work-based learning and enhance the likelihood that it could be institutionalized over the long-term. These include:

- **Restructuring of the vocational and technical delivery system.** Regardless of whether or not responsibility for part of the post-secondary technical education system is transferred to the Board of Higher Education, there is interest in strengthening post-secondary technical education and building a stronger academic component, i.e. programs that could be certified and academic credits that could be transferred. The idea of work-based learning should be part of those discussions and planning.

The reorganization may facilitate articulation between vo-tech schools and community colleges, and the state's 4-year colleges. Focus groups suggest that this will be key to making youth apprenticeship an attractive option for students and parents. The accreditation of more post-secondary schools will add to the attractiveness of non-B.A. post-secondary options. Current higher education funding formulas which reduce a schools FTE (full time equivalent) count unless the student learns on campus could present a potential problem, however.

◆ **The state standards setting process.** Interviewees mentioned two standards setting processes underway that could encourage work-based learning. First, tenth graders are currently required to take multiple choice norm-referenced ("ranking") exams. Arkansas' Department of Education has issued a request for proposals for a new test which might include portfolio and demonstration approaches to evaluation. These approaches to evaluation are highly compatible with the principles of work-based learning. Second, last year the state began a five-year cycle Comprehensive Outcomes Evaluation process that 20% of Arkansas schools are undergoing each year. As a tool for facilitating change at the local level, it is another possible leverage point for youth apprenticeship.

The Arkansas Business Council clearly has a long-term interest in and concern for the quality of technical education. Members should be briefed on work-based learning and cultivated as possible advocates, providers of training slots, and financial contributors. The Winthrop Rockefeller Foundation is interested in the concept and would entertain a proposal in the $50,000 range to support either teacher development or an initiative in the Delta. Representatives from these organizations should be part of whatever planning team is put together.

Recommendations on Process

We had expected that the end product of the feasibility study would be a grant proposal to enable Arkansas to compete for federal Department of Labor funds. But since then, the state has created its own fund to stimulate demonstration programs.

Based on the research so far, we recommend that a Design Team be put together that would work in April-May to plan the overall program structure. This group would delineate linkages with other initiatives (such as Tech Prep and CES), actively solicit proposals from desirable sites, and review proposals. This should be a multi-agency review team with some external members as well. It should explicitly discuss and plan for how this initiative fits into a larger objective that by 1996, every student graduating from secondary or post-secondary school will have a mastery certificate with demonstrable core competencies and a guarantee. The team should include representatives from:

Department of Education, General Division
Department of Education, Vocational and Technical Division
State Board of Higher Education
Legislature
Arkansas Business Council
Arkansas Apprenticeship Coordination Steering Committee
Winthrop Rockefeller Foundation
Coalition of Essential Schools
Teachers unions
Project MAST
Key employers and unions
Arkansas Science and Technology Authority

5. Design Options

Arkansas has several design options for its youth apprenticeship programs. We have taken some design parameters as given: 3-4 years, bridging the last two years of high school and one or two years thereafter; work-based learning during the school year and summers; a strong link between what is learned on the job and in academic classes; and the active participation of a workplace supervisor as a teacher in the learning process. But others are still to be determined. Important design questions are: (1) Who is the teaching team? (2) Where does classroom learning take place? (3) Should the third and fourth years be built in as optional rather than as a critical piece of the program? (4) Should the program start in 12th grade rather than 11th? (5) Can youth apprenticeship—or its post-secondary component—be made accessible to adult workers?

Teaching team and location of classroom. The importance of the teaching team is that the more closely a small team of teachers works with a given group of students, the greater the continuity and support for students, and the greater the teacher's ability to connect learning in the classroom with the student's learning at work. Also, the more closely a team of teachers works on curriculum, the more inter-disciplinary connections students can make in their learning. All of these—continuity, support, connection between classroom learning and workplace learning, and connection between disciplines—are believed to be key to effective learning.

The importance of place lies in the image it sets for the program (e.g. a community college location may give it prestige in the eyes of high school students). Place can also influence the program's culture and expectations for achievement among staff as well as students.

What follows is a brief description of a range of options, from the most "stand alone" independent model to one which attempts to fit youth apprenticeship into already existing structures and staffing. The advantages and disadvantages of each are described.

1. ***Independent teacher team, not high school based.*** This might be a group of 3-4 teachers dedicated to a group of about 50 students. Some of the teachers would need to be certified to teach more than one subject. Teachers would plan curriculum and teach as a tightly knit team and would visit students' workplaces regularly. The classroom would be at a location other than a high school—perhaps a community college, which would lend the program prestige, expose students to a college campus, and set the stage for a new, more demanding, culture around learning.

One advantage of this model is that by stepping outside the confines of the way things are typically done in high schools, teachers and students can be freer to pursue high performance alternatives. Another advantage is that if the classroom is centrally located, it may be easier for students from several districts to participate.

One disadvantage is that an independent program is likely to be more work to start up, and therefore also more difficult to replicate. Likewise, it may be more difficult for school systems to learn from a successful experiment lying outside their boundaries than inside them. Another disadvantage is that students might find it difficult to participate in school-based extra-curricular activities or to receive the range of support services provided by schools. The financial cost of this approach is likely to be somewhat higher than traditional high school enrollment, particularly in the first year as the program gets up to scale.

2. ***Independent teacher team, high school based.*** This might also be a group of 3-4 teachers dedicated to a group of about 50 students. Teachers would plan and teach as a team and visit students' workplaces regularly. Students would take classes separate from regular high school students. But unlike in (1), the classroom would be in a high school. One advantage of this model is that it would probably be easier to start up and replicate than (1)—not only among schools but among teachers within a school. Also, students would find it easier to participate in some extra-curricular activities and the social life of the school. One disadvantage is that dominant school culture, norms and rules might make it difficult for administrators, teachers, and students to jump to a higher level of expectations and to experiment with alternatives.

3. ***Partially independent teacher team, high school based.*** This might include one or two teachers who teach courses geared particularly to youth apprenticeship students. Students would take their other classes with regular high school students and teachers. This is the Academy or "school within a school" model which has received considerable recognition for reducing drop-out rates and boosting post-secondary attendance. It requires less of a commitment on the part of all participants than (1) and (2). This is likely to make it easier to start up and replicate. But many well-recognized Academies fall short on team teaching. Students often do not understand the connections between their classes. And classes taught by teachers outside the youth apprenticeship

program are likely to use traditional teaching methods, as opposed to the experiential, team-based approach which is an important component of youth apprenticeship. Likewise, by diluting the teaching team, opportunities for linking work-based learning and classroom learning are likely to be lost.

4. ***No independent teacher team, high school based.*** This would include no program-specific teachers. Students would take courses—perhaps a particular core of courses—alongside regular students. This would be the easiest to start up and replicate, since the program would consist only of a connection to employers and a link with post-secondary opportunities. In effect, it would be a combination of work-study and 2+2 or 2+4. Although this model might be an improvement over the system's current ability to ease the transition from school to work, it would fall significantly short of creating meaningful work-based and classroom learning opportunities for students.

One of Arkansas' characteristics is the dispersion of students and employers in a largely rural state. This dispersion may impede the development of youth apprenticeship programs that lie outside high schools and that have a wholly dedicated teaching team because it might be difficult to find a sufficient number of students interested in a particular occupation, or to find a sufficient number of interested employers within a limited area.

The geography of the state might therefore make it worthwhile to consider how to reduce the potential pitfalls of model (3), which involves a high school based partially independent teacher team, or possibly (2), which involves a non-high school based, totally independent teacher team.

How optional should the post-secondary years be ?
The third design question—whether the third and fourth years should be designed in as optional for both students and employers, rather than as expected—is particularly relevant in areas of the state that young people are considering leaving (i.e. most rural areas and especially the Delta). Many students expect to leave the area, whether for a few years or permanently, whether for college or work. Although some would be glad to stay if good work opportunities were available, a program which required them to make a commitment to staying after high school could be seen as unduly confining. On the employers' end, it is possible that some small retail operations which might offer excellent youth apprenticeship positions during high school years might balk at committing themselves to three to four years.

Should the program start in 12th rather than 11th grade? Clearly a program starting in 12th grade would be easier to start up. Students might have a better idea of their interests. But this late start would deprive 11th graders of the program's benefits, leaving the 11th grade as what would for some be a wasted year.

Opportunities for adult workers. Finally, opportunities exist to make the last two years of a youth apprenticeship program accessible to adult workers. This is particularly relevant to Arkansas where many employers have expressed concern with the skill level of the existing workforce.

Georgia's pilot Work-Based Learning Program for a diploma in Applied Manufacturing Technology started this September at 17 sites in the state is one illustration of credentialing the work-based learning of adults. It awards high school or GED graduates credit for related work-based learning in a structured work environment along with college courses towards a 2-year certificate.

In addition to getting credit for learning on the job, adults participating in the last two years of a youth apprenticeship program could benefit from teachers whose explicit role is to connect classroom and work-based learning, to help apprentices learn about all aspects of the trade or industry, and to create an experiential and interactive learning environment.

If work income did not eliminate public assistance, youth apprenticeship could also be an attractive option for people on public support who do not have a high school diploma (such as some mothers on AFDC). Since youth apprentices would only be working part-time, adults would be unlikely to participate unless they received some sort of public assistance during the initial year or two.

Appendices

I. **Interviews**
Interviews and meetings were held with 89 individuals.

II. **ASCIT Board of Directors**
The Arkansas Society for Computer and Information Technology, founded in 1989, is a trade organization representing Arkansas information service firms, mostly in the Little Rock area. Board members share an interest in education and labor force issues. This organization would be a key player in the initiation of any kind of school and work transition program.

III. **Ozark Food Processors Association Board of Directors**
This trade association of food processors in northwestern Arkansas represents many of the more active food processors in the area. It would be a key player in the initiation of a youth apprenticeship program in industrial machinery maintenance and repair.

IV. **1988 County Business Patterns: Food Processing Map**
This mapping of food processing firms and employment by county provided a starting point for identifying areas in which a youth apprenticeship in food processing might be attractive.

V. **1988 County Business Patterns: Metalworking Maps**
These mappings of metalworking firms and employment by county provided a starting point for identifying areas in which a youth apprenticeship in metalworking might be attractive.

VI. **"Integrated Work and Learning: An Exploration of the Feasibility of Implementing a Youth Apprenticeship Program in the Allied Health Field in Boston," April 1990**
This paper was the principle piece of occupational/ employer research conducted as the foundation for "Project Pro-Tech," a youth apprenticeship program in the allied health fields in Boston whose design and implementation was recently funded by the U.S. Department of Labor. Much of the career ladder and other occupational and labor market information it contains may be useful in discussions about a youth apprenticeship program in the allied health fields for Arkansas.

VII. **"A Youth Apprenticeship in Health Services for Arkansas: A Preliminary Concept Paper"**
This thought piece is written as a starting point for further discussion within the state about what a youth apprenticeship in the allied health fields might look like, and how it might work.

Appendix I:
Interviews

Appendix I: Interviews

Education

Arkansas Valley Vo-Tech School
- Patricia McCreary, Food Lab Technology Program+

Department of Education, General Education Division
- Emma Bass, Associate Director, Instructional Services**
- Marie Parker, Associate Director, Planning and Development**

Division of Higher Education
- Diane Gilleland, Director**

Lee County School District
- Beverly White, Superintendent++

New Futures for Little Rock Youth
- Don Crary**

Project MAST (Math and Science Together)
- Kathy Briggs**

Westark Community College
- John McKay, Vice President, Instruction+
- Sherry Smith, Business and Industries Coordinator++

West Memphis High School
- Glen Fenter, Principal++

Winthrop Rockefeller Foundation
- Mahlon Martin and Freeman McKindra**

Labor

Arkansas Apprenticeship Coordination Steering Committee (AACSC), and IBEW Local #1516
- Nathan Edgar, Chairperson*

Allied Health Occupations

Arkansas Department of Health
- M. Joycelyn Elders, M.D., Director**
- Tom Butler, Deputy Director for Administration **
- Bill Rodgers, Office of Primary Care**

Arkansas Health Care Association
- Ben Salewski, Executive Director**
- Sue Harvey, Director of Education and Community Affairs**

Arkansas Hospital Association
- Paul Cunningham, Associate Vice President**

* Phone interview
** In-person interview
+Attended meeting
++ Helped organize meeting

Arkansas Industrial Development Commission
- Dave Harrington, Director**
- Cherry Duckett, Deputy Director**

East Arkansas Family Health Center, Inc.
- Tom Coleman, Executive Director**

Lee County Cooperative Clinic
- John Eason, Administrator**

Little Rock School District
- Evelyn Memz, Biology Teacher and Director of Health Options Program at Parkview High School — a Science Magnet School**
- Dennis Glasgow, Science Coordinator for the District**
- Doyle Dillahunty, Associate Vocational Director**
- Doris Jones, Health Occupations Instructor**
- Richard Wright, Vocational Supervisor**

University of Arkansas at Little Rock
- Charles Stevens, Dean of College of Science and Engineering Technology**
- Ann Larowe, Director of Associate Degree Nursing Program**
- Virginia Smith, Associate Professor of Nursing**
- Ellen Drummond, Assistant Professor of Nursing**

University of Arkansas for Medical Sciences
- Ronald H. Winters, Dean, College of Health Related Professions**
- James Blagg, Associate Dean for Academic and Student Affairs, College of Health Related Professions**
- Benni Ogden, College of Nursing**
- Bob Wheeler, Assistant Vice Chancellor for Human Services**
- Hosea Long, Director of Employee Relations**

Information Services

Arkansas Blue Cross & Blue Shield
- Steve Hammons+

Arkansas Farm Bureau
- Jerry Matthews, Director of Human Resources*

Arkansas Power & Light
- William Lee, Human Resource Specialist*+

Arkansas Systems, Inc.
- James Hendren, President**
- John Chamberlin, Vice President*++
- Polly Deems, Personnel**

Axciom, Inc.
- Kathleen McComber, Assistant Director of Human Resources*+
- David Moix, Group Director, information Systems**

* Phone interview
** In-person interview
+Attended meeting
++ Helped organize meeting

Appendix I:
Interviews

Datatronics, Inc.
- Chris Burton*

Hendrix College
- Allison Nicholas, Director of Internships*

IBM
- Linda Green, Business Operations Manager*+

Northeastern University (Boston, MA)
- Melvyn Simms, Associate Professor of Cooperative Education in Computer Science*

Southwestern Bell
- Millard Smith, Manager of Employment*+

Systematics, Inc. and ASCIT
- Collins Andrews*

University of Arkansas, Fayetteville and ASCIT
- Hal Berghel*

University of Arkansas, Little Rock and President, ASCIT
- John Talburt*

* Phone interview
** In-person interview
+Attended meeting
++ Helped organize meeting

Food Service Management/Chefs

American Culinary Federation
- Steve Fernald, National Apprenticeship Director (Florida)*
- Jerry Vincent, National Apprenticeship Chairman, Education Institute and Program Director, Hospitality Management, Johnson County Community College (Kansas)*

Excelsior Hotel and Restaurant, Little Rock
- Roff Tinner, Executive Chef**

Hospitality Personnel Serices, Inc.
- Hans Amstein, President*

Food Processing, Fort Smith Area

A.E. Staley Manufacturing Co. (cornstarch)
- Phyllis Kerby*

Cargill
- Monelle Maier, Human Resources Manager+

Fort Biscuit Company
- Lenelle Leraris, Director of Personnel*
- Phil White, President**

Gerber
- Dick Friday, Plant Manager, and President, Ozark Food Processors Association+
- Pat Hassman, Personnel Manager+

OK Foods, Inc.
- David Arnald, Plant Manager & Training Coordinator**+

Ozark Food Processors Association
- Justin Morris*

Planters
- Chick Boren, Plant Manager**+
- Mark Schluterman, Personnel Supervisor+

Rymer Foods, Chicken Division
- Dick Bracker, Human Resources*

Tyson
- Paul Whitley, Vice President, Training & Development+

Business, Delta Area

ADM Milling Company
- Phil Stratton, General Manager**

Arkansas Catfish
- Dina Milton, Co-owner**

Coca-Cola Bottling Company of Northeast Arkansas
- Tommy Lawrence, General Manager, and member of Exisiting Industries**

Delta Brokerage Company
- Stephanie Lefler, Co-owner**

Food Giant
- Steve Edwards, Co-owner**

Riceland Foods
- J.C. Mahon, Manager, Jonesboro Division**
- Jim Corter**

Smith Shoe Store
- Mrs. Smith, Co-owner**

Metalworking

Delta VoTech School
- Keith Steele, Superviser of Instruction*

* Phone interview
** In-person interview
+Attended meeting
++ Helped organize meeting

Appendix I:
Interviews

Metal Working Connection
- Clayton Franklin, Director of Economic Development, Henderson State University**

Southern Arkansas University
- Bob Graham, Director of Economic Development**

Southern Technology Council (North Carolina)
- Stuart Rosenfeld, Director**

University of Arkansas, Little Rock
- John Opiztz, Senior Researcher**

Others

- Hillary Rodham Clinton, First Lady**

Arkansas Human Development Corporation
- Earl Moore, President++

Arkansas Science and Technical Authority
- John W. Ahlen, President**

Associated Builders and Contractors of Arkansas
- Chris Ames, Vice Chairperson, and member, Arkansas Apprenticeship Coordination Steering Committee**

* Phone interview
** In-person interview
+Attended meeting
++ Helped organize meeting

Out of State

Department of Technical and Adult Education, Georgia
- Robert Mabry, Deputy Commissioner*

Institute of Food Technologists, Chicago, IL*

REAL Enterprises, South Carolina
- Sarah Ritter-Paulin**

Materials Consulted

- Arkansas County Business Patterns, 1988, U.S. Chamber of Commerce.
- Labor Supply/Demand 1986 - 2000, Future Training Needs, Arkansas Employment Security Division, November 1990.
- "Realizing the Dream...Fulfilling the Potential," A Report by the Lower Mississippi Delta Development Commission, May 1990.

Appendix II: ASCIT Board of Directors

The ASCIT 1990-91 Survey of College and University Computing Programs in Arkansas

ASCIT, the Arkansas Society for Computer and Information Technology, is a not-for-profit Arkansas corporation founded in 1989. ASCIT's primary purpose is to advance the state of computer and information technology in Arkansas through the cooperative efforts of business, government and education. Through the leadership of its governing board, ASCIT sponsors a number of important computer related activities in the State, such as the annual Arkansas Computer Conference and the publication of the quarterly Arkansas Computer Bulletin.

Board of Directors as of August 1, 1990

Collins Andrews, Systematics, Inc.
Hal Berghel, University of Arkansas, Fayetteville (Chairman of the Board)
Doyle Cannady, First Commercial Bank (Treasurer)
John Chamberlin, Arkansas Systems, Inc.
Gary Green, National Center for Toxicological Research
Steve Hammons, Blue Cross and Blue Shield of Arkansas
Rodger Kline, Axciom, Inc. (Vice-President)
George Knight, International Business Machines
John Talburt, University of Arkansas at Little Rock (President)

Appendix III:
Ozark Food Processors Association Board of Directors

Appendix III: Ozark Food Processors Association Board of Directors

OZARK FOOD PROCESSORS ASSOCIATION
Officers: 1989-1990

President: Mr. Dick Friday, Gerber Products Co., PO Box 10010, Fort Smith, AR 72917-0010, Phone: 501/782-8671.

Vice President: Mr. Lee Turman, Stilwell Foods, Inc., PO Box 432, Stilwell, OK 74960, Phone: 918/696-7222.

Executive Vice President: Dr. Justin R. Morris, Department of Food Science, University of Arkansas, 272 Young Ave., Fayetteville, AR 72703, Phone: 501/575-4607.

Secretary-Treasurer: Ms. Carolyn Q. Sharp, Department of Food Science, University of Arkansas, 272 Young Ave., Fayetteville, AR 72703, Phone: 501/575-4607.

BOARD OF DIRECTORS
1990

Mr. Bill Allison, Allen Canning Company, PO Box 250, Siloam Springs, AR 72761, Phone: 501/524-3111.

Mr. Jerry Dickson, Heekin Can Company, PO Box 11, Springdale, AR 72764, Phone: 501/751-4666.

Mr. Guy Hinton, Campbell Soup Company, PO Drawer G, Fayetteville, AR 72702-1678, Phone: 501/443-3451.

Mr. Don McCaskill, Riceland Foods, PO Box 926, Stuttgart, AR 72160, Phone: 501/673-5500.

Mr. Don Petri, Stone Container Corporation, Box 520, Rogers, AR 72756, Phone: 501/636-7000.

Mr. Jim Robason, Allen Canning Company, PO Box 250, Siloam Springs, AR 72761, Phone: 501/524-3111.

1991

Mr. Rick Allen, Allen Canning Company, PO Box 250, Siloam Springs, AR 72761, Phone: 501/524-3111.

Mr. Delbert Allen, Jr., Allen Canning Company, PO Box 250, Siloam Springs, AR 72761, Phone: 501/524-3111.

Mr. John Coan, Schmieding Produce, Inc., PO Box 369, Springdale, AR 72764, Phone: 501/751-4602.

Mr. Edward Raymond, Tyson Foods, Inc., PO Drawer E, Springdale, AR 72764, Phone: 501/756-4000.

Mr. Paul Rutherford, Stilwell Foods, Inc., PO Box 432, Stilwell, OK 74960, Phone: 918/696-7222.

Mr. Phillip Steele, Good Old Days Foods, PO Box 269, Springdale, AR 72764, Phone: 501/756-2230.

Appendix III:
Ozark Food Processors Association Board of Directors

1992

Mr. David Allen, Allen Canning Company, PO Box 250, Siloam Springs, AR 72761, Phone: 501/524-3111.

Mr. Steve Brooks, Razorback Farms, Inc., PO Box 291, Springdale, AR 72764, Phone: 501/756-6141.

Mr. Tom Brown, Allen Canning Company, PO Box 250, Siloam Springs, AR 72761, Phone: 501/524-3111.

Mr. James Dubberly, Ingredient Technology, PO Box 5002, Greenville, MS 38704, Phone: 601/332-6864.

Mr. Tony Johnston, Ozark Salad Company, PO Box 30, Baxter Springs, KS 66713, Phone: 316/856-2203.

Mr. Bill Watson, Gerber Products Co., PO Box 10010, Fort Smith, AR 72917-0100, Phone: 501/782-8671.

DIRECTORS EMERITI

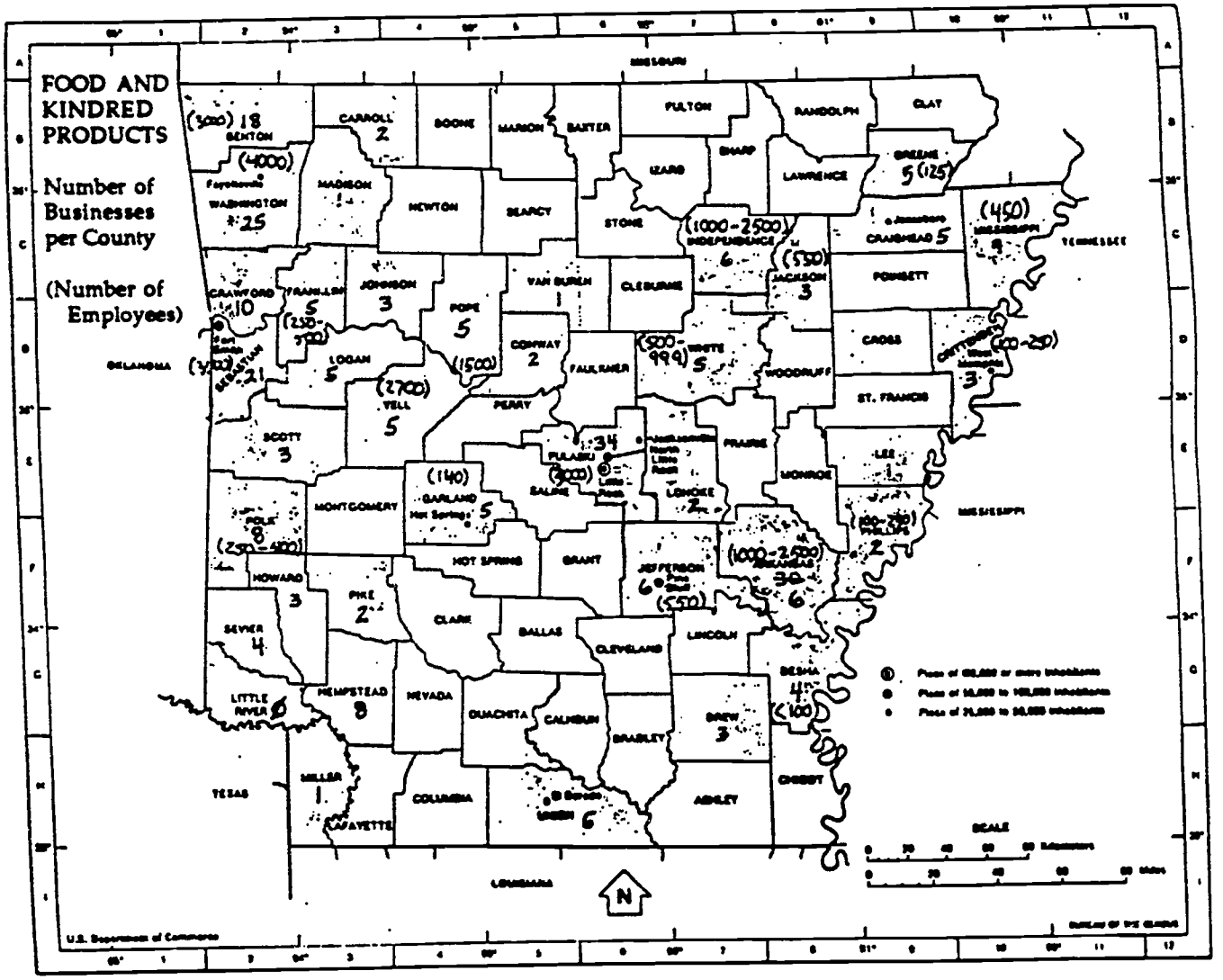
Mr. Bill Rollins, 4024 Hillside Terrace, Fayetteville, AR 72703, Phone: 501/443-3032.

Mr. Claude Todd 2250 East 49th Street, Tulsa. OK 74100, Phone: 918/743-1281.

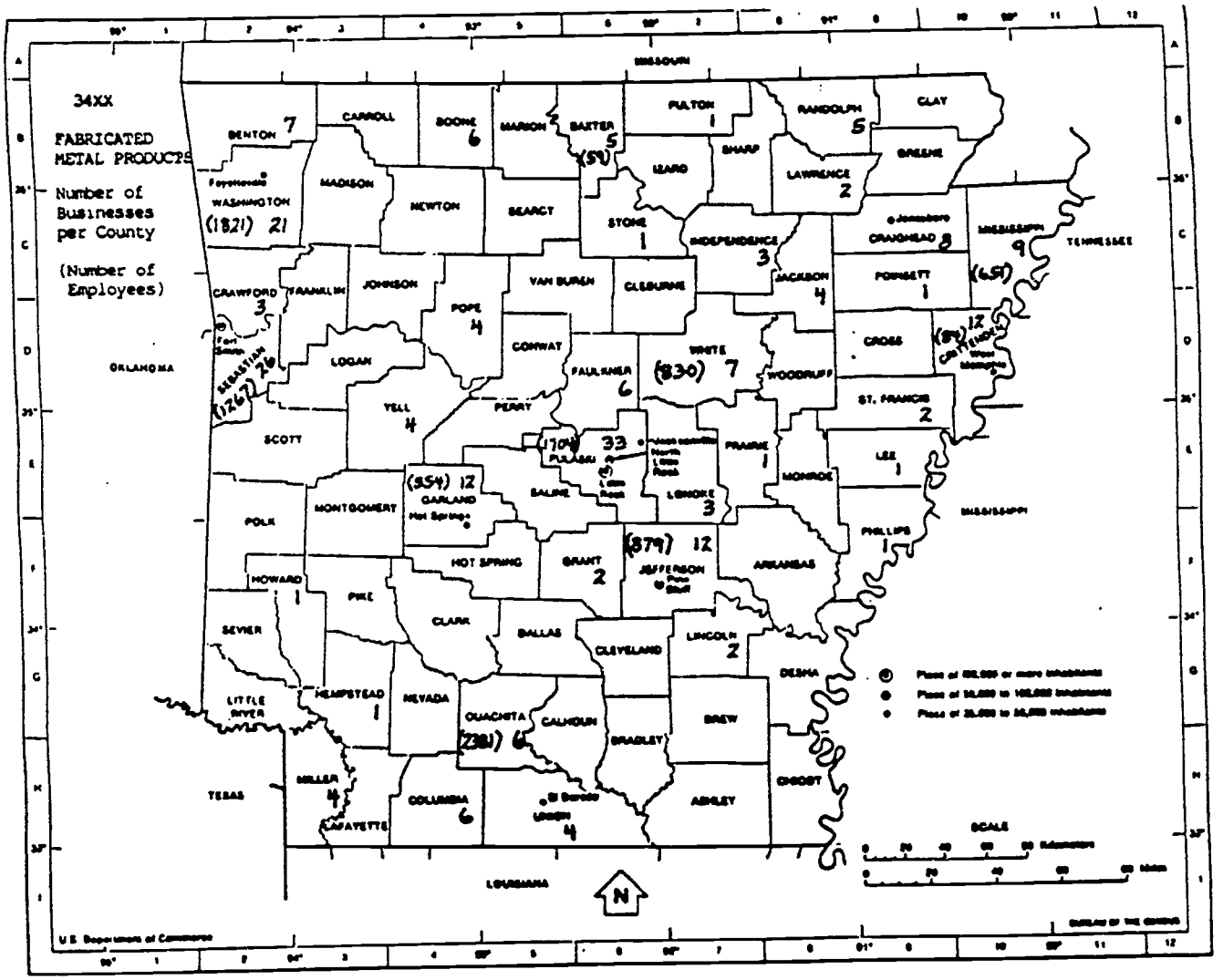
Mr. Walter Turnbow, PO Box 267, Springdale, AR 72764, Phone: 501/751-1270.

Appendix IV:
County Business Patterns:
Food Processing Map

Appendix IV:
County Business Patterns:
Food Processing Map

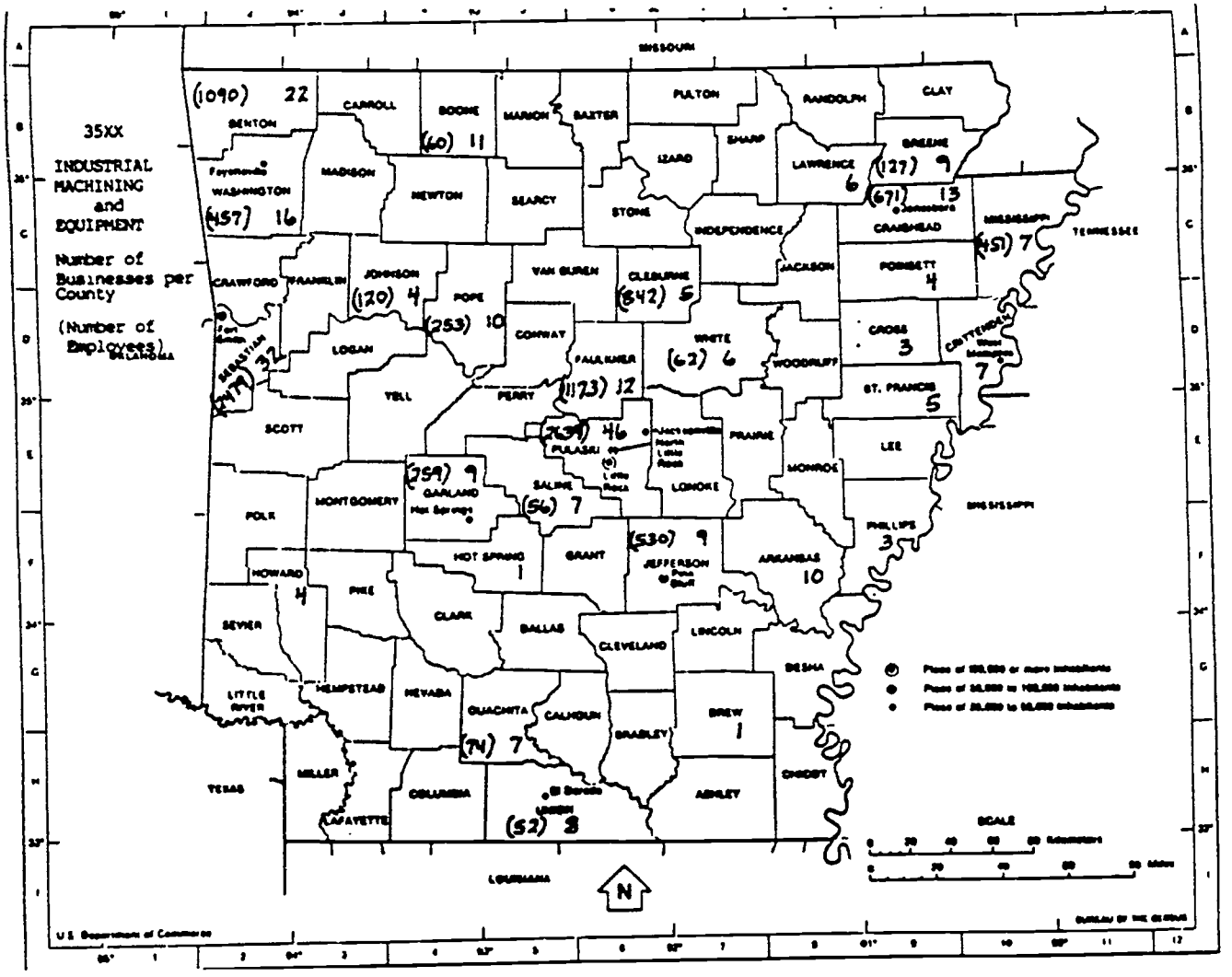


Appendix V:
County Business Patterns:
Metalworking Maps



Appendix V:
County Business Patterns:
Metalworking Maps

Appendix V:
County Business Patterns:
Metalworking Maps



Appendix VI: "Integrated Work and Learning: An Exploration of the Feasibility of Implementing a Youth Apprenticeship Program in the Allied Health Field in Boston," April 1990

Prepared by Margaret Vickers
Submitted as a Policy Analysis Exercise for the John F. Kennedy School of Government, Harvard University on April 12, 1990

Advisors:
Olivia Golden
Richard J. Murnane

INTRODUCTORY NOTE

In April 1989, the New England Resource Center for Higher Education at the University of Massachusetts at Boston, along with the New England Board of Higher Education, Bunker Hill Community College, and the Goethe-Institute Boston held a conference on "New Pathways from School to Work: What Can We Learn from the German Dual System?"

Out of this conference was born the New England Council for Integrated Work and Learning, an informal group of educators, employment policy experts, and economic development leaders in the New England area interested in exploring the relevance of European models of occupational training to strategies for the reform of vocational education in the United States. This group, whose key participants included Professor Ernest Lynton of the University of Massachusetts, President Piedad Robertson of Bunker Hill Community College, and William Spring, Vice-President of the Federal Reserve Bank of New England, began to meet regularly to plan strategies for testing in New England some of the principles of the German system of preparing young people for productive work and citizenship.

The group initially identified three industries where labor demand was high and there was employer interest in new training and recruitment strategies. These were: printing and publishing; financial services; and allied health. The greatest early interest appeared to come from the hospital sector in the city of Boston. Consequently, the group asked Margaret Vickers, a doctoral candidate at the Harvard Graduate School of Education who had previously worked on school-to-work transition programs for the Australian government and for OECD in Europe, to prepare an

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initial study of the feasibility for implementing an apprenticeship-like training program that would combine employers, high schools, and post-secondary institutions in a new, work-based learning program for young adults. That study resulted in the report you are about to read.

There is more to this story. This report became the basis for a proposal, written by the Private Industry Council, for a collaborative effort to design and implement a work-based youth apprenticeship program in the allied health professions that would link the Boston School System, several major hospitals in Boston, the Private Industry Council, and Bunker Hill Community College. The proposal was submitted to the U.S. Department of Labor in response to a competitive RFP for School-to-Work Demonstration programs. Of 86 proposals received, six were successful. Project ProTech, as the Boston project has been named, received the largest grant award—just under one million for two years of design, development and first year implementation.

Project ProTech anticipated the placement of 25 eleventh graders in programs at each of three Boston high schools starting in September 1991. Jobs for the Future is conducting a formative evaluation of this project in both its development and initial implementation stages.

EXECUTIVE SUMMARY

The perceived shortcomings of the schools, family life and society at large in preparing young people for a respectable place in the working world have been extensively chronicled. Many capable young people are leaving high school without graduating. Many of these will be condemned to low-wage, unskilled jobs, while at the same time well paid high-skill positions in the work force remain unfilled.

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Demographic changes—the decline in the size of the 16- to 24-year old age group and the increase in the proportion of young people from backgrounds that place them at risk educationally—mean that inadequate educational achievement will lead not only to individual tragedy, but to social and economic hardship. There is already evidence that the supply of graduate labor is not meeting labor market demand in a number of professional areas.

As the wages offered for skilled work in the private sector increase, fewer young people can afford to choose careers like teaching or health care. Hospitals in particular cannot match the wages private industry can pay to science and technology graduates, so inevitably vacancy rates are growing and the shortage of qualified people is forcing an increase in health care costs. While the possibility of lower levels of industrial productivity and innovation are serious and should not be ignored. the social and economic costs of inadequate college participation will be felt most immediately in spiralling health care costs and a growing shortages of qualified teachers.

In this context the New England Council for Integrated Work and Learning argues that we need new pathways from high school through college to professional employment. They propose a series of four-year traineeships in which young people would have dual status: they would be employed part-time and at the same time they would be enrolled in a high school for two years, followed by two years enrollment in a community college. The Council is examining three occupational areas to determine their suitability for traineeships: allied health, financial services and printing trades.

The purpose of this report is to examine the feasibility of creating an integrated work and learning program in which hospitals, schools and community colleges would work together to prepare young people for professional entry to the allied health field. While the report found that there are many organizational, legal and financial obstacles to be overcome in establishing allied health traineeships, it also found that the current personnel shortages create a climate which is auspicious for the NEC proposal.

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Hospitals recognize that they are facing a crisis. They also recognize that they will need to cooperate with education institutions to increase the supply of skilled workers. Hospital-based training has always existed for nursing, and although there are not hospital-based internships for all the professions traineeships might cover, the existing programs provide useful models to work from.

Traineeships offer certain advantages over hospital-based internships. They will reduce training costs for hospitals, since much of the learning will occur in schools and colleges. Students will benefit, because they will receive a college degree rather than a hospital-issued certificate of competency. The report identifies six allied health professions that would be suitable for traineeship development; five out of six of these offer opportunities for professional and career development beyond the associate degree level.

The report argues that it is imperative that the NEC design the traineeships to culminate in college degrees and entry to professional careers. It is imperative that students, parents, teachers and counsellors perceive traineeships as an alternative route through college to professional jobs with a future. While traineeships will help many students who might not otherwise have continued beyond high school to complete a college degree, the NEC should resist the temptation to target the program narrowly on potential drop-outs.

On the other hand, the traineeship system, with its emphasis on contextualized learning, should be able to assist students whose literary, mathematical and scientific skills might not otherwise be adequate for college entrance. The report suggests that in designing the traineeship curriculum the NEC should look at recent developments in cognitive psychology which imply that general intellectual skills can be abstracted from learning in practical contexts. Evidence based on this work also implies that it is not necessary to teach these general skills *before* students begin hands-on practice, but that these skills can be developed *in the process* of hands-on practice.

Despite substantial increases in allied health salaries in recent years, college enrollments in health science courses have continued to decline. Clearly, new approaches are needed to make entry to the allied health professions more attractive to young people. By providing an accessible education program which integrates learning and work, offers a training allowance, and reduces the costs of tuition, the NEC's proposal should go a long way towards meeting this need.

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1. What is the New England Council Proposal?

The New England Council is a group of educators and employers who are seeking to create a new pathway from high school to professional-level employment for young people in Boston. The program will be available to high school students who have successfully completed the tenth grade. Participants will have dual status. They will be employees of participating organizations and will receive an allowance for their work. They will also continue as students in their schools until they obtain the high school diploma, after which they may enter the work force, enroll in a participating community college, or enter an associate or baccalaureate program.

The NEC proposal therefore supports a range of objectives. First, it aims to achieve a general improvement in high school completion rates. For students who wish to enter the work force at this stage, the program will have already provided career orientation and direct contact with potential employers. A second group of students may leave the program to enter liberal arts or professional schools at this stage. The objective for those who remain in the program for the full four years is to complete a two-year college credential, achieve appropriate occupational certification, and enter a professional career.

Focusing on the greater Boston area, work is now underway to examine the feasibility of creating programs in three occupational areas: allied health, financial services, and printing trades. For each occupational area, the program will combine four developmental components:

- formal and informal on-the-job training in occupation-specific tasks in the context of part-time employment;
- organized, off-the-job training in technical and other skills related to an occupational area, such as, for example, accounting, laboratory techniques, word processing, etc.;
- broad conceptual and theoretical education in subjects pertinent to the occupational area, as well as general education in the humanities and social sciences.
- for some students, it may also be necessary to provide a transitional phase of basic skill development.

For the first and second years, high schools will provide off-the-job learning, while in the third and fourth years, this component will be provided by community colleges. The overall objective is to create an integrated curriculum, where learning in both work and school settings will be closely related to practical work experience.

Employers would provide a limited number of training positions, and students interested in the program would apply for these positions. The selection process should be such as to provide choice for both participants and employers, but since there will be a limited number of training positions, employers will essentially select trainees from among the applicants. The selection process will result in a direct contractual relationship between each employer and each individual participant.

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2. Purpose, Scope and Methods

In consultation with my client, two objectives were established for this report: first, to ask whether creating an integrated work and learning program in the allied health field is an intelligent and workable proposal, and second, to examine the problems entailed in implementing such a program in schools and hospitals, and to recommend ways of addressing these problems.

The first objective of the report can be broken down into three more specific sets of questions:

- Could the NEC proposal help Massachusetts hospitals to overcome some of the short- and long-term problems they are facing because of the shortage of skilled workers?
- What career pathways in the hospital system could young people enter by way of an NEC traineeship? How do people enter these careers at present? Could the hospitals offer on-the-job training to year 11 and 12 students, as envisaged by the NEC proposal?
- What kinds of students might be attracted to integrated work and learning programs? Would these students be interested in allied health traineeships, and would the traineeships provide an appropriate educational program for them?

Each of these issues is the subject of a major section of this report. The politics and organization of the "high-school side" and the "college-side" of the proposal are separate issues. A student in a four-year traineeship would be enrolled in a high school for two years, followed by two years enrollment in a community college. Over the four years the student would be working and learning in a hospital, and at each stage the school-based learning and the work-based learning should be integrated as closely as possible. For the schools and colleges, numerous organizational, legal and financial issues would need to be resolved before such a scheme could be implemented.

However interesting these issues may be, dealing with them is an ambitious exercise which the NEC is treating as a separate project. My report indicates some of the issues that should be taken into account in designing the curriculum and publicizing the program, but does not address the more specific decisions that would have to be made at the school and college levels.

The scope of the report has been deliberately narrowed to allow for an in-depth analysis of three key questions outlined above: Would the NEC program be attractive to hospital-based employers? Which particular allied health professions would be most suitable for traineeships and could hospitals provide the work-based learning component for these areas? Would integrated work and learning programs in allied health be attractive to students and meet both their vocational and their broader educational needs?

Before considering these questions I will very briefly discuss some of the things we know on the basis of past successes and failures with experiential education. Reviewing these lessons will help us establish criteria for what a "good" NEC traineeship program might look like, and will also identify some practical design issues that will need to be considered at the implementation stage.

The final section of the report will examine some of the practical difficulties entailed in implementing integrated work and learning programs in the allied health field. It will discuss budgetary and administrative issues, and will identify some of the organizational and legal obstacles that may need to be overcome if hospitals are to act as employers and trainers under the NEC proposal.

To foreshadow my conclusion, the data compiled through all these sources suggests that the NEC should proceed, but with caution. My report indicates the potential benefits of an integrated work and learning program in the allied health field, but it also spells out the numerous complex and sensitive issues that must be addressed if its implementation is to be successful.

Scope and Methods: At this stage in its planning, the NEC is focusing on the greater Boston area, and has begun preliminary discussions with two major employers: the Boston City Hospital and the Massachusetts General Hospital. As a consultant to the NEC, I was able to gain access to these two hospitals and obtain information about their skill shortages, training needs, resource constraints, and their attitudes to the NEC proposal.

Information about labor shortages in these hospitals was checked against state-wide and nation-wide surveys of allied health vacancies and projections of future demand. The Massachusetts Hospital Association (MHA) provided detailed data demonstrating the need for new and expanded training options to meet existing and anticipated shortage of allied health workers in Massachusetts.

Data from a number of sources were used to assess the feasibility of creating integrated work and learning options in the hospital setting. Officers from professional associations and national certification boards supplied publications explaining how the hospital work force is organized, and what legal constraints and certification requirements would need to be considered if "trainees" were to be employed in various hospital positions. College professors from the various sub-disciplines of health science explained how the classroom and laboratory-based aspects of their courses related to the hospital-based practicum, and what organizational and legal issues need to be worked through in using the hospital as a learning site. The industrial issues implied in the creation of NEC traineeships in hospitals were also discussed with representatives of the relevant union, the Service Employees International Union (SEIU).

To determine whether or not there is a market for an integrated work and learning program in allied health it might be desirable, ideally, to know how many Boston 10th graders who are interested in allied health careers and who have adequate math and science competencies would find this alternative more attractive than the high school mainstream. There are no data providing a direct answer to this question. Nevertheless, data from national science achievement and career choice surveys allow some inferences to be drawn. Discussions with science educators and vocational educators in the Boston area provided further warnings and advice. MHA data on the effects of tuition costs and course duration on student enrollments in different nursing and health science college courses are also relevant.

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3. Lessons from Experiential Learning Programs

Educational programs which offer alternatives to the academic high school mainstream sometimes evoke distrustful responses from students, parents and school counsellors. In contrast with Germany and the UK where the vocational system, though less prestigious, constitutes an accepted pathway into well-paid jobs, in the United States, the creation of a "dual system" has never been an acceptable option.

Raizen (1989) summarizes some of the criticisms that have been consistently leveled against vocational education in the United States. In both the "vocational track" and the vocational high school the courses offered are typically narrow and focus on training in occupation-specific skills. Nevertheless, there is often a mismatch between the skills training offered and the skills needed, especially when the curriculum does not keep up with changes in the workplace. Furthermore, vocational education tends to segregate poor and minority young people into a track that offers diminished access to high status careers, and thereby violates equal educational opportunity goals. The evidence suggests that vocational education generally does not address the drop-out problem or the problems of unemployment of a sizeable segment of the youth population. Overall, vocational education is seen as educationally inferior and of doubtful economic value in comparison with traditional academic education.

The plight of the Madison Park-Humphrey Center High School in Boston illustrates the negative image of vocational education. Built to accommodate 3,000 students, the facility combines the features of a modern shopping complex and a small business center. Its restaurant, bakery, and automotive repair shop serve members of the school community as well as the wider world. It has outstanding workshops and facilities for training in 37 vocational areas, from advanced office management and data processing through electronics to construction and automotive/truck repair. It also has a substantial health education division, providing courses in child care, dental assisting, medical assisting, nursing, and medical clerical work. None of the courses in this area is up to full enrollment. For example, Nancy Wheaton, director of the Dental Assistant program, told me that she has only one junior student and one senior student, whereas she has the capacity to train 13. The school closed the Medical Assistant course because there were not enough students with adequate math and science abilities volunteering to enroll in it.

I toured the facility with Jack Mooney, Career Instruction Manager, who said he could not understand why parents and middle school counselors did not encourage students to enroll here. Students graduating high school with a trade qualification will earn more than students who graduate from regular academic high schools, he said. Nevertheless, the Madison Park High School has only 1,400 enrollments at present, and none of the policies tried over the last five years has made any difference to this dramatic level of under-utilization. No matter what they call the facility, it seems that parents regard it as a vocational technical school and will not buy it. Its location in Roxbury could also be a disadvantage.

NEC traineeships will offer an "alternative" to academic high school education, but it is essential to ensure that they will not be viewed as a second-rate option. This means they must be explicitly disassociated from traditional vocational education courses. Traineeships should be designed to train young people for professional positions in the hospital labor market. During the training period, the work that trainees do should be designed to give them practical insights into the key concepts of the health science field. All traineeships should culminate in at least an associate degree, and where practicable, trainees should be encouraged to continue to the baccalaureate level. Each of these issues will be dealt with in more detail in the subsequent sections.

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In terms of broad policy goals, the New England Council should design traineeships so as to increase the number of young people who achieve associate degree qualifications or higher, by offering a new pathway through the education system. This pathway would place less reliance on formal classroom instruction than is customary on the "college track," but its ultimate goal would be the same as that of traditional academic programs: a college degree, a professional career, and a sound education providing the ability to think critically and respond creatively in a wide range of situations.

To avoid the charge that traineeships provide narrow and specific vocational skills only, the program should remain broad at the beginning, and the curriculum should be designed to develop generalizable problem-solving and thinking strategies. Much of the learning will be contextually based, but as Perkins and Salomon (1989) argue, specific learning can support generic understanding. They claim that the interaction between general strategic knowledge and specialized domain knowledge has been oversimplified and suggest that both function in close partnership. Where active decontextualization of knowledge is stressed, general principles of reasoning can be extracted from specific practical learning contexts.

Recent work in cognitive science supports the idea that these outcomes can be achieved through context-based learning —it seems that many people learn more effectively when what they are learning is context related (see, for example Scribner, 1984, 1986). In arguing for integrated learning as an educational reform, the NEC emphasizes that this program is not a special approach for would-be drop outs. The aim is not to return to outdated ideas about learning with the hand rather than learning with the head.

As Berryman (1988) writes, contextual learning aims to vitalize, not vocationalize education. There is real growth is in areas that demand higher level cognitive skills in the hospital work force. Good jobs that pay well are going unfilled, and technicians in hospitals are working double shifts simply because there are not enough educated people to fill the positions available.

To decide whether the NEC proposal could be implemented in the allied health field we need to know whether it is *possible* for hospitals to provide experiential learning for high-school students. To be attractive to students, NEC traineeships should lead to well-paid professional careers. To be worth the effort for hospital employers, traineeships must offer a new source

of graduates to fill critical areas of labor shortage in the allied health system. A description of the structure of hospital labor markets will facilitate discussion of all these issues.

4. The Hospital Labor Market

Hospital labor markets have much in common with labor markets in other technologically advanced occupational areas, in addition to a few characteristics of their own. First, they are characterized by very high rates of growth compared with the economy as a whole. Table 1 (next page) shows the US Department of Labor's projections to the year 2000 for all occupations, and for the seven main health care professions. It is clear from the table that demand growth in the health care professions will significantly exceed the 19% average increase in employment expected across all other occupations.

According to economist Rita Ricardo-Campbell, in 1980 almost 10% of the nation's GNP was dedicated to health care, up from 6% in 1960, making the health care industry the fastest growing industry in the United States. Demand for health care workers is booming, and currently the health care sector is the nation's third largest employer.

The Massachusetts Hospital Association attributes this growth in demand to "an increase in the labor intensity of the hospital product" during the 1980s (MHA, 1989, p. 4). Major advances in medical technology, an increase in ambulatory services and shorter periods of hospital stay, the appearance of new diseases such as AIDS, and a natural aging of the population augmented by the ability of modern medicine to keep people alive longer have all contributed to more labor intense hospital services. A brief description of the organization of hospital labor markets illustrates the complexity of the supply and demand issues in this industry.

The Organization of Hospital Employment

Hospitals provide employment for a wide array of people of varying skills. Using MHA sources, Laster (1989) classified the various occupations into five tiers based on both pay rates and the level of credentials required for the jobs. Figure 1 represents the hospital hierarchy, which shows occupations, salary rates and full-time equivalent positions at each level.

Tier-1 positions are poorly paid and offer few opportunities for advancement. A high school drop out may train as a nurse aide, work in maintenance or housecleaning, or join the army of hospital clerks. With evening or hospital-sponsored courses in typing, medical terminology or electrocardiographic technology, workers can advance from $6.00-an-hour to $9.00-an-hour positions. However, they then run into a qualifications ceiling—further advancement requires some form of professional certification. Thus, while there is some mobility between Tier 1 and Tier 2, employment at Tier-3 level is impossible without further qualifications.

Yet it is at Tier 3 and above that the most severe labor shortages are occurring. The majority of Tier-3 workers are employed in four occupations: licensed practical nurse, radiologic technician, medical laboratory technician, and respiratory therapist. The data summarized in Figure 1 show that these positions and

Table 1

Projected Increases in Demand, U.S.

Occupation	Percent Change In Demand 1986–2000
All Occupations	19.2%
Physical Therapy	88.5%
Radiologic Technology	65.2%
Occupational Therapy	55.2%
Registered Nurse	44.0%
Licensed Practical Nurse	37.7%
Pharmacy	24.0%
Medical Laboratory Technology	23.8%

Source: U. S. Department of Labor, Bureau of Labor Statistics, 1987

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command wages of $10.00 to $14.00 an hour. Appendix 1 provides a more detailed breakdown; it shows that of the 9,280 Tier 3 employees, LPNs comprise by far the largest category, with 4,649 employees. According to the MHA Manpower Statistics Survey (1990) the state-wide vacancy rates for Tier-3 positions now range from 6.2% (Respiratory Therapist) to 29.5% (Radiation Therapy Technician).

Total employment at Tier-4 level is much greater—almost 33,000 positions—of which about 28,000 are nursing (RN) positions. According to the MHA the RN vacancy rate remained at about 11% in 1987 and 1988, despite a 36% increase in RN salaries over this period. Vacancy rates for other Tier-4 positions range from 5% for Medical Technologists to almost 17% for Occupational Therapists.

During the last two decades, a number of organizations have been formed to monitor and control professional standards, and most states, including the state of Massachusetts, now require formal licensing as a prerequisite for entry to these fields (see Table 2). Tier-3 positions also typically require that applicants obtain an associate (AS) degree at a Community College by completing two years of full-time study. Tier-4 positions typically require a BS degree based on four years of study, although there are some BS degrees in nursing which allow graduates to qualify as an RN after only two years.

Before examining the possible relevance and value of the NEC proposal for alleviating the shortage of allied health professionals, it is important to examine the supply characteristics of the hospital labor market on some detail.

The Supply of Professional Allied Health Workers

On the supply side, hospital labor markets have some unique features, which are contributing to the escalating shortages of skilled workers. Employees in allied health professions are traditionally predominantly female, and enrollments in nursing and health science courses in Massachusetts show that this pattern is continuing. MHA (1989) surveys show that the proportion of female students ranges from 94% of LPNs and 88% of Occupational Therapists at the top of the list down to Respiratory Therapy, which is the least feminized at 62%.

The supply of newly graduated allied health workers is therefore highly sensitive to changes in women's career preferences. As alternative opportunities in higher paying occupations have opened up for women, interest in health careers has declined significantly. Figure 2 shows some of the changes in career choices of freshman women between 1977 and 1987. As the Figure shows, there has been a sharp decline in the percentage of women choosing nursing (from 8.8% to 4.0%) and a simultaneous increase in the proportion choosing business studies (from 6.1% to 11.5%).

In addition to the majority of allied health workers being women, almost all of them are paid on a part-time basis, which means that they tend to vary the number of hours they work according to economic conditions. The effect of this has been illustrated in Massachusetts during the recent personnel crisis: vacancy rates have have fallen as wages have increased, while at the same time there has been no apparent increase in the total numbers employed (MHA, 1989).

Figure 1

Hierarchy of Hospital Jobs

(These Data are Based on 1988 MHA Surveys)

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Number		Wage
	Tier 5: Physicians, Administrators	
32, 901	**Tier 4: Professionals** Registered Nurses, Social Workers, Physical and Occupational Therapists, Pharmacists, and Medical Technologists	$11.83–$16.09
9,280	**Tier 3: Skilled Technicians** LPNs, Radiologic Techs, EEG Medical Laboratory Techs Respiratory Therapists	$10.53–$13.22
9,338	**Tier 2: Clerical and Assistants** Secretaries, Clerical Workers, EKG, Operating Room, Surgical Supply, and Pharmacy Technicians	$7.52–$9.31
14,068	**Tier 1: Unskilled Service Workers** Kitchen Help, Housekeeping, Nurse Aides, Cooks	$5.95–$8.45

Source: Laster (1989).
Appendix 1 lists salaries and numbers of positions for each occupation.

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Attracting members of the allied health "reserve pool" back into the work force and encouraging others to work longer hours is helping to alleviate the shortages.

This is not enough, however, to solve the current problems: total vacancies are still very substantial (e.g., over 1800 for RNs); staff shortages are forcing employees to work long hours under stressful conditions, and high wages are further straining the tight fiscal situation in public hospitals. Allied health professionals are finding that non-hospital employers offer higher wages and better working conditions. For example, there are many new opportunities in the pharmaceutical and bio-technology industries for medical technologists; schools are now employing occupational therapists to work with handicapped children, and temporary employment agencies are offering health care workers rates far in excess of hospital wages (MHA, 1989). Agencies now pay nurses 31% more than hospitals do, and as a result hospitals have found themselves losing nurses to the agencies, then being forced to buy them back at exorbitant rates.

Shortages of professional allied health workers cannot be blamed on an artificial inflation of credentialing requirements. These jobs are genuinely complex. Medical Technologists, for example, must exercise high levels of responsibility and accuracy in reading the output of sophisticated machinery and in interpreting its meaning. Human lives are at stake, and it would be inappropriate to relax the licensing requirements in an attempt to ease shortages.

It is to be expected that improved salaries and job opportunities in allied health fields will eventually influence student's career decisions, that enrollments in health sciences will grow, and that after an appropriate "lead time," supply will be restored (Freeman, 1976; Murnane & Olsen, 1989). But this has not started to happen yet. In section 6 the reasons for this will be examined in more detail, and it will be argued that new approaches are needed to make entry to the allied health professions more attractive to young people. By providing an accessible education program which integrates learning and work, offers a training allowance, and reduces the costs of tuition, the NEC's proposal should go a long way towards meeting this need.

Despite the good salaries and substantial vacancies, enrollments in allied health courses are falling, courses are being withdrawn, and the output of graduates is simply inadequate to meet the demand. Factors influencing the growth in demand for health care specialists are beyond the control of hospitals. The aging of the population and advances in medical technology are not likely to slow down in the coming years.

The MHA suggests that increasing the internal efficiency of hospital operations may be a partial solution, but their report, *Health Care Personnel: Avoiding a Crisis in the 1990s*, gives greater emphasis to supply-side strategies. According to Bob McNeil of the MHA, the most important of these strategies is expansion of the capacity of the education system, and increased recruitment of young people into health care professions.

In seeking to provide better educational opportunities for young people, the NEC is in a good position to exploit the urgency of current needs for new professional workers in the hospital sector.

Table 2:

Allied Health Careers

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	CAREER LEVELS		QUALIFICATIONS
NURSING	1. Licensed Practical Nurse	LPN	12 months training in college or hospital
	2. Registered Nurse	RN	AS or BS degree
RESPIRATORY THERAPY	Respiratory Therapist	RT	AS or BS degree
MEDICAL TECHNOLOGY	1. Medical Laboratory Technician	MLT	AS degree
	2. Medical Technologist	MT	BS degree
RADIOLOGIC TECHNOLOGY	To qualify in one speciality in this field, the minimum is a 2-year AS degree. Combined qualifications in two or more areas require a 4-year BS degree. Subspecialities include: —Radiographer —Nuclear Medicine Technologist —Radiation Therapy Technologist —Ultrasound Technologist (Sonographer) —Magnetic Resonance Technologist		AS degree (minimum)
PHYSICAL THERAPY	1. Physical Therapy Assistant	PTA	AS degree
	2. Registered Physical Therapist	RPT	BS degree
OCCUPATIONAL THERAPY	1. Occupational Therapy Aide	OTA	HS diploma
	2. Certified Occupational Therapy Assistant	COTA	AS degree
	3. Registered Occupational Therapist	OTR	BS degree

Source: *Career Opportunities in Health Care*, MHA, 1989

Figure 2:

Probable Career Choices of Freshmen Women 1977 and 1987

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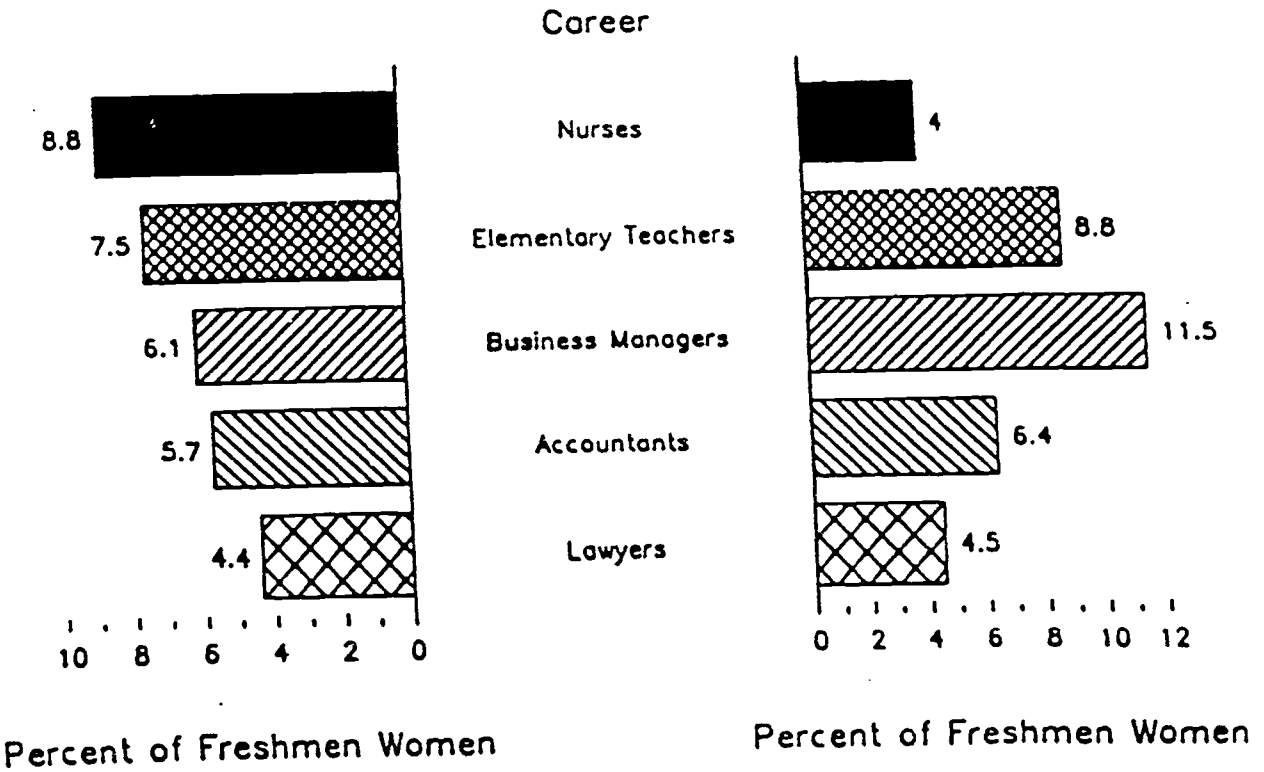

Source: *The American Freshman*
Reproduced in MHA, 1989

The next three sections deal with different aspects of the implementation of the NEC proposal. Which allied health fields will be most suitable for traineeships? How should the program be designed, and will students be attracted to it? How can the legal, financial and organizational problems it raises be solved?

5. Which Allied Health Professions are suitable for NEC Traineeships?

A major challenge of the NEC proposal is to make arrangements for the *employment* of trainees in hospitals. Fiscal constraints in Massachusetts hospitals are currently are very tight, so it would be preferable if trainees could earn their way. With staff shortages in most areas, allied health professionals are overworked, and may find it difficult to provide the supervision and training that young students need. Inadequate supervision leading to errors in patient care would have terrible consequences.

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The most obvious solution—one which would deal with all the above problems—would be to give students part time work in entry level Tier 1 and Tier 2 positions. But this would be totally incompatible with the educational objectives of the NEC proposal, and would almost certainly stigmatize the program. Suggestions that trainees should be confined to the low-skill areas where there are no legal liability problems and few training requirements should therefore be strenuously resisted..

A compromise solution suggested in interviews with Community College faculty was to employ students in *skilled* work areas which entail few legal restrictions. One is the medical-clerical area and the other is assistant dietician work. Neither of these jobs involves direct hands-on clinical work. Both require a reasonable degree of initial literacy, and lead to moderate salaries, of the order of $15-20,000 per annum. In addition, there is an employment-based chain of mobility from entry level to higher level positions in both areas.

According to supervisors at Boston City Hospital, there are severe labor shortages in at least two clerical areas— medical records coding and third party billing. A few traineeships leading to employment in the medical-clerical area *could* be created in this way, but that would be a sad restriction of the overall concept. It would do nothing to encourage students' interests in scientific training, and would not address the growing shortage of professional health care workers. Further, the arguments presented in section 3 emphasized that it is critically important to establish that NEC traineeships are not a second-rate option. This is best done by ensuring that traineeships will lead to college graduation and entry to good careers.

There are six allied health occupations which meet these criteria, and these are presented in Table 2. Pharmacist has been excluded because it does not offer an "intermediate level" of professional entry; it requires five or six years of college education. Dietician could be included, but since it is not classified by the MHA as a "Health Science Career," further investigation would be needed to decide if it is organizationally and educationally compatible with the other six, or whether is would need to be separately organized.

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All six occupations in Table 2 demand a solid basis in English, life sciences and health care concepts and techniques. All of them require a two-year associate degree for employment at the Tier-3 level, but advancement through further study (in 5 of the 6 areas) leads to Tier-4 positions and requires a Baccalaureate degree or its equivalent. Of the six areas, only Respiratory Therapy "terminates" at the Tier-3 level. In Massachusetts, employees seeking to progress from LPN to RN and from Occupational Therapy Aide to Registered Occupational Therapist can take advantage of tuition reimbursement benefits from their employers (MHA, 1989b).

The normal pathway for students seeking to enter these six careers involves two years of full-time study at a Community College to get onto the first rung, and another two years of study to progress to the second rung. In nursing, however, two years at a college can lead to an RN qualification. College students must cover their tuition fees and living expenses, and they are further handicapped financially since they cannot take summer jobs. During the summer students do a clinical practicum, but since it is for academic credit, they are not usually paid (Laster,1989). In each specialist area, becoming a registered practitioner entails passing either a state or a national licensing examination after completing the AS degree. To qualify at the Tier-3 level, students must pass further licensing examinations as well as completing a BS degree.

An alternative pathway to professional entry is provided by hospital-based internships, which directly prepare trainees to take the licensing exams. It is possible to qualify as a Nurse (RN, LPN), Occupational Therapist (OTA, COTA, OTR), Medical Technologist or Radiologic Technologist by combining employment and study in this way. While there are several hospital-based programs in Massachusetts for nurses and medical technologists, at present there are none for occupational therapists and only one for radiologic technologists.

The existence of hospital-based internships in three of the six areas listed in Table 2 shows that on the job training in these areas *can* be done, and that there are Massachusetts hospitals with experience in taking on high school graduates and training them. These students are essentially "unqualified" at the time of recruitment. The NEC proposal entails taking in equally unqualified students who are a little younger, and who perhaps know a little less, and giving them part-time employment and training which would be complemented by school and college-based learning.

There are some differences between the current hospital internships for Nurses and Medical Technologists and the NEC traineeships, which would possibly make the NEC proposal more attractive to both the hospitals and the trainees. Hospital interns are paid a full-time training stipend, and the hospitals cover all of their training costs. NEC trainees would only be employed on a half-time basis: they would not be paid by the hospitals for the time they spend at school and at college, and the hospitals would not be covering all the training costs. For trainees the advantage of the NEC alternative is that they would be receiving a superior qualification: a college degree, which would give them more

transferable education credits than qualifications based on a hospital internship.

Where a hospital department is already a teaching department, catering for trainees would mainly involve expanding and modifying what they are already doing. In non-teaching departments, modifying work organization to accommodate students, gaining the teaching experience and developing a training infrastructure will prove more difficult. But there are models that can be built on, and these, together with other implementation issues, will be discussed in more detail in section 7.

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6. Attracting HS students into allied health traineeships

As already stated, traineeships should be designed to prepare young people for entry to good jobs with a future. These would be jobs which attract $20,000–$25,000 as a starting salary and offer further earnings growth based on experience and training. At minimum, trainees should graduate with a two-year college degree, and wherever possible they should be encouraged to continue to the baccalaureate level.

In a broad sense, these features will ensure that the traineeships are consonant with students' *general* preferences. National surveys in 1980 showed that 70% of students wanted greater academic emphasis in their high schools; this was true of students in all tracks (US Department of Education, 1982). NEC traineeships will be a "college track" alternative; they will aim to develop high-order intellectual skills in integrated work and learning contexts.

A more difficult issue to consider is whether the traineeships will be consonant with students' *particular* career preferences. As already discussed in section 4, changes in women's preferences have led to reductions in college enrollments in several allied health areas, especially nursing and medical technology.

In Massachusetts, the only allied health college courses that are enrolled to capacity are Physical Therapy and Occupational Therapy, while courses in Nursing, Respiratory Therapy, Medical and Radiologic Technology continue to be under-subscribed (MHA, 1989). In some of these professional areas enrollments have fallen so substantially that college programs have closed— for example, across the nation, the number of courses in Medical Technology has fallen from 639 in 1982 to 464 in 1988 (Castleberry and Kuby, 1989).

If college-bound students are turning away from allied health courses, why should they be attracted to NEC traineeships? Part of the answer is that there are capable students whose aspirations might lead them to become Occupational Therapists or Physical Therapists or even Physicians and Pharmacists, but who cannot afford the tuition fees. For these and others with similarly high aspirations, traineeships would allow them to start earning money while still at high school, gain a professional health science qualification, and eventually pay their way through college.

Another, perhaps more compelling, answer is that it has simply become imperative to find ways of enabling and persuading a larger proportion of US high school students to enter college. Overall there will be a decline in the size of national youth cohorts in the late 1980s and 1990s, and at the same time there will be

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increases in the proportions of students from minority groups (Joint Economic Committee of the US Congress,1989). This implies that substantial vacancies in high-skill occupations will continue unfilled unless higher education is opened up to young people who, in the past, would never have gone to college.

It is useful to consider what economists would call "marginal increases in output," or "changing the marginal preferences of students." Suppose that *n* students in a high school are going to college. What would you have to do to persuade the *(n+1)th* student to go? Three important strategies are: provide better information about the future benefits of going to college; reduce the costs of staying at school; and create more supportive and effective educational programs.

1. Improve information about the benefits of college: Aware of the need to increase the supply of new graduates, all the allied health professionals that I interviewed were eager to be engaged in recruitment activities. They have brochures and videos to support school-based presentations, and will arrange recruitment tours in hospitals. Their message about salaries and opportunities in allied health careers is a positive one: in 1989 the hospital vacancy rates for the six targeted allied health occupations ranged from 5% for Medical Technology to 17% for Occupational Therapy (MHA,1989) and as the data in Appendix 1 shows, in 1988 these occupations attracted *starting* salaries from $18,100 (LPN) to $23,240 (Radiation Tech) and at Tier-3 level. For students who complete baccalaureate qualifications and move into Tier-4 positions, 1988 data suggest *average* salaries between $25,000 and $40,000. The average percentage increase in hourly salaries for the six occupations between Spring 1987 and Spring 1989 was from 20.1% to 36.0%.

Recruitment activities for parents and students should begin when potential program candidates are in 9th year or early 10th year. High schools and allied health professionals should develop and conduct recruitment activities jointly.

2. Reduce the costs of staying at school: The costs of remaining in high school and continuing through college include both the foregone wages (what the student would have earned had she left school) and the direct costs (tuition fees and books). That these factors influence student choices is evident from MHA (1989) data which show that the most under-subscribed allied health courses in Massachusetts are private college courses which charge high fees. Furthermore, in nursing, where a student can qualify as an RN by doing a 2-year AS degree, or a 4-year BS degree, or by doing hospital-based training, student interest in the BS degree has declined substantially, while interest in hospital-based courses has increased (MHA, 1989).

This implies that an NEC traineeship, which offers a training allowance from year 11, is hospital-based, and leads to an AS degree two years after high school should be attractive to students. To further increase the attractiveness of the traineeships, it is suggested that the NEC negotiate tuition waivers, which students would repay during the first years of their post-graduation employment.

3. Provide more effective educational programs: What evidence is there that an integrated work and learning program would

improve high school completion and college entrance rates among young people who are not typically college-bound? Direct evidence is difficult to obtain; no controlled randomized studies have been conducted allocating some students to integrated work and learning programs while others remain in the routine academic program. Indirect evidence that a curriculum which is seen as relevant to future work place activities may enhance motivation is provided by reviews of studies on vocational education in USA high schools. Lerman and Pouncy (1988), for example, found that taking one vocational course during ninth, tenth or eleventh grade lowered drop-out rates from 20% to 14%. Among drop-out prone youth, taking two vocational courses during four years of study could increase graduation levels from 64 to 76%.

Experimental programs which integrate the teaching of general intellectual skills with practical knowledge have also produced encouraging results. Raizen (1989) reviews several programs of this kind. One such program was designed to prepare young people with inadequate backgrounds (low literacy and low technology skills) to become electronics technicians. Instead of "front-loading" decontextualized basic literacy and basic skill courses before providing hands-on experience, the course explicitly went from the concrete to the abstract, from the specific to the general, and from practice to theory. Sticht et al. (1987) reported that students, who otherwise would probably have been screened out of traditional electronics training, were learning basic electricity and electronics skills, and at the same time were improving their reading, writing, mathematics and problem solving skills in the context of technical training.

The point of this argument is not to suggest that NEC traineeships should be targeted on low skill students, but rather, that students with low level math and science skills who are interested in the program should not be excluded from participating. On the other hand, since employers would be *selecting* trainees from among applicants (see p. 3), students interested in the scheme should be encouraged to work hard on their mathematics and science studies during years 9 and 10 to improve their chances of being selected. Provisional contractual offers of traineeship positions could be used to create incentives for higher achievement levels in these areas.

If the learning processes designed into traineeships are sufficiently individualized and comprehensive, it would be reasonable to encourage a diverse group of young people to enter the program, as an alternative to normal high school graduation. Narrow targeting which could potentially stigmatize the program should be avoided.

7. Implementing Integrated Work and Learning in the Allied Health Field

However compelling integrated work and learning may appear to be in theory, it is bound to fail in practice unless it is carefully implemented. Accumulating evidence from implementation studies (e.g., Lipsky,1978) has shown that the best laid plans of policy makers frequently come to nothing if they fail to take account of the constraints that control everyday life at the grassroots level of their organizations. This is especially true in

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organizations where the participants' roles are defined in terms of wide discretion, so that their performance cannot be reduced to simple routines.

Implementation planning should begin as close as possible to the problem itself and should aim to maximize the discretion of the implementers in order to enhance their problem-solving ability within the system. What this means is that hospital workers and other health science professionals should be asked what would be entailed in creating an integrated work and learning system for high school students.

The following section reports the results of interviews with hospital managers, researchers from the MHA, officers of the national registration boards, health science faculty, medical technologists and nurses, and union representatives, as well as drawing on the extensive literature dealing with the health care labor market and its training system.

The hospital labor market may be characterized in terms of a large collection of short mobility chains, each of them highly regulated by educational qualifications and licensing requirements. A strong nexus has developed between licensing requirements and legal liability, so that unlicensed trainees must always be thoroughly supervised by registered practitioners.

This restrictive work environment poses a number of problems for the NEC's proposal of integrated work and learning. Under normal conditions, high school juniors would be recruited only to Tier 1 and Tier 2 within the hospital structure. Little of educational value could be derived from combining part-time high school with part-time dishwashing, pushing trolleys, or doing low-level clerical work.

In creating an integrated work and learning program, three sets of problems are anticipated. In order to create opportunities for practical experience in the hospital setting, appropriate organizational structures are needed, and legal liability issues must be resolved. The third problem is to work out how the traineeships should be financed; i.e., what costs will be entailed in the educational program, how much should trainees be paid, and who should pay them?

1. Organizational structures: Interviews with health science educators (Claas, Cauble), hospital administrators (Marcussen, Chalek) and unionists (Wcislo) all suggested that a "traineeship" should be a separate, broadly-based employment category, at least for the first two years. This would mean that they would be rotated through a number of different Departments and positions for a year or two, and would decide during this time where to specialize. Specialization would then coincide with the beginning of their Community College years.

Celia Wcislo of the SEIU suggested a number of ways of organizing traineeships that would be acceptable to the union. Trainees must not be employed as replacements for workers who are fired. Rotation between temporarily vacant positions would be acceptable, and to allow the flexibility for this Wcislo suggested that an apprenticeship scale, tied pro-rata to entry-level wages, could be negotiated. Trainees could to some extent be moved around to deal with temporary work overloads in particular areas.

Mark Chalek, Director of Education and Training for the Boston City's Department of Health and Hospitals, said he had organized a group of students during the summer vacation to clear temporary backlogs in medical records at BCH. Students were able to do this work well after only a brief period of initial training, and they cost much less than temporary workers employed through an agency. Chalek believes that traineeships could be made to work in most other areas of the hospital, and that proposals like the NEC one are in the long-term interests of the hospitals.

2. *Legal issues:* An interview with Judy Claas, who is responsible for arranging hospital-based clinical practicum placements for Medical Technology students at Framingham State College suggested that the NEC could build on college procedures to cover possible legal liability problems for high school students. Essentially, each hospital department receiving students needs to work out a program of formal and clinical instruction in collaboration with participating schools, and this program needs to be registered with and accredited by the professional body for that particular field. For Medical Technology interns, the Hospital indemnifies the College against damages. These procedures may not, however, be the same for each of the six targeted occupations.

After consulting the Legal Department at Massachusetts General Hospital, Tom Marcussen reported that legal liability depends on employment status: students who are part-time employees would be covered by regular hospital insurance. Student nurses are often covered by insurance policies taken out by their College. In brief, there are a number of different approaches to solving legal liability problems. It can be done, but there is little point in considering the alternatives until the specifics of the particular case are defined.

3. *Financing traineeships:* Boston's public hospitals are facing severe fiscal restraints. They are being forced to consider staff retrenchments and cut backs in important core programs. Nevertheless, Mark Chalek suggests that a traineeship system may make a lot of sense in this context. High agency rates for temporary health care workers are having a crippling effect on hospital finances, but as long as supply lags seriously below demand, hospitals will continue to lose workers to the agencies and be forced to buy them back at great cost, as we have already noted.

Unless new pathways to professional entry are opened up, it is highly likely that supply levels in Massachusetts will continue well below demand. Even if all college courses were filled to capacity, the State would generate less than half the Nurses and Medical Technologists it will need to the year 2000 (MHA,1989). In Occupational, Physical and Respiratory Therapies and in Radiological Technology the State does have the educational capacity to meet projected work force needs. But in relation to the latter two—Respiratory Therapy and Radiological Technology—the courses are so under-subscribed that anticipated needs will not be met without significant changes in student preferences (MHA,1989).

In 1988, nurses held 77% of the 42,180 hospital positions at Tier-3 and Tier-4 levels (see Appendix 1). Since Massachusetts only has the educational capacity to train 46% of the nurses required to the year 2000, the gross number of nursing vacancies in the coming years is likely to be very serious indeed.

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The MHA concluded its report on the health care personnel crisis by urging hospitals to cooperate actively with education institutions to improve the supply of course places for allied health training, and to ensure that students have access to those places. In its recommendations, the MHA proposed that the feasibility of joint hospital/education sector planning regarding the future of health care worker supply should be examined (MHA, 1989, p.75).

If the MHA is prepared to act as a coordinating body on behalf of the hospital industry this would facilitate arrangements for providing that financial support for traineeships. The skills of traineeship graduates would be equally valuable to hospital employers all over Massachusetts, so that participating hospitals could lose financially if other hospitals poached their graduates. If more hospitals participate ands the costs are more equally shared, the likelihood of poaching will be reduced, and the total financial resources available to fund traineeships will be greater.

8. Recommendations and Conclusions

Overall, the present health care personnel crisis creates auspicious conditions for the creation of allied health traineeships. Hospitals recognize the need to work with education institutions to increase labor supply, and they also recognize that using trainees to assist professionals (wherever this is possible) is likely to be much more cost-effective than hiring large numbers of temporary agency employees at exorbitant hourly rates.

It is therefore *recommended* that the NEC should work towards establishing traineeships in the allied health area. It is also *recommended* that traineeships should be created in areas which allow entry to professional employment at the end of a two-year college degree, but which provide opportunities for advancement beyond that level. It is imperative that students, parents, teachers and counsellors perceive traineeships as an alternative route through college to professional jobs with a future. Six allied health occupations which meet these criteria have been identified. It is *recommended* that traineeships be developed leading to qualifications as a Registered Nurse, Radiological Technician, Respiratory Therapist, Medical Technician, Occupational Therapist and Physical Therapist.

It is anticipated that during their final years trainees will be employed part-time as assistants in these areas. However, it is *recommended* that during the first two years a "traineeship" should be a separate, broadly-based employment category, and that trainees should be rotated through different Departments and positions for a year or two, and should decide during this time where to specialize. Specialization would therefore coincide with the beginning of the trainees' years at a community college.

Throughout the course of my investigations, the enthusiasm and willingness of allied health professionals to be engaged in recruitment activities was evident. It is *recommended* that High Schools and allied health professionals should work together to develop and conduct recruitment activities for the traineeships. It is quite possible that some of the students interested in traineeships will not have high levels of literacy or science achievement. It is *recommended* however that such students *not* be excluded from participating.

Recruitment activities for parents and students should begin when potential program candidates are in 9th year or early 10th year. There will be a limited number of traineeships, and positions will be filled as employers select from among the applicants. It is *recommended* that provisional contractual offers of traineeship positions should be used to create incentives for higher student achievements in relevant academic skills.

Despite the organizational, legal and financial problems that must be dealt with if the NEC proposal is to succeed, it is clear that hospitals are more than willing to discuss the creation of a traineeship system at the present time. The proposed system promises to substantially improve the educational opportunities of young people and to ameliorate some of the supply problems of the hospital labor market. Whether traineeships will achieve those objectives will depend in part on how well the NEC understands and responds to the needs of students, schools and hospitals in designing and negotiating the system's implementation. This report is submitted to the NEC in the hope that it will assist in developing some of the required understandings.

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Appendix 1
Wages and Number of Employees for Hospital Occupations
Massachusetts, 1988

Appendix VI:
"Integrated Work and Learning..." April 1990

Tier	Position	Wage Min	Wage Avg	Wage Max	Credential	Number Workers
1	Nurse Aide or Assistant	$5.65	$7.74	$9.22	none	4,950
1	Kitchen Help	$5.65	$6.30	$7.57	none	3,380
1	Light Housekeeping	$6.29	$7.20	$8.43	none	3,191
1	Heavy Housekeeping	$6.19	$6.87	$7.93	none	2,314
1	Cook	$9.45	$9.84	$10.48	none	233
2	Secretary	$8.07	$9.77	$10.31	Med Term	2,316
2	Admitting Clerk	$7.24	$7.96	$9.11	Med Term	1,418
2	Switchboard	$6.52	$7.49	$8.99	Med Term	1,104
2	Unknown Clerical	$7.14	$8.01	$8.01	Med Term	1,079
2	Pharmacy Tech	$7.24	$7.75	$8.77	Med Term	833
2	Surgical Supply Tech	$6.88	$7.72	$8.48	Med Term	704
2	Operating Room Tech	$8.66	$9.72	$10.38	Med Term	641
2	Unknown Clerical	$8.02	$8.96	$9.46	Med Term	563
2	EKG Technician	$7.48	$8.11	$8.94	Med Term	455
2	DRG Coder	$8.81	$9.49	$9.88	Med Term	215
3	Licensed Practical Nurse	$9.05	$10.66	$11.66	LPN, Exam	4,649
3	Radiological Technician	$9.76	$11.42	$12.41	AS, Exam	1,614
3	Medical Lab Technician	$9.07	$10.40	$11.64	AS, Exam	957
3	Respiratory Therapist	$10.46	$11.62	$12.56	RRT	824
3	Respiratory Technician	$9.44	$10.63	$11.30	AS, Exam	458
3	Nuclear Medicine Tech	$11.55	$12.39	$13.16	AS, Exam	213
3	CAT Scan Technician	$11.37	$12.51	$12.99	AS, Exam	212
3	Ultrasound Technician	$12.33	$13.09	$13.52	AS, Exam	153
3	Radiation Therapy Technician	$11.62	$12.51	$13.75	AS, Exam	103
3	EEG Technician	$9.97	$10.13	$10.51	AS, Exam	97
4	Physical Therapist	$11.36	$12.61	$14.23	BS	823
4	Occupational Therapist	$11.56	$12.21	$13.39	BS	409
4	Medical Technologist	$10.37	$12.21	$13.43	BS	2,264
4	Social Worker	$11.83	$13.20	$14.22	MSW	558
4	Social Worker Assistant	$10.97	$11.63	$11.94	BS	179
4	Pharmacist	$13.79	$15.44	$16.41	BS	779
4	Staff Nurse	$11.50	$14.53	$16.18	ADN or BSN	25,434
4	Nurse Anesthesiologist	$18.96	$21.36	$21.37	BSN+	142
4	Nurse Practitioner	$16.10	$18.32	$18.36	BSN+	222
4	Head Nurse	$15.75	$18.20	$18.94		1,275
4	Nurse Supervisor	$16.41	$18.32	$19.70		816
4	Total RNs	$11.91	$14.57	$16.45		27,889
	Total Tier 1	$5.96	$7.1[illegible]	$8.45		14,068
	Total Tier 2	$7.51	$8.5[illegible]	$9.31		9,338
	Total Tier 3	$10.53	$12.10	$13.22		9,280
	Total Tier 4	$11.83	$14.57	$16.09		32,901

Source: MHA Wages and Benefits Survey, 1988

Appendix VII: " A Youth Apprenticeship in Health Services for Arkansas: A Preliminary Concept Paper"

Appendix VII:
"Youth Apprenticeship in Health Services for Arkansas: A Preliminary Concept Paper"

April 15, 1991
Jobs for the Future, Inc.

This paper offers a very preliminary outline of how a youth apprenticeship in health care occupations might work in Arkansas. It is based on tentative findings from limited research and selected interviews with key Arkansas health personnel and on models of youth apprenticeships developing elsewhere in the U.S. The purpose here is only to establish a starting point for preparation of a project plan. This preliminary concept would certainly undergo much change when it is tailored to the needs in Arkansas as we come to understand them better.

The rationale for this project is found in two related problems. First, in Arkansas, as in the rest of the country, there is no good system for helping young people make the transition between school and work, especially to highly skilled technical occupations, and on to continued learning. While vocational education has helped some Arkansans prepare for a job while still in school, it hasn't met the needs of some young people. As a consequence, large numbers of young people graduate from high school with no connection by training or experience with the world of work. Some may achieve professional or occupational qualification through post-secondary education. But if Arkansas is anything like the rest of the country fewer than 25% of its high school graduates complete any college program. This disjunction between school and work has enormous social and economic cost.

The second problem is the lack of skilled new workers for business and industry, in this specific case for the health care industry. Health care is one of the largest employers in the state and occupational demand is growing in virtually every category of skilled work (i.e., jobs for which some post-secondary educational certification is necessary). The availability of sophisticated new medical technology and increased demand for the application of that technology has led to a dramatic surge in the skill requirements of health care employers. Hospitals, particularly in rural areas, report serious shortages of nurse and allied health service professionals. Extended nursing care facilities and primary care centers are experiencing similar problems.

The objective of this project is to test, demonstrate and begin to establish a new system in Arkansas for improving both of these problems and meeting some of the needs that have resulted. A youth apprenticeship project in health services would provide a work-based context for helping young people acquire stronger

academic and "learning to learn" skills while simultaneously developing the technical and occupational skills for high wage employment in health occupations.

The program would be available to young men and women who have completed their 10th grade in high school. Interested students would be asked to demonstrate a level of basic skills that will predict success in this program. Those accepted will enter a four-year youth apprenticeship in health services that integrates school and work to a degree not previously attempted in Arkansas. This might be a year-round program and would be 40 hours each week, some of that time on a job and some in off-the-job schooling. Alternatively, the program could provide some summer vacation time and could be scheduled to be less than 40 hours each week.

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Apprenticeship positions would be offered by a variety of health providers participating in the program. These would include hospitals, nursing care facilities, public health clinics, group medical practices and other primary care facilities. Since one of the objectives of the first two years would be to expose youth apprentices to a wide variety of occupational choices, rotational placements in different areas of health care would be encouraged. In many cases, different providers might link together to offer the range of placement options that would be attractive to a youth apprentice.

Employers would follow a general set of policies established by the program designed to provide work experiences that strengthen learning. They would be encouraged to provide adult mentors in the work place. The youngsters would enter into a training agreement with a participating health facility. They would work for about 50% of their time in year one, increasing to 60-70% of their time in the later years. They would be paid a salary, which might start at about $80-100 per week in the first year and increase by 30-40% or so each year thereafter.

The work portion of the program must be carefully designed to provide education and training value to youth apprentices and to challenge them while meeting real needs of the employers. Employers will not be willing to sustain a program of this kind if they do not receive value from the apprentices in the form of real work. Bright young people that we would hope to attract to the program will not sustain their commitment if the work consists wholly of routine chores. Educators will want to encourage job assignments that increase learning opportunity.

During the first two years of the program the off-the-job schooling would be provided by specially prepared teams of teachers. There might be one team of four teachers for every cluster of 40-50 student apprentices. Alternatively, the team might be smaller, perhaps three teachers, working with a cluster of 25-35 apprentices. (Each team of teachers might have to have a small budget to purchase specialized instructional expertise that no member of the team possesses.) One member of the teaching team might have an

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occupational background in health care; the others would be teachers of math, science, language, arts and social studies. A few members of the teaching teams might even be drawn from post-secondary institutions participating in the program.

The role of the teachers in this program will be central. It will be their responsibility to assure the intimate connection between the working and the schooling portions of this program. They will need special training in work-based learning, cooperative learning and curriculum design. They must become knowledgeable in the occupational needs of the health care industry and in issues of health care ethics, patient care, health care administration and health economics.

Working from a general curriculum framework approved by a consortium of participating secondary schools, employers and post-secondary institutions, the team of teachers would develop the detailed instructional plans and provide the full range of off-the-job learning needs of the students. All of the traditional academic subjects would be taught, but all in an applications framework tailored to the health care industry. The teaching techniques would apply research findings which demonstrate that work-based learning can lead to significantly more rapid learning with much higher retention. The objective would be to take the student apprentices well past the level of competency normally associated with a high school degree to include proficiency in general education topics at levels usually developed on a post-secondary basis.

The off-the-job learning site(s) for this program should be determined by three factors. First, it should be in a central location that is reasonably accessible to young people, some of whom will have to rely on school-provided or public transportation. Second, curriculum requirements would necessitate at least at times certain facilities such as science laboratories. Finally, the need to attract young people with high ambitions and expectations would suggest a location that is seen as high status and offer a collegiate image.

It might be possible to base the program within the "home" school of the apprentices if there were a large enough cluster at that school. For example, if 20-30 young people from a particular high school chose to participate in this program it might be possible to base the program at their home school. In such an alternative some of the instructional needs of the students might be met by teachers with conventional teaching responsibilities.

When teachers are not with youth apprentices in the schooling portion of the program, they would follow them back into the work places. Here, the teachers would become coaches and consultants, helping supervisors to make job assignments that get provide the best learning experiences possible. Teachers would evaluate the need for remediation based on the actual job performance of the apprentice and would identify opportunities to use work activities to advance learning objectives.

As the project is established, there would have to be considerable attention paid to the development of an extra-curricular program. Such activities would nurture a positive peer culture that would encourage achievement and success. Youth apprentices also would be assisted in retaining some social and activity links with their home high school.

At the end of two years, the student-apprentices would receive a high school degree. It might be possible to design the first two years such that each student-apprentice will also have met the requirements for some occupational certifications. For example, it should be possible to design the curriculum of work and education in the first two years to assure that each student meets the requirements for a certified nurse aide. (Further investigation will be necessary to determine whether it will be possible to gain certification at levels which have traditionally required some training beyond the secondary level. A few examples would be licensed practical nurses, phlebotomists, emergency medical technicians, and dietetic assistants.)

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During these first two years of the program (actually 21 months from a September start date to a June graduation date), all the youth apprentices would have had a fairly uniform experience, at least in the off-the-job schooling portion. But in the second two years, the programs of the youth apprentices would begin to diverge, reflecting their different health career interests and choices. After receiving their high school diploma, the student-apprentice would select a post-secondary program in the health occupations. The apprentice would be encouraged to select an occupation which leads to an Associate degree from one of the participating post-secondary institutions, but may select a program which lasts only one year and does not result in an academic certification at the associates level.

Thus, while the youth apprenticeship in health services would be designed and marketed primarily as a four year program, it might have multiple exit points: at the end of the secondary period for a few who choose not to continue on but who have gained some occupational certification in addition to their high school diploma; at the end of three years for those who choose a program which can be completed in one post-secondary year (e.g., EMT, respiratory care, and surgical technology); four years for those who choose an associate degree program; and even six years for those who might choose to continue through for a professional certification requiring a bachelor's degree. Wherever the youth apprentice might exit the program, the academic/occupational credential must be transferable to a higher level of preparation if the individual later decides to continue his or her education.

The work placement of the student-apprentice would change at the beginning of the third year to reflect his or her occupational interest and to contribute as much as possible to the degree program being pursued. Some of the nursing education and allied health professions programs might require a work-based or clinical

experience. To the extent possible, the apprenticeship placement should seek to satisfy this requirement.

During the post-secondary portion of the program, the teaching team would work with the faculty of the post-secondary programs to meet the instructional needs of the youth apprentices. Sometimes, post-secondary program professional accreditation or licensing requirements might severely restrict any effort to modify the traditional curriculum. In such cases, the teaching team's role would be limited to a "case management" role. In other cases, the teaching team might concentrate on the collegiate level general education (pre-professional) courses while the faculty of the post-secondary institution meets the professional training needs of the program in which the youth is enrolled. It might be feasible to identify a common core of health care related instruction that all youth apprentices should receive in the third and fourth years of the program.

There would, of course, be no cost to student apprentices during the secondary portion of the program as participating school districts would pay a tuition transfer to support the program. However, during the post-secondary period, students would have to contribute to the cost of the program. Participating employers might be willing to pay for some of the tuition costs of the post-secondary program. Many health employers are now contributing to the education of their employees. State and federal government financial aid also should be available to many students. And it might be possible to attract some special subsidy for the post-secondary portion of the program.

This program would likely be marketed to the middle 50% (in terms of prior achievement) of a high school class. The top 25% probably would not be attracted to this program; their college plans are firm and this program might appear an unnecessary risk. Besides, high school seems to work well for the upper quartile of young people who are clear in their post-secondary plans and who are doing what seems to work to get into college. The bottom 25% may not, for many different reasons, have achieved the foundation of skills appropriate to success in this demanding program. At least in its developmental stage, youth apprenticeship in Arkansas probably can't afford the massive remediation that would be necessary to prepare these students for this challenge. (Although after this program has been in place for a few years it may offer a compelling motivation for students to work hard in middle school and in the first two years of high school to gain admission to it.)

In the middle 50%, there will be many who would not choose this option because it would preclude participation in traditional school-based activities like athletics and after school clubs and corridor socializing that are very important to some high schoolers (and to their parents). But within this group, there should be many who will respond very favorably to the opportunity to work and learn in a new kind of schooling.

Getting started on such a demonstration project would require the establishment of a statewide consortium of educators and health employers. With some technical and financial assistance, such a consortium could develop a detailed program design, set up a teacher development program and establish a general curriculum framework which the teachers would then convert into more detailed instructional plans and materials. The consortium would also develop a marketing program aimed at convincing employers to create apprenticeship positions, convincing school districts to make the opportunity available and convincing students and their parents to select the program. Money to finance these design and development costs would have to come from special grants from public and foundation sources.

Sizing the demonstration program in the first year would be important. A cluster of 50 apprentices supported by a team of four teachers would cost about $4000 per student per year, more than the average annual per student cost of Arkansas high schools, but within reach of schools. It might be possible to work with a cluster of as few as 20-25 apprentices, but only if some of the instruction were provided by more conventional classes where teachers would not be able to customize the material to the work context of the student.

A significant demonstration of this new approach to developing skilled workers for the health care industry might involve two or three clusters in a major urban center and one or two clusters in rural areas of the state where problems in the concentration of interested students and willing employers might demand some special transportation arrangements for the teachers as well as the student apprentices.

A Special Program For The Delta

A variation of this program might make it particularly suitable to some of the special problems confronted by people living in the Delta where serious health problems are exacerbated by an acute shortage of health care facilities and personnel.

A health care youth apprenticeship program in the Delta might follow the general model described above for the first two years. However, during the post-secondary portion it might attempt to meet some of the health care needs in that region. One way to try this would be for the work placements of the apprentices to shift, after high school graduation, to a form of public service apprenticeship.

In such a program, young people who have completed the special secondary training in health sciences might form a high status "Youth Health Service Corps." They would be employed by the Arkansas Department of Health as health care "extenders" and assigned to a variety of prevention, education and primary care support functions. They could be linked for purposes of

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supervision to community health centers, clinics and community hospitals in the Delta. They might be especially effective in dealing with health problems of school-age populations, and could help extend the reach of home health care, substance abuse prevention, family planning and teen pregnancy.

The flexibility of their assignments could be enhanced if there were a special effort during their secondary program and/or immediately after their high school graduation to gain certification as LPNs or EMTs. (As noted above, these certifications are normally granted only after a year of training following high school. However, given the intense full day and year round nature of youth apprenticeship, it may be possible to telescope these requirements.)

During this public service apprenticeship, the apprentice would be paid a modest wage amounting to perhaps $5.00 per hour for about 20 hours per week. In addition, they would receive free tuition in post-secondary health care training programs such as nursing and allied health occupations. They would serve their apprenticeship for the duration of the particular program in which they were enrolled, one, two or even four years.

At present, the availability of health professions training programs in the Delta are limited. However, creating a significant cadre of young people with special secondary level preparation in health sciences and special occupational interest in health care might induce post-secondary institutions to experiment with new ways to make professional training programs more accessible to Delta residents. The existence of the teaching teams also might make possible some support to mobile training programs.

This program would offer a way for young residents of Delta communities to remain there while they prepared for a high skill, high wage occupation. During their preparation they could make a significant contribution to improving health problems in the region. After receiving post-secondary certification in the field they have chosen, some of these young people might choose to leave the region for higher wage opportunities in urban centers. But many might stay in order to better meet community needs they witnessed as youth apprentices, and some might decide to continue on toward a medical degree and return as physicians.

A special health care youth apprenticeship of this kind in the Delta would work at three problems simultaneously—the absence of school to work transition systems for young people, the skill shortages facing the health care industry and the very serious problems of health care in the Delta.